

केल्यानें होत आहे रे । आधीं केलेंची पाहिजे II

Bhartiya Shikshan Prasarak Sanstha Amabajogai's

**Shri Siddheshwar Mahavidhalaya, Majalgaon**  
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3.3.1 Number of research papers published per teacher in the Journals notified on UGC website during the last five years

Sr.No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Link to the recognition in UGC enlistment of		
							Link to website of the Journal	Link to article / paper / abstract of the article	Is it listed in UGC Care list
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2	Bhartachya Krishtil Pramukh pikanchya utpadan pravruticha abhyas-53-56	Dr.M.P. Deshmukh	Economics	Peer reviewed Journal Universal Research Analysis IF-6.20	2021-22	ISSN-2229-4409	<a href="http://www.irasg.com">www.irasg.com</a>		
3	Digitization and its Impact on the Indian Economy	Dr.M.P. Deshmukh	Economics	Peer reviewed Journal Interlink research AnalysisXXV	2021-22	ISSN-0976-0377	<a href="http://www.irasg.com">www.irasg.com</a>		
4	gilligudu upanyasme bujurgo ka yatharth chitran	Dr. Ushamwar G. B.	Hindi	Akshara multidisciplinary research Journals	2021-22	2582-5429			
5	Mahatma phule yanche Asruyataniarnache kary	Dr. T.P. Sondage	Sociology	Indo western Researcher IF-5.47	2021-22	ISSN-2349-1027			
6	Mahila sabalakaran ani shasnachi bhumika -ek Samajik Chintan	Dr.T.P. Sondage	Sociology	Hi-Tech Research Analysis IF-6.20	2021-22	ISSN-2331-6671	<a href="http://www.irasg.com">www.irasg.com</a>		
7	Bhartiy Swatratry Ladhayatil Mahilancha sahbhag	Dr. G.P. Phasale	History	Itihas Darpan Peer reviewed	2021-22	ISSN 0974-3065			
8	Shivkalin Guptachar Yantrana	Dr. G.P. Phasale	History	Akshar Wngmay Conference Proceeding	2021-22	ISBN- 81-953976-5-5			
9	Uday prakash ki Kahaniyomir Upbhogtavadi sankruti ka chitran	Dr.Mulye Y.R.	Hindi	Conference Proceeding	2021-22	ISBN-978-92538-20-9			
10	Pravasi Sahitya me Mahila Sahityakaronki Bhumika	Dr.Mulye Y.R.	Hindi	Bhasha Sahodari Non-Peer reviewed	2021-22	ISSN_2582-1679			



11	Phas Upanyas me Kisan Jeevan Ka Yatharth Chitran	Dr. Ushamwar G. B.	Hindi	Printing Area	2021-22	ISSN-2394-5303	<a href="http://www.vidyawarta.com">www.vidyawarta.com</a>	
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15	Bio-fertilizer play vital role for organic farming	Dr.G.B. Honna	Botany	Newmen International journal of Multidiciplinary studies	2021-22	ISSN-2348-1390		
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# Certificate

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(Managing Editor)





## Buddhism and National Integration in Thailand

\* Dr. Suhas Morale \*\* Mr. Phra Wutthiphong Aggavuddho



### Introduction

In 1965, the Thai government, through the Department of Public Welfare, launched a program of Buddhist missions to the hill tribes of North Thailand that was to be carried out by members of the Thai Buddhist clergy, the Sangha. The purpose of the program was to strengthen sentimental ties [of Thai] with the tribal people and to create loyalties [of the tribal people] to the nation through development of strong beliefs in Buddhism.<sup>1</sup> This policy that aims at the bringing of marginal people into the national fold of Thailand through conversion to Buddhism would seem to have its origins in policies concerning the relationship between Buddhism and national integration that were first formulated in the reign of King Culalongkorn at the end of the last century. Among Culalongkorn's attempts to weld the territories under his rule into a unitary nation was the institution of laws designed to create a national Buddhist church. Present-day statistics on religion in Thailand suggest that these efforts were highly successful. In the 1960 census, 93.4 percent of the population of the kingdom are said to be Buddhists.<sup>2</sup> While this classification is somewhat misleading since it subsumes adherents of different forms of Buddhism, the distortion is not very significant. Less than 1 percent of the Buddhist monasteries and Buddhist clergy of the kingdom are not part of the Thai church.<sup>3</sup> In such a context, it would appear that a policy of integrating marginal peoples into Thai

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national life through conversion to Buddhism would be a reasonable one. However, despite the apparent connection between recent policies toward tribal peoples and the integrative policies of King Culalongkorn, these two are actually based on quite different assumptions. King Culalongkorn sought to negate the importance of "primordial attachments"<sup>4</sup> by creating national social structures. The present policies reflect quite a different tendency, namely, the appeal to Buddhist ideology as a basis for mobilizing the populace to attain national ends. To Culalong-

### **Northern Thai Society in 19<sup>th</sup> century**

Until the end of the 19th century, usually referred to as the North<sup>7</sup> palities of Chiangmai and Nan. of Siam at the end of the 18th century, the Siamese court of Bangkok tonomy was particularly marked the population were adherents termed the "Yuan cult." This the variant found in Siam proper<sup>8</sup> structure and content of rituals, Sangha. While the Yuan cult is also among Tai-speaking<sup>8</sup> peoples of northern Laos, and in southern Thailand where it probably originated velopment in the 16th century<sup>9</sup> The Yuan church in the 19th (wat) had autonomy, and its clergy Powers to ordain monks and novices and he in turn could pass this death.<sup>10</sup> A distinction existed congregations and those supported had important relics which also tion to the senior clergy of these than were the clergy of ordinary more than a local reputation. These were the khu ba ("esteemed teachers"), monks whose reputation, often for presumed magical powers, attracted large followings. Beyond these distinctions, however, the Sangha of the Yuan tradition appears have had little hierarchical organization. Yuan cult Buddhism was not the only religion found in 19th-century North Thailand, and not even the only form of Buddhism. Migrants from Burma, includ- ing Burmese, Mon, and Shan, had brought their religious traditions with them. In such towns as Lampang, which were centers of the Burmese-dominated teak trade, Burmese and/or Mon Buddhist temples could be found. In areas of Shan settlement such as Mae Hong Son, Fang, and Phrae, Shan Buddhism also existed. The largest non-Buddhist element in the 19th-century population of northern Thailand was accounted for by those people who are usually referred to as "tribes." The tribal population was made up primarily of Karen and such Mon- Khmer speaking peoples as the Lua' (Lawa), T'in, and Khamu. Only a few repre- sentatives of Miao, Yao, and such Tibeto-Burman groups as the Lahu, Akha, Lisu had moved into Thailand by this period. All of the tribal



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## भारताच्या कृषीतील प्रमुख पीकांच्या उत्पादन प्रवृत्तीचा अभ्यास

डॉ. महेश पी. देशमुख

अर्थशास्त्र विभाग प्रमुख,  
श्री. सिध्देश्वर महाविद्यालय,  
माजलगाव, जि. बीड



### Research Paper - Hindi

#### प्रस्तावना :

भारतीय अर्थव्यवस्था कृषी प्रधान असून देशातील लोकांचा मुख्य व्यवसाय शेती हा आहे. भारताच्या कृषी क्षेत्रात साधारणपणे ५५ टक्के लोकांना प्रत्यक्ष रोजगार उपलब्ध होतो. वाढत्या लोकसंख्येला अन्नधान्याची गरज पूर्ण करण्यात कृषी क्षेत्राची महत्वाची भूमिका आहे. देशातील हरितक्रांती नंतर भारत अन्नधान्याच्या बाबतीत स्वयंपूर्ण झाला आहे. २०२०-२१ मधील कोरोना काळात शासनाने देशातील गरीब लोकांना मोफत अन्नधान्य पुरवठा सरकारी राशन दुकानाच्या माध्यमातून केला. या काळात कृषी क्षेत्राचे महत्व सरकार व लोकांच्या लक्षात आले. भारतीय अर्थव्यवस्थेला कृषी क्षेत्राने तारले. भारतीय अर्थव्यवस्थेतील कृषी क्षेत्राचे महत्व लक्षात घेऊन भारत सरकारने शेतकऱ्यांचे उत्पन्न दुप्पट वाढ करण्याच्या अनुषंगाने कृषी विकासाच्या अनेक योजना आणल्या, यामध्ये विशेषतः सिंचन, कृषी तंत्रज्ञान, रासायनिक खते, बी-बियाणे, कोरडवाहू शेती विकास कार्यक्रम, कृषी कर्ज पुरवठा, कृषी वस्तू किंमत घोरणात अमुलाग्र बदल केल्यामुळे आज देशात कृषी क्षेत्राच्या विकासाला अनुकूल वातावरण निर्माण झाले आहे. भारताच्या एकूण GVA (Gross Value Added) मध्ये कृषी व संलग्नीत क्षेत्राचा वाटा १८.८ टक्के आहे. हा वाटा २०१६-१७ मध्ये १८ टक्के, २०१७-१८ मध्ये १८.३ टक्के, २०१८-१९ मध्ये १७.६ टक्के, २०१९-२० मध्ये १८.४ टक्के तर २०२०-२१ मध्ये २०.२ टक्के आहे. तसेच देशाच्या एकूण निर्यातीत कृषी व संलग्नी क्षेत्राचा वाटा १२ टक्के असून देशातील उद्योग क्षेत्राला कच्चा माल पुरवठ्याचा मुख्य स्रोत म्हणून कृषी क्षेत्राकडे पाहिले जाते. विविध पंचवार्षिक योजनेच्या माध्यमातून कृषी क्षेत्रात मोठी गुंतवणूक केली जाते. भारताच्या कृषी क्षेत्राच्या GVA मधील वार्षिक वृद्धी दर २०१६-१७ मध्ये ६.८ टक्के, २०१७-१८ मध्ये ६.६ टक्के, २०१८-१९ मध्ये २.६ टक्के, २०१९-२० मध्ये ४.३ टक्के, २०२०-२१ मध्ये ३.६ टक्के तर २०२१-२२ मध्ये ३.९ टक्के वाढ झालेली आहे. जगातील कुठल्याही देशाच्या



विकासाची पूर्व अट म्हणजे कृषी क्षेत्राचा विकास असते, म्हणून कृषी क्षेत्राचा विकास तर देशाचा विकास या अनुषंगाने भारताच्या कृषी उत्पादनात विक्रमी वाढ झाली आहे.

#### संशोधनाची उद्दिष्टे :

- १) भारताच्या कृषी क्षेत्रातील मुख्य पिकांच्या क्षेत्राचा अभ्यास करणे.
- २) भारताच्या कृषी क्षेत्रातील मुख्य पिकांच्या उत्पादनाचा अभ्यास करणे.
- ३) भारताच्या कृषी क्षेत्रातील मुख्य पिकांच्या उत्पादकतेचा अभ्यास करणे.

#### संशोधन पद्धती :

"भारताच्या कृषी क्षेत्रातील मुख्य पीक उत्पादन प्रवृत्ती", या विषयावर संशोधन करताना विश्लेषणात्मक संशोधन पद्धतीचा वापर केला असून तथ्य संकलन द्वितीयक सामग्री संग्रहन पद्धतीच्या साहाय्याने केले आहे.

#### संशोधनाची गृहिते :

- १) भारताच्या कृषी क्षेत्रात मुख्य पिकांच्या लागवडीखालील क्षेत्रात घट होत आहे.
- २) भारताच्या कृषी क्षेत्रात मुख्य पिकांच्या उत्पादनात वाढ होत आहे.
- ३) भारताच्या कृषी क्षेत्राची उत्पादकता कमी आहे.

#### भारताच्या कृषी क्षेत्रातील मुख्य पीकांचे क्षेत्र, उत्पादन व उत्पादकता :

२०२०-२१ मधील चौथ्या तिमाही अंदाजाप्रमाणे भारतातील अन्नधान्ये विक्रमी उत्पादन ३०८.६५ दशलक्ष टन झाले असून २०१९-२० च्या तुलनेत ही वाढ ११.१४ टक्के आहे. तक्ता क्र. ०१ मध्ये भारताच्या कृषी क्षेत्रातील मुख्य पिकांखालील क्षेत्र, उत्पादन व उत्पादकता दर्शविली आहे.

तक्ता क्र. ०१ नुसार भारतात २०२०-२१ मध्ये अन्नधान्ये खालील एकूण क्षेत्र १२९३.४३ लाख हेक्टर असून यामध्ये तांदूळ क्षेत्र ४५०.६७ लाख हेक्टर (३४.८४ टक्के), गहू क्षेत्र ३१६.१५ लाख हेक्टर (२४.४४ टक्के), भरड धान्य क्षेत्र २३८.२८ लाख हेक्टर (१८.४२ टक्के) तर डाळी क्षेत्र २८८.३३ लाख हेक्टर (२२.२९ टक्के) आहे, तर तेलबिया खालील क्षेत्र २८७.८८ लाख हेक्टर, ऊस क्षेत्र ४८.५७ लाख हेक्टर, कापूस क्षेत्र १३०.०७ लाख हेक्टर आणि ज्यूट / मेस्टा क्षेत्र ६.६३ लाख हेक्टर आहे. भारतातील मुख्य पिकांमधील उत्पादन २०२०-२१ मध्ये अन्नधान्ये उत्पादन ३०८.६५ दशलक्ष टन असे विक्रमी उत्पादन झाले असून यामध्ये तांदूळ उत्पादन १२२.२७ दशलक्ष टन (३९.६१ टक्के), गहू उत्पादन १०९.५२ दशलक्ष टन (३६.४८ टक्के), भरडधान्य उत्पादन ५१.१५ दशलक्ष टन (१६.५७ टक्के), तर डाळी उत्पादन २५.७२ दशलक्ष टन (८.३३ टक्के) आहे. तेलबिया उत्पादन ३६.१० दशलक्ष टन, ऊस उत्पादन ३९९.२५ दशलक्ष टन, कापूस उत्पादन ३५.३८ दशलक्ष गासड्या आणि ज्यूट उत्पादन ९.५६ दशलक्ष गासड्या उत्पादन झाल्याचे दिसून येते.



भारताच्या कृषी क्षेत्रातील मुख्य पिकांचे क्षेत्र, उत्पादन व उत्पादकता

पीक	क्षेत्र (लाख हेक्टर)				उत्पादन (दशलक्ष टन)				उत्पादकता (कि.ग्रॅम/हेक्टर)				२०१४-१५ तुलनेत २०२०-२१ मधील वाढ / घट			
	२०१४-१५	२०१८-१९	२०१९-२०	२०२०-२१	२०१४-१५	२०१८-१९	२०१९-२०	२०२०-२१	२०१४-१५	२०१८-१९	२०१९-२०	२०२०-२१	क्षेत्र	उत्पादन	उत्पादकता	उत्पादकता
तांदूळ	४४१.१०	४४१.५६	४३६.४२	४५०.६७	१०५.४८	११६.४८	११८.८७	१२२.२७	२३९१	२६३८	२७२२	२७१३	२.१७	१३.४७	१५.९९	१५.९९
गहू	३९४.६५	२९३.९९	३१३.५७	३१६.१५	८६.५२	१०३.६०	१०७.८६	१०९.५२	२७५०	३५३३	३४४०	३४६४	०.४८	२५.९६	२६.९३	२६.९३
भरड	२५१.७०	२२१.४६	२३९.८८	२३८.२८	४२.८६	४३.०६	४७.७५	५१.१५	१७०३	१९४४	१९९१	२१४६	-५.३३	२६.०१	१२.३४	१२.३४
धान्य																
डाळी	३३५.५४	२९१.५६	२७९.८७	२८८.३३	१७.१५	२२.०८	२३.०३	२५.७२	७२८	७५७	८२३	८९२	-१४.०६	२२.५३	४९.९७	४९.९७
ज्वार	१२४३	१२४७.७७	१२६९.९५	१२९३.४३	२५२.०५	२८५.२१	२९७.५०	३०८.६५	२०२८	२२८६	२३४३	२३८६	४.०८	१७.६५	२२.४६	२२.४६
धान्य																
तलविया	२५५.९६	२४७.९४	२७१.३९	२८७.८८	२७.५१	३१.५२	३३.२२	३६.१०	१०७५	१२७१	१२२४	१२५४	१२.४७	१६.६५	३१.२३	३१.२३
ऊस	५०.६६	५०.६१	४६.०३	४८.५७	३६२.३३	४०५.४२	३७०.५०	३९९.२५	७१५१२	८०१०५	८०४९७	८२२०५	-४.१३	१४.९५	१०.१७	१०.१७
कापूस	१२८.१	१२६.१४	१३४.७७	१३०.०७	३४.८०	२८.०४	३६.०७	३५.३८	४६२	३७८	४५५	४६२	१.४७	०	१.६७	१.६७
ज्युट / मेस्टा #	८.०९	७.०५	६.७३	६.६३	११.१२	९.८२	९.८८	९.५६	२४७३	२५०८	२६४१	२५९५	-१८.०५	४.२३	-१४.०३	-१४.०३

\* 2020-21 - 4th advance estimates



भारतातील कृषी क्षेत्रातील मुख्य पिकांती उत्पादकतेतील वाढ / घट २०१४-१५ च्या तुलनेत २०२०-२१ मध्ये तांदूळ १३.४७ टक्के, गहू २५.९६ टक्के, भरडधान्य २६.०१ टक्के, डाळी २२.५३ टक्के, अन्नधान्य १७.६५ टक्के, तेलबिया १६.६५ टक्के, ऊस १४.९५ टक्के, कापूस ० टक्के, ज्यूट / मेस्टा ४.९३ टक्के उत्पादकतेत वाढ झाल्याचे दिसून येते.

निष्कर्ष :

भारताच्या कृषी क्षेत्रातील मुख्य पिकांचे क्षेत्र, उत्पादन व उत्पादकता २०१४-१५ ते २०२०-२१ याकालावधीत पाहत असतांना असे दिसून आले की, काही पिकांचे क्षेत्र घट झाले असून उत्पादन व उत्पादकतेत वाढ झाल्याचे दिसून आले.

### संदर्भ सूची :-

- १) कृषी आणि सहकार विभाग, भारत सरकार, वार्षिक अहवाल, २०२०-२१
- २) भारताचा आर्थिक पाहणी अहवाल, २०१६-१७
- ३) हॅडबुक ऑफ स्टॅटिस्टिक्स ऑन इंडियन इकॉनॉमी २०२०-२१
- ४) भारतीय अर्थव्यवस्था, रुद्र दत्त, सुंदरम
- ५) भारती अर्थव्यवस्था, डॉ. आर.एस. सोळुंके, डॉ. व्ही.बी. ककडे



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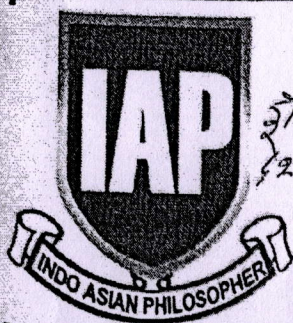
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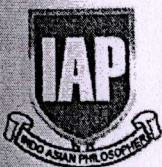
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## **Digitization and its Impact on the Indian Economy**

**Dr. Mahesh P. Deshmukh**

*Head, Dept. of Economics,*

*Shri Siddeshwar Mahavidyalaya,*

*Majalgaon, Dist. Beed*



### **ABSTRACT**

*India has appeared on the global countryside as a major development probable with a talented future on account of its rich incomes and big market. Against this background, governments and authorities are incessantly determined to enhance procedures to take the next big bound by leveraging the gift of know-how and digitalization. The occasions on the numerical front totally support with India's objectives and would play the organizer in its growth story. The paper emphasizes on the present position of the numerical uprising in the country. Moreover, to make the case for digitalization tougher there is a deep-dive into the impact seen on ground on account of this imminent, yet imperious, change. The actual as well as credible influence is deliberate across the areas of employment, output and competence.*

**Keywords:** Digitalization, growth, technology, employment, efficiency

### **Introduction :**

India, one of the world's largest frugalities, is viewed around the rondure as a major probable for growing and invention. Over the past few periods, India has successfully changed and taken real time choices, allowing it to truly develop as an eye-catcher for global business terminuses and savings. The foremost improvements of the 1990s helped India transition to become an eminent part of international trade , gaining the benefits of what the world has to



offer as part of globalization. This also unprotected India to rivalry from world class amenities and products born out of next gen production procedures and ground-breaking copies. This puts burden on the country to stay pertinent and not fall into the trick of age old processes and deteriorate. It is poised that government and the private sector move in combination and take pre-emptive actions to generate satisfactory employment for about 12.8 million new competitors to the workforce every year. Additionally, the focus should be not just the quantity but quality of employment generated as well, where necessary steps are to be taken to ensure that India's youth develop the right kind of skill sets that are required for high-quality manufacturing and cultured world class services. With the widespread emerging as a big blow to India's growth plans, it's time to break the traditional paradigms and categorizes of economic development and instead adopt what is now the need of the hour and life-threatening for not just development but diet and significance—technology controlled invention. The 1990s observed the initiation of technology in the country with the use of personal computers and rising popularity of mechanization, giving birth to a virtual world. This made market participants familiar of the boon that is Information and Communication technology (ICT). ICT adoption, digitalization and automation provide countless new occasions in terms of increased competence and yield, creation of new services and professions and increased connectivity among agents. Being a global concept, digitization has prominent impact on economic growth and employment of any nation, going beyond national borders. In the present world, it is well recognized that there is a continuous growth in demand of skilled specialists who are well prepared to work with Machine Learning, AI and Big data Analytics. In this regard, Digital technology is not just an end in itself but also a means which may be leveraged to actually impact these skills by employing training via virtual reality and enlarged certainty tools. In this day and age, the argument is stronger than ever before as the ongoing epidemic has forced everyone to go digital, including both businesses and their customers. Even small and medium businesses, which traditionally shied away from technology investments, can't afford to look the other way now.

**OBJECTIVES:**

1. To comprehend the present situation of the level of digitization in the country
2. To commence systematic view of the enterprises and policy applications taken by government to give a improvement to digitalization and formation of a digital economy
3. To measure the influence digitalization would have on different rudiments of economic development in the country

**RESEARCH METHODOLOGY:**

The analysis leverages secondary data which has been taken from journals, articles



and selected government websites, RBI Reports and existing literature in this field from earlier published studies.

### **State of Digitalization in India:**

At Present India has experienced a remarkable pace of ICT diffusion, being one of the world's fastest growing markets. The country is witnessing a monumental increase in the volume of internet users especially in tier 2 and 3 cities, small towns and villages. The penetration of network bands in tandem with rising awareness has done a great deal in bridging the digital gap between urban and rural India. Internet-based e-commerce in India generates \$30 billion to \$35 billion merchandise annually, employing more than 100,000 people. Such levels of Digital technologies and smart phone penetration has led to increased access to computing, thereby creating new business models and increased access to services.

### **Initiatives by Government:**

India is already the world's largest exporter of ICT – related services and now the Indian government is also using ICTs as a key policy strategy. The government believes digitilisation to be an important strategy to address the twin challenges of economic growth and social inclusion. To further the cause and enable Indian to match the global pace of digitilization, Indian government launched a flagship reform known as the “Digital India” project in July 2015. The project aimed at transforming the country into a knowledge-based economy by ensuring easy access to technology, infrastructure and government services by fostering investment in digital infrastructure, improving digital literacy, and increasingly providing online services to citizens. The Communications and IT Ministry aimed to create business opportunities worth 1 trillion dollars through major interventions in IT/ITES, electronic, manufacturing and telecom sectors. The “Digital India” programme has sought to (i) provide high-speed Internet to common man, (ii) make all government services accessible to the population at large, and (iii) ensuredigital empowerment of citizens. Since its inception the Government has been consistently scaling the Digital India initiative, they increased the outlay for the programme by 23% to Rs. 3,958 crore for the year 2020-21.

### **Digital Payments:**

Businesses are built and expand on trust and the ability of digitates to enhance trust is unparalleled compared to other payment instruments and gives huge capability to grow the business. Any retail facing business must look at establishing their digital presence, even through simple tools such as a website and google maps. The next step would be to make it convenient for customers to pay digitally. If you connect digital payments to your services, you could potentially sell to any postal code in the country today. The implicit understanding is that a



faster pace of adoption of ICTs will enhance productivity and economic efficiency by optimizing operations, bringing greater transparency in the delivery of public services and welfare programmes, reducing the level of corruption, integrating remote places with cities and towns and improving the level of democratic participation. Going digital would crush the parallel economy that thrives and flourishes on cash-based businesses. Most of the participants operating the parallel economy do not own or use proper bank accounts and thereby avoid paying taxes to the government.

### **Impact on Agriculture:**

Most of India's landholdings are small, averaging a little more than one hectare in size, with yields much lower than other developing economies. Among others, a major reason for this is a dearth of farm machinery and relatively little data on soil, weather, and other variables. Poor storage and logistics allows produce to go to waste before reaching consumers—\$15 billion worth in 2013. Digital technology can alter this ecosystem for better in several ways. The use of real-time granular data to optimize inputs such as fertilizer and pesticides—can increase yields by 15 percent or more. In the post harvest stage, farmers could use such online marketplaces to interact with a larger pool of potential buyers. One such platform is the government's electronic National Agriculture Market, has led to an increase in farmers increase revenue by up to 15 percent.

### **Impact on Businesses:**

Given the wide and diverse landscape of the Indian consumer, Companies that innovate and digitize rapidly will be better placed to take advantage of the huge market which could include up to 700 million smartphone users and over 800 million internet users by 2023.

### **Impact on Healthcare:**

India has always faced a shortage of health infrastructure with too few doctors, not enough hospital beds, and a low share of state spending on healthcare relative to GDP – an issue that was particularly highlighted in light of the current pandemic. Digital solutions can help address the shortage of medical professionals by making doctors and nurses more efficient. Telemedicine makes it possible for doctors to consult with patients over a digital voice or video link rather than physically; this could allow them to see more patients overall and allow doctors in cities to serve patients in rural areas.

### **CONCLUSION AND RECOMMENDATION:**

Research on digitalization and development highlights that much ground needs to be covered as socio-economic benefits of ICT adoption are far from being organic and automatic, in fact often are dependent on a set of economic, social and institutional dimensions that are

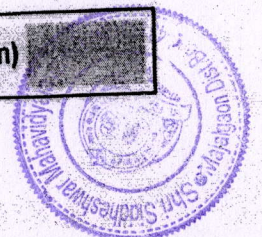


characteristic of each national economy. To capture the potential economic benefits, businesses will need to deliver digital technologies at a micro level: that is, how they use digital technologies to fundamentally alter day-to-day activities. For full realization of the benefits, what is warranted is the coming together of people from all corners and sections. Since people belonging to varied strata and nature of jobs are stakeholders and intended beneficiaries of this revolution, it is only fitting that all these partake in this transition. For India to fully reap the benefits of digitization—and minimize the associated adversities and pain of transitioning to a digital economy—business leaders, government officials, and individual citizens will need to play distinct roles while also working together. The interplay of these forces will create new data ecosystems, which in turn will spur new products, services, and channels in virtually every business sector, and create economic gains for consumers as well as those members of the supply chain that best adapt their business models. Businesses will need to assess how and where the digital transition may disrupt their existing processes, rendering a lot of them obsolete. Potential disruptions and benefits could be dangerously large in India because of its scale, the rapid pace of digitization, and its relatively low productivity in many sectors. Entrepreneurs also need to accordingly adapt to extend services and solutions that would still be relevant with the galloping pace of digitalization. Digital should be front of mind as executives plan. Customers are more digitally literate and have come to expect the convenience and speed of digital, whether shopping online or questioning a bill and companies would have to react accordingly. Also, Indian companies will need to invest in building digital capabilities, especially hiring people with the skills needed to start and accelerate a digital transformation. That is an uphill task as many of India's most talented workers prefer to emigrate. Companies could work with institutes and universities to recruit and develop skilled workers. National and state governments can step in and extend help by collaborating with the private sector to drive digitization, by putting the technology at the core of their operations. This helps by providing a market for digital solutions, which generates revenue for providers, encourages digital startups, and gives individuals more reasons to go online. Governments also can help by providing tax incentives to those investing in new age practices and creating and administering public data sources that entrepreneurs can use to improve existing products and services and create new ones. Individual in the country are already reaping the benefits of digitization as consumers, but they will need to take this convenience with a grain a salt and be cautious that its disruptive powers can affect their lives and work in other fundamental ways.



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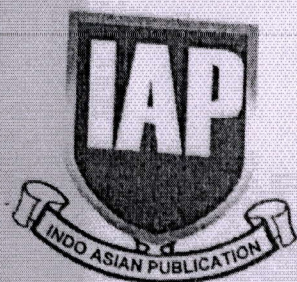
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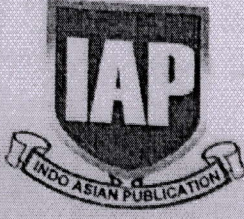
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Sociology

## महात्मा फुले यांचे अस्पृश्यता निर्मुलनातील कार्य

डॉ. टी. पी. सोंडगे

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### प्रस्तावना :

आपल्या समाजात अनेक रूढी आणि परंपरा आहे. त्यापैकी काही रूढी अनिष्ट आहेत. अस्पृश्यता ही त्यापैकी एक आहे. माणूस म्हणून जगणे हा नैसर्गिक हक्क देखील या रूढीमुळे नाकारला गेला. ज्ञान, संपत्ती यापासून अस्पृश्य मानवी समुहाला वंचित ठेवण्यात आले. त्यामुळे विषमता हाच या समाजाचा पाया झाला. आपल्या देशातील बुध्दभावाचे सार्वत्रिक भान नाहीसे झाले. परिणामी जाती-जातीमध्ये समाज विभागला गेल्याने समाज हा एकात्म बनू शकला नाही. एवढे प्रचंड नुकसान अस्पृश्यतेसारख्या प्रथेमुळे झाले. या प्रथेविरुद्ध अनेक संघर्ष उगे राहिले. ते संघर्ष निषमता प्रणित समाज रचनेच्या विरुद्ध होते. तसेच ते 'समता' हे तत्त्व समाज व्यवस्थेत स्विकारले जावे यासाठीही होते. नव्या समाजामध्ये पुढे आलेल्या सामाजिक नेतृत्वाने मानवाला 'मानव' म्हणून प्रतिष्ठा मिळावी, धर्म, जात, वंश, वर्ण, लिंग याचा विचार न करता 'एक माणूस' म्हणजे एक मूल्य या पद्धतीने माणसाचा विचार व्हावा, हा आग्रह धरला. प्राचीन काळी भगवान बुद्ध, वर्धमान महावीर

यांनी असा प्रयत्न केला होता. आधुनिक काळात म. फुले, म. गांधी, डॉ. आंबेडकर इत्यादींनी त्यासाठी चळवळी उभ्या केल्या. स्वातंत्र्योत्तर काळात १९५० साली स्वतंत्र भारताने नवी राज्य घटना स्वीकारली. या घटनेत 'अस्पृश्यता' नष्ट केल्याचे घोषित करण्यात आले. घटनेनुसार जो अस्पृश्यतेचा पुरस्कार करील त्यास कायद्याने गुन्हेगार ठरविण्यात आले. आज कायद्याने अस्पृश्यता नष्ट झाली असली तरी व्यवहारात ती पूर्णपणे नष्ट झाल्याचे दिसत नाही. अस्पृश्यता निवारण करावयाचे झाल्यास समाजाच्या मानसिकतेमध्ये परिवर्तन घडवून आणावे लागते. प्रस्तुत शोध निबंध लिहण्यासाठी काही उद्दीष्टे समोर ठेवण्यात आलेले आहेत. ती खालील प्रमाणे होत.

### उद्देश :

- (१) अस्पृश्यता संबंधी म. फुले यांच्या विचारांचा विश्लेषणात्मक आढावा लक्षात घेणे.
- (२) अस्पृश्यता संबंधी विविध समाज सुधारकांची मते विचारात घेणे.
- (३) आधुनिक भारतामध्ये अस्पृश्यतेचे उच्चाटन झाले आहे किंवा नाही याचा शोध घेणे.



तथ्य संकलन तंत्र :-

प्रस्तुत शोध निबंध लिहण्यासाठी द्वितीयक स्रोताचा वापर करण्यात आलेला आहे. त्यामध्ये संदर्भग्रंथ, मासिके, विविध वर्तमान पत्रे, साप्ताहिके याचा उपयोग करण्यात आले आहे.

अस्पृश्यतेचा प्रश्न केवळ एक प्रश्न न मानता तो येथील समाजव्यवस्थेतून निर्माण झालेल्या गुंतागुंतीचा प्रश्न आहे. तो सोडविणे म्हणजे संपूर्ण समाजव्यवस्थेची पुनर्मांडणी करणे, असा विचार सर्व प्रथम म. फुले यांनी मांडला. समग्र परिवर्तनाशी या प्रश्नाला जोडून स्त्री व शुद्रातिशुद्र यांच्या मुक्तीचा लढा असे त्यांच्या कार्याचे स्वरूप होते. मानवी मुक्तीची कल्पना मा. फुले यांनी मांडली. त्यांच्यामते समाजात दोन वर्ग आहेत. एक शेटजी भटजींचा व दुसरा श्रम करणाऱ्या शुद्रांचा. धर्म, जात, देव, दैवत, विद्या, पाप-पुण्य, पुनर्जन्म, कर्म, कर्मकांड हे सर्व शुद्रांना फसविण्यासाठी ब्राम्हण वर्ग वापरतो व त्यांची आर्थिक मानसिक पिळवणू करतो. असे मानतात. स्त्री-शुद्रांनी या विरोधात बंड करून विद्येची कास धरावी असा त्याचा आग्रह होता. मानव हा एकच आहे. त्यात श्रेष्ठ-कनिष्ठ, उच्च-नीच, स्पृश्य-अस्पृश्य असा भेद नसतो. या विचाराच्या प्रसारासाठी त्यांनी अहोरात्र प्रयत्न केले. स्त्री-शुद्रांची मुक्ती झाल्याशिवाय निकोप समाज निर्माण होऊ शकत नाही असा त्यांचा विश्वास होता. म.फुले हे केवळ बोलके सुधारक नव्हते. तर आपल्या विचारांना मुर्त रूप देण्यासाठी त्यांनी इ.स. १८५१ साली पुण्यात नानापेठेत पहिली अस्पृश्याची शाळा सुरू केली. १८६८ साल आपला स्वतःच्या घरातील पिण्याच्या पाण्याचा हौद अस्पृश्यांना खुला करून परंपरागत रूढींना धक्का दिला. आपल्या सुधारणावादी विचारांची पद्धतशिर मांडणी व प्रसार करता यावायासाठी १८७७ साली त्यांनी कृष्णराव भालेकर यांच्या सहकार्याने पुण्याहून 'दीनबंधू' साप्ताहिक सुरू केले. १८७३ साली 'सत्यशोक समाजाची' स्थापना करून मानव मध्यवर्तितव असलेल्या धर्मसंकल्पनेचा प्रसार

केला.

म. फुले यांच्या विचारचा थोडक्यात गोषवारा असा सांगता येईल. निसर्गाने दिलेले अधिकार हे जन्म सिद्ध आहेत. ते स्वार्थी, भोंदू लोकांनी हिरावून घेतले व त्यातूनच विषमतेचा जन्म झाला. धर्माच्या नावाखाली अनेक भाकड कथारचून पुरोहितांनी इतरांना अज्ञानी ठेवले. विद्या, संपत्ती यापासून सामान्यजनांना वंचित ठेवले. मानवाचे नैसर्गिक अधिकार हे समतेचा पुरस्कार करणारे आहेत हे सांगतांना ते म्हणता "आपणा सर्वांच्या निर्मिकाने एकंदर सर्व प्राणीमात्रास उत्पन्न करतेवेळी मनुष्यास जन्मतः स्वतंत्र प्राणी निर्माण केला आहे आणि त्यास आपापसात सारखे हक्कांचा उपभोग घेण्यास समर्थ केला आहे."

आपला हक्क वजावतांना दुसऱ्याच्या हक्काची पायमल्ली होता कामा नये अशी काळजी घेतली गेली पाहिजे. हा बंधुभाव आदिम मानवी समाजात होता. तो आजच्या समाजात नाही असे त्यांचे मत होते. बंधुभाव, समता, नैसर्गिक जन्म सिद्ध हक्क यांना तिलांजली देऊन कृत्रिम, अन्याय कारक, पक्षपाती आणि फसवेगिरीची व्यवस्था आर्यभटांनी येथे बाहेरून आणली. त्यातून ब्राह्मण, महार, मांग अशा जाती किंवा स्पृश्य व अस्पृश्य हे भेद आणले. या विरोधात त्यांनी ब्राह्मण पुरोहितांच्या भोंदूगिरीवर आसूड ओढला. गुलामगिरी, शेतकऱ्यांचा आसूड, सार्वजनिक सत्यधर्म पुस्तक व तृतीयरत्न या सारख्या ग्रंथातून त्यांनी विषमतेच्या विरोधात वैचारीक पार्श्वभूमी तयार केली. देवांच्या आवताराच्या कथांना वैज्ञानिक दृष्टीकोणातून तपासून त्या कशा वेडगळ आहेत हे त्यांनी 'गुलामगिरी' या पुस्तकातून दाखवून दिले आहे.

अस्पृश्यांच्या उत्पत्ती विषी ज्योतीराव फुल्यांची स्वतःची उत्पत्ती आहे. त्यांच्यामते अस्पृश्य आणि शुद्र हे येथील मुळ रहिवासी आहेत. ज्यांनी परकिय आर्यभटांशी शुद्ध केले व पराभूत झाले ते अस्पृश्य ठरले. त्यांना शिक्षा म्हणून स्पर्श देखील करावयाचा नाही, असे भट लोकांनी इतरांच्या मनात भरविले. एवढेच नव्हेत तर ती धर्माज्ञा



आहे, असं सांगितले. म. फुले यांनी यासाठी समाजातील दोनच वर्ग गानले एक भटब्राह्मण, दुसरा शुद्र. जाती व्यवस्था मोडीत काढल्याशिवाय इथला व्यापार-व्यवसाय, मानवाची प्रगती होऊ शकत नाही, असे त्यांचे मत होते. अस्पृश्यता ही जाती-व्यवस्थेचा अविभाज्य असा भाग असल्याने, प्रथम त्या विरुद्ध बंड करणे आवश्यक आहे. जातीव्यवस्था हा हिंदुधर्माचा प्राण आहे. म्हणून अशा धर्मावर त्यांनी कडाडून हल्ला चढविला. त्यासाठी वेगळ्या सत्यधर्माची स्थापना केली. विवाह पद्धतीतून ब्राह्मण बाद केला. ओतूर जि. पुणे येथील पाटलांचे लग्न ब्राह्मणशिवाय लावल्याने ब्राह्मणांनी त्या लग्नामुळे आमचे वेतन बुडाले, अशी केस कोर्टात टाकली. म. फुले आणि त्यांच्या सहकार्यांनी ती केस हायकोर्टापर्यंत लढवून जिंकली. आपल्या कृतीला कायदेशिर आधार फुल्यांनी मिळून घेतला. अस्पृश्याच्या मुलांसाठी शाळा काढली तेव्हा सर्व समाजातून त्यांना विरोध झाला. धर्म बुडाल्याचा हाकारा पिटला गेला. विद्येशिवाय काही खरे नाही. विद्येशिवाय मती आणि गती लाभत नाही. समाजाला परिवर्तनाकडे न्यायचे असेल तर त्यांना शिक्षण देणे हे प्रथम कर्तव्य ठरले पाहिजे, असे त्यांचे आग्रही मत होते. म्हणून स्त्रिया पाठोपाठ स्पृश्यासाठी त्यांनी शाळा उघडली. धार्मिक व सामाजिक गुलामगिरी नष्ट करण्याचे त्यांच्या सतयशोधक समाजाचे मुख्य उद्दिष्ट होते.

ब्रिटिश राजवट ही जातीभेद आणि जातिव्यवस्था यांचा अंत करण्यासाठी चालुन आलेली मोठी संधी आहे. तिचा फायदा घेऊन येथील विषमता प्रणित समाज व्यवस्था व जातिपद्धती नष्ट कराव्यात असे त्यांना वाटत होते. त्यासाठी नव्या मूल्यांची म्हणजे समतेच्या मूल्यांची कास धरावी व जुन्या, अन्यायी मूल्यांना गाडून टाकावे, असे त्यांचे मत होते. पुढे डॉ. बाबासाहेब आंबेडकरांनी मनुस्मृती जाळली. तिच्या धिकाराची घोषणा पूर्वीच केली होती. एका पोवाड्यात त्यांनी हा इशारा दिला आहे. 'भटाच्या मतलबी ग्रंथाचे कसब' याविषयी सांगतांना ते म्हणतात. अवयव बुध्दी दोघासारखी ॥ ब्राह्मण का सुखी ॥ झाला

फार ॥ १३ ॥

सत्तेच्या मदने विद्या बंद केली ॥ शुद्राही मानीली ॥ सर्व काळ ॥ १४ ॥

मनु तो जळाला इंग्रजी वा झाली ॥ ज्ञानाची माऊली ॥ पान्हा पाजी ॥ १५ ॥

आता तरी तुम्ही मागे घेऊ नका ॥ धिः कारुणी टाका ॥ मनुला ॥ १६ ॥

विद्या शिकताच पावाल ते सुख ॥ घ्यावा माझा लेख । जोती म्हणे ॥ १७ ॥

म. फुलेच्या प्रभावाने असंपृश्यामध्ये गोपाळ बाबा वलंगकर, शिवराम जानवा कांबळे, किसन फागू बनसोडे, गणेश अवई यासारखे समाज सुधारक असंपृश्यता निवारणाचे कार्य करू लागले. इ.स. १९९९ पासून महाराष्ट्रातील असंपृश्य जातीतील महार समाजाला इंग्रजांनी सैन्यामध्ये भरती करण्यास बंदी केली. ही बंदी उठवून महारांना पूर्ववत सैन्यात घ्यावे अशी मागणी होऊ लागली. व्यवसाय परिवर्तनाची ही संधी असंपृश्य समाजाला असंपृश्यतेचा कलंक धुवून टाकण्यास गरजेची होती. याकाळात 'सोमवंशि मित्र' 'अनार्थ दोष परिहार समाज' यासारख्या संस्था स्थापन होऊन कार्य करू लागल्या. त्यांनी काही नियतकालिके प्रकाशित करून असंपृश्यते विरोधी भूमिकाही मांडली. समाज परिवर्तन हे केंद्रबिंदू मानून सामर्थ्याने चळवळ उभी केली. असे असले तरी महात्मा जोतीराव फुले यांनी ! म. फुल्यांना डॉ. बाबासाहेब आंबेडकर यांनी गुरू मानले ते यामुळेच ! समाज परिवर्तनाचा फारमोठा लढा उभा करून प्रस्थापित धर्मसंकल्पना, देव - दैववादी भूमिका व समाजव्यवस्था यांना नाकारून नवी वैश्विक मानवी कुटुंबाची कल्पना व्यवहारात आणण्याचा प्रयत्न केला. आंबेडकर पूर्व समाजपरिवर्तनाची चळवळ म्हणजे महात्मा जोतीराव फुले यांची चळवळ होय. म. फुले यांच्या प्रभावातून अनेक छोटे-मोठे समाज सुधारक कार्य करीत होते त्यापैकी काही महत्त्वाच्या व्यक्तीची येथे ओळख करून घेणे आवश्यक आहे.





## (१) छत्रपती शाहु महाराज :-

कोल्हापूर संस्थानातील राजे त्यांनी हिंदु धर्मातील ब्राम्हणाचे वर्चस्व नाकारून 'क्षात्र पीठाची' स्थापना केली. त्याच्यावर फुलेंच्या विचाराचा फारमोठा पगडा होता. त्यांनी प्रथमता अस्पृश्यताविरोधी कायदा केला व तो आंमलात आणला. गंगाराम कांबळे नावाच्या एका अस्पृश्य माणसाला त्यांनी हॉटेल काढून दिले व ते स्वतः तेथे जाऊन चहा घेत असत. शिक्षणाशिवाय तरणोपाय नाही असे शाहु महाराजांचे मत होते. अनेक ठिकाणी वस्तीगृह सुरू केले. १९०८ मध्ये अस्पृश्यासाठी मिस क्लार्क हॉस्टेल सुरू केले. माणगांव येथे पहिली अस्पृश्याची परिषद घेऊन त्यांनी दलितांचा नेता म्हणून डॉ. बाबासाहेबांना पाठींबा दिला. यापुढे 'दलितांना तुम्हाला तुमचा नेता मिळाला' असे या परिषदेत घोषित केले व ते सातत्याने डॉ. बाबासाहेबांच्या पाठिमागे खंबीरपणे उभे राहिले.

## (२) सयाजीराव गायकवाड:-

हे बडोद्याचे राजे, अस्पृश्यांना त्यांच्या काळात चांगली वागणूक मिळत होती. डॉ. बाबासाहेब आंबेडकरांना शिष्यवृत्ती देऊन त्यांनीच इंग्लंड, अमेरिकेत शिक्षणासाठी पाठवले होते.

## (३) गोपाळ बाबा वलंगकर :-

हे इंग्रजांच्या पलटणीत हवालदार होते. तयांचे मुळगांव महाडजवळ रावदूल हे खेडे ते नॉर्मल परीक्षा पास होते. त्यांची पलटन ज्या वेळी पुण्यात येत असे त्यावेळी ते महात्मा फुले यांना भेटत भेटत असे. हवालदार पदावरून निवृत्त झाल्यानंतर ते दापोलीत स्थायीक झाले. 'अनार्थ दोष परिहार समाज' याची स्थापना केली. त्यांनी 'पिटाळ विध्वंसन' या नावाचे एक पुस्तक लिहून जातिभेद व अस्पृश्यता यासंबंधी अनेक प्रश्न उपस्थित केले. अस्पृश्यामध्ये आपल्या हक्का बाबत त्यांनी जाणीव निर्माण केली. डॉ. आंबेडकर यांची पत्नी रमाबाई आंबेडकर यांच्या कुटुंबाशी त्यांचा जवळचा संबंध होता. अस्पृश्य समाजातील पहिले पत्रकार व समाज कार्यकर्ते म्हणून त्यांना ओळखले जाते.

## (४) महर्षी विठ्ठल रामजी शिंदे:-

अस्पृश्य वर्गाची सुधारणा व्हावी यासाठी त्यांनी आयुष्यभर प्रयत्न केले. ते प्रार्थना समाजाचे प्रचारक होते. प्रचाराच्या निमित्ताने ते देशभर फिरत असतांना त्यांनी अस्पृश्य वर्गाच्या हलाखीच्या परिस्थितीची नोंद घेतली.

अशा प्रकारे म. जोतीबा फुले यांच्या अस्पृश्यता विषयक विचारांचा उहापोह या ठिकाणी करण्यात आलेला आहे.

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9

## महिला सबलीकरण आणि शासनाची भूमिका एक सामाजिक चिंतन



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### Research Paper - Sociology

महिला सबलीकरण ही संकल्पना नवीन नाही. भारताला स्वातंत्र्य मिळून ६५ वर्ष पुर्ण झाली आहेत. तरीदेखील स्वातंत्र्याचे फायदे भारतीय समाजातील महिलांसारख्या एक मोठा घटक अद्यापही उपभोगु शकत नाही. लिंगभेदावरील आधारित विषमतेला त्यांना तोंड द्यावे लागते म्हणून महिलांच्या प्रश्नाविषयी अधिक संवेदनशीलतेने विचार करण्याची गरज भासते आहे.

#### महिला सबलीकरणाचा अर्थ व स्वरूप :-

महिला सबलीकरण या शब्दाची फोड केल्या स्त्रिला सबल करणारी म्हणजेच दुर्बलता नष्ट करणारी, तिच्या मनात, बुद्धीत स्वातंत्र्याची जाणीव व स्वतः बदल जागरुकता निर्माण करून त्या दृष्टीने संपूर्ण विकास प्रगती विविध क्षेत्रातील समान सहभाग, न्यायपुर्ण वागणुक मिळवून देणारी ही संकल्पना आहे. सबलीकरणाचा अर्थ स्त्री ही आर्थिकदृष्ट्या स्वतंत्र, स्वयंनिर्भर व स्वावलंबी असणे होय. महिला सबलीकरण म्हणजे स्त्रीया स्वतःच्या आयुष्याबद्दल, मुलांबद्दल आणि कुटुंबादलचा निर्णय स्वतः घेऊ शकतील व सामाजिक निर्णय प्रक्रियेत सहभागी होतील, अशी विचारसरणी होय.

खरे महिला सबलीकरण म्हणजे समाजाची स्त्री बाबतची मानसिकता बदलून स्त्रीला समजून घेणे होय. प्रस्तुत शोधनिबंधात महिला सबलीकरण आणि शासनाची भुमिका एक सामाजिक चिंतन या विषयावर साधक बाधक चर्चा करण्यात आली आहे महिलांकरिता शासनाने विविध घोरणे, कायदे तयार केले अंमलात ही आणले काही अंशी त्याचा परिणाम महिलांच्या दर्जावर झाला असून काही अंशी आपण दुर आहोत असे चित्र सामान्यपणे दिसून येते या विषयाच्या संदर्भात अम्यासाची उद्दिष्टे समोर ठेवली आहे.

#### अम्यासाची उद्दिष्टे :-

- १) विविध पातळीवर महिला सबलीकरणाबाबत शासकीय भुमिकेचा आढावा घेणे





- २) महिला सबलीकरणाबाबत शासनाने अनेक घोरणे, कायदे तयार आहेत, त्यांना अभ्यास करणे.
- ३) महिला अत्याचाराविरोधात कार्य करणाऱ्या शासकीय, गैर शासकीय संस्था, राष्ट्रीय व आंतरराष्ट्रीय संघटना यांचा महिला सबलीकरणास कितपत उपयोग झाला हे तपासणे. प्रस्तुत शोधनिबंधासाठी पुढील गृहीतके मांडली आहेत.

#### गृहीतके :-

- १) अधुनिक काळात महिलांच्या क्षमता व योग्यता यात उत्तरोत्तर प्रगती होत आहे
- २) विविध क्षेत्रात पात्रता निकषानुसार महिला यशस्वी होत आहेत. पण पुरुषांच्या तुलनेत त्यांची संख्या कमी आहे.
- ३) सार्वजनिक जीवनात त्या महिला पुढे आहेत समाजात त्यांनाच मानाचे स्थान मिळते. सर्वसामान्य महिला अनेक गोष्टींपासून वंचित राहतात.
- ४) स्त्री सबलीकरणाच्या उद्दीष्टांपासून महिला फार दूर आहेत. ती उद्दीष्टे पूर्णत्वाला गेली नाहीत.

कोणत्याही समाजाची ओळख ही त्या समाजातील स्त्रीयांच्या स्थितीवर अवलंबून असते. अनेक समाजसुधारक, विचारवंत, संशोधक त्यांच्या विचारांच्या प्रभवातून आणि शासनाने विविध योजनेच्या माध्यमातून स्त्रियांच्या परिस्थितीमध्ये दर्जामध्ये सुधारणा घडवून आणण्याचा प्रयत्न केला. भारत सरकारने सन २००१ हे महिला सबलीकरण वर्ष म्हणून घोषित केले व या वर्षात स्त्रियांना सामाजिक, आर्थिक, राजकीय दृष्टीने सक्षम करण्यासाठी विविध पातळ्यांवर प्रयत्न केले

**स्त्री सबलीकरणामध्ये शासनाची भूमिका :-**

स्त्री सबलीकरणासाठी महाराष्ट्र शासन, शासन आंतरराष्ट्रीय पातळीवरील घोरणे, जागतिक पातळीवरील संस्थात्मक यंत्रणा या सर्व पातळ्यांवर स्त्री सबलीकरणासाठी प्रयत्न करण्यात आले. त्याचा आढावा खालीलप्रमाणे घेतला आहे.

#### महाराष्ट्र पातळीवरील शासनाची भूमिका :-

- १) १९९४ चे महाराष्ट्र स्त्री सबलीकरणाचे घोरण :-

राज्यातील स्त्रियांच्या शारीरिक, मानसिक आणि भावनिक जीवनाची गुणवत्ता उंचावण्यासाठी हे घोरण स्विकारण्यात आले.

- २) २००१ मधील महिला संबंधीचे महाराष्ट्र राज्यातील घोरण :-

महिलांना केंद्रस्थानी मानून नियोजन केले महिलांच्या सबलीकरणासाठी विशेष निर्धीची तरतुद, महिलांच्या स्वयंसहाय्य गटाची स्थापना साक्षरता वाढविणे, आरोग्य सुविधा, प्रशासन गृहे, पाळणाघरे इ. योजना राबविण्यात आल्या.





३) महाराष्ट्रामध्ये शासकीय नोकऱ्या व उच्च शिक्षण अभ्यासक्रमासाठी महिलांना आरक्षण मिळावे. :-

अशा प्रकारे महाराष्ट्र शासनाने स्त्री सबलीकरणासाठी योजना राबविल्या. भारतीय पातळीवर महिला सबलीकरणाबाबतच्या योजनांचा आढावा पुढीलप्रमाणे.

**भारतीय पातळीवरील स्त्री सबलीकरणासंदर्भात शासनाची भूमिका:-**

१) महिलांच्या अधिकारांविषयी भारतीय राज्यघटनेतील तरतुदी :-स्त्री पुरुष समानता हा भारतीय संविधानाचा आधार आहे. वंश, लिंग, धर्म भाषेच्या आधारावर भेदभाव केला जाणार नाही असे स्पष्ट करण्यात आले आहे. पुरुष व महिलांना समान वेतन दिले जावे हे स्पष्ट केले आहे.

२) महिलांच्या रक्षणासाठी भारतीय दंड विधानासाठी तरतुदी :- भारतीय दंडविधानामुळे बलात्कार, विनयभंग, हुंडा मागणे, हुंडाबळी, पत्नीला मारहाण, स्त्रीचे अपहरण, वेश्या व्यवसायासाठी मुलींची विक्री करणे, इ. गुन्हांसाठी कडक शिक्षेची तरतुद करण्यात आली.

३) प्रसूती काळात हक्काची रजा :-

महिला हितरक्षण कायदयामध्ये नोकरी करणाऱ्या महिलांना ६ महिन्यांची रजेची तरतुदी करण्यात आली आहे.

४) स्त्रियांच्या दर्जाविषयी अभ्यासगटाची स्थापना :-

इ.स. १९७१ मध्ये भारत सरकारने स्त्रीचे स्थान समजून घेण्यासाठी, स्त्रियांच्या विकासासाठी अभ्यासगट स्थापन केला.

५) राष्ट्रीय महिला आयोग :-

महिलांच्या विविध समस्यांवर संशोधन करून विविध समस्यांची माहिती शासनाला करून देण्यासाठी १९९० साली राष्ट्रीय महिला आयोगाची स्थापना करण्यात आली. हा आयोग प्रतिवर्षी महिलांच्या दर्जाविषयीचा अहवाल शासनाला सादर करतो.

६) ७३ वी घटना दुरुस्ती :-

७३ व्या घटना दुरुस्तीमुळे स्त्रियांना ग्रामपंचायत, पंचायत समिती, जिल्हा परिषद यात आरक्षण देण्यात आले.

या आरक्षणामुळे समाजांच्या शेवटच्या स्तरापर्यंत महिलांचे सबलीकरण होत आहे, असे दिसते.

**महिला सबलीकरणाची प्रत्यक्ष धोरण व भूमिका :-**

१) साक्षरता :-

स्त्रियांना सर्व पातळीवर जागरूक बनविण्यासाठी साक्षरता आवश्यक आहे. ज्या राष्ट्रात स्त्रियांमध्ये साक्षरतेचे प्रमाण अधिक आहे. त्या राष्ट्रातील स्त्रिया आरोग्य हक्क, आत्याचार याविषयी जागरूक असल्याचे दिसून येते.





२) आर्थिक स्वावलंबन :-

स्त्रियांना रोजगाराच्या संधी उपलब्ध करून देऊन त्यांना आर्थिक दृष्ट्या स्वावलंबी बनविण्याचा महिला सबलीकरणाचा उद्देश आहे.

३) राजकीय निर्णय प्रक्रियेत सहभाग :-

७३ व्या घटना दुरुस्ती नुसार स्त्रियांना ग्रामपंचायत, पंचायत समिती, जिल्हा परिषद यात आरक्षण मिळाले. त्यामुळे महिलांच्या राजकारणातील सहभाग वाढला. स्त्री- शिक्षणासाठी प्रयत्न :-

सन १९९१ ला केंद्रशासनाने राष्ट्रीय साक्षरता अभियान सुरु केले त्याचा योग्य तो परिणाम झाला १९९७ ला केलेल्या पाहणीनुसार महिलांचे साक्षरतेचे प्रमाणे ५०% झाले. १२ वी पर्यंतचे मुलींना शिक्षण मोफत करण्यात यावे म्हणून राज्य परिवहन मंडळाच्या वतीने मोफत प्रवासाची व्यवस्था करण्यात आली. दुपारचे जेवण देण्यात आले.

सन २००८ मध्ये कस्तुरबा गांधी विद्यालय योजना मागासलेल्या भागातील मुलींचे शैक्षणिक मागासलेपण दूर करण्यासाठी निशुल्क निवासी विद्यालय प्रत्येक तालुक्यात सुरु करण्यात आले. महिला सक्षमीकरण आर्थिक बाजू :-

आर्थिक स्वातंत्र्य ही संपूर्ण स्वातंत्र्याची पूर्वअट आहे. भारतीय स्त्रीला ते कधीच नव्हते स्त्रीच्या आर्थिक परावलंबनाचा परिणाम सर्वच गोष्टींवर झाला.

भारत सरकारने तिला आर्थिक दृष्ट्या सक्षम करण्यासाठी अनेक कायदे केले. वडिलांच्या संपत्तीत तिचा मुलाबरोबरीने वाटा राहिल अशी तरतुद केली. पोटगीचा कायदा केला. पण यापेक्षा महत्वाची चळवळ सुरु केली व ती म्हणजे महिला बचत गट चळवळ महिला स्वयं सहायता बचत गट. आज महिलांसाठी ही मोठी आर्थिक चळवळ आहे. या चळवळीमुळे ग्रामीण स्त्रियांच्या हातात पैसा आला त्या आर्थिक व्यवहार स्वतंत्रपणे करू लागल्या. बँकेची त्यांना माहिती झाली ग्रामीण निरक्षर महिलांना या चळवळीने व्यावहारिक दृष्ट्या साक्षर केले.

या चळवळीमुळे महिलांचा आत्मविश्वास वाढला. महिला आत्मनिर्भर होण्याच्या वाटेवर आहेत त्यांची मते दखलपात्र झालेली आहेत.

राजकीय निर्णय प्रक्रियेत सहभाग :-

महिला सबलीकरणात ७३ व्या घटना दुरुस्तीचे मोठे योगदान आहे. लोकसंख्येत महिलांचे प्रमाणे ५०% असून त्यांना पंचायतराज व्यवस्थेत फारसे स्थान नव्हते. अनुसूचित जाती-जमाती, इतर मागास वर्गातील स्त्रियांना देखील सत्तेत सहभागी होता यावे यासाठी ७३ वी घटना दुरुस्ती २२ डिसेंबर १९९२ ला करण्यात आली.

७३ व्या घटना दुरुस्तीने पंचायत राज व्यवस्थेचा सर्व स्तरांवर सर्वपदासाठी महिलांना ३३%





आरक्षण देण्याची तरतुद करण्यात आली. सार्वजनिक जीवनात महिलांचा प्रवेश झाला.  
शेती व सिंचन क्षेत्र :-

या क्षेत्रात महिलांच्या सबलीकरणासाठी त्याचा कामाच्या तुलनेत त्यांना स्थान व अधिकार देण्यासाठी आता सिंचन क्षेत्रात सुधारणा केल्या आहेत. त्यानुसार जलव्यवस्थापन समित्यात स्त्रियांसाठी आरक्षणाची तरतुद केली आहे. ग्रामीण महिला शेतीतील ८०% कामे करतात मात्र त्याचा मालकी हक्क नसतो. विशिष्ट परिस्थितीत स्त्रियांना शेती मालकीत सहभागी करून समानता असावी या हेतूने महिलांच्या नावावर जमीन आढळत नाही.

निष्कर्ष :-

सर्व शासकीय घोरणांचा/कायद्यांच्या महिला सक्षमीकरणाबाबत विचार केला असता खालील गोष्टी प्रकर्षाने जाणवतात.

- १) स्त्रियांना आपल्या अस्मितेची जाणीव होऊ लागली.
- २) ७३ व्या घटना दुरुस्तीमुळे सर्व स्तरावरील स्त्रियांच्या राजकीय सहभाग वाढला आणि त्यामुळे स्त्रियांचे ज्वलंत प्रश्न ऐरणीवर येत असून त्यांच्या पुर्ततेसाठी प्रयत्न होताना दिसतात.
- ३) महिला सबलीकरणासाठी विविध आयोग शासकीय, अशासकीय, राष्ट्रीय व आंतरराष्ट्रीय संघटनांद्वारे स्त्री विरोधी होणाऱ्या अन्याय-अत्याचारा-विरुद्ध आवाज उठविण्याच्या कार्य करण्यास सुरुवात झाली आहे.
- हे कार्य स्त्री सबलीकरणाचा मुलाधार आहेत.
- ४) स्त्री सबलीकरणाची उद्दीष्टे फार दूर आहेत ती पूर्णत्वाला गेलेली नाही.

उपाययोजना :-

- १) यापुढील काळात लैंगिक विषमता जगातील कोणत्याच समाजात राहणार नाही. या दृष्टीने जागतिक पातळीवरील प्रयत्न करणे आवश्यक आहे.
- २) ग्रामपंचायत राज्यामध्ये निवडून आलेल्या महिलांना योग्य स्थान दिले जात नाही. त्या अल्पशिक्षित असल्याने त्यांचा गैरफायदा पुरुष सदस्य घेत आहेत. महिला सदस्यांची क्षमता वाढविण्यासाठी सातत्याने प्रयत्न केले पाहिजे.
- ३) स्त्री सबलीकरणाकरिता किशोरी, युवती, महिला यांचे आत्मभान मिळावे, परिषदा, चर्चासत्रे, विचारवंतांची भाषणे आयोजित करावेत.
- ४) शासन व स्वयंसेवी संस्थानी महिला सबलीकरणाचा प्रश्न अचुकपणे हाताळावा. काही अंशी असे दिसते की, स्त्री ही स्वतः आर्थिक, राजकीय, शैक्षणिक, सामाजिकदृष्ट्या उदासिन आहे तिचे सबलीकरण करायचे असल्यास शासकीय स्तराबरोबर व्यक्ती, कुटुंब, राज्य असा चढताक्रम अपेक्षित





आहे.

महत्वाचे :-

आधुनिक काळात बदलत्या परिस्थिती नुसार महिलांच्या क्षमता व योग्यता यात उत्तरोत्तर प्रगती होत आहे. काही महिला योग्यतेच्या, क्षमतेच्या बळावर विविध क्षेत्रात यशस्वी झाल्या आहेत. पण पुरुषांच्या तुलनेत त्यांची संख्या नगण्य आहे. ही न्युनता भारताबरोबरच विविध स्तरावर आढळते.

**संदर्भ सूची :-**

- १) समाज प्रबोधनात पत्रिका मार्च २००९.
- २) महिला स्वयंसहायता बचत गट - एम.ए.यु. मालानी.
- ३) डॉ. भा.ल. भोळे - भारताचे शासन व राजकारण.
- ४) महिला सबलीकरण :- स्वरूप व समस्या, शुभांगी गोटे.
- ५) महिला सबलीकरण :- राजकारण आणि धोरणे, राज्यस्तरीय चर्चासत्र.
- ६) भारतीय सामाजिक समस्या - सुधा काळदाते.
- ७) भारतीय समाज :- प्रश्न आणि समस्या, विद्या बुक्स, औरंगाबाद.
- ८) स्त्री परिवर्तनाची आव्हाने - शुभांगी गोटे



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# इतिहास दर्पण ITIHAS DARPAN

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## भारतीय स्वातंत्र्य लढ्यात महाराष्ट्रातील महिलांचा सहभाग

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### प्रस्तावना :

1947 मध्ये भारत स्वतंत्र झाला स्वातंत्र्याच्या प्राप्तीसाठी .हजारो स्त्री-पुरुष व बालक-बालके यांनी आपले प्राण दिले आहेत पुरुषांच्या खांद्याला खांदा लावून स्वातंत्र्यलढ्यात भाग घेतला आणि सर्वस्वाचे समर्पण करणाऱ्या समाजातील सर्व थरांतील महिलांनी कोणती कामगिरी केली हेही पाहणे जरूरीचे आहे.म गांधींच्या हाकेला ओ देऊन .स्वातंत्र्यलढ्यात भाग घेणाऱ्या प्रमुख स्त्रियांची यादी खूप मोठी आहेनामांकित घरांतील लेकी . सुनाही स्वातंत्र्य प्राप्तीपर्यंत स्वातंत्र्यलढ्यात तुरुंगात जात येत राहिल्या .श्रीमंत व मध्यम वर्गातील स्त्रियांनी आपले दागिने . की जे स्त्रीला प्राणप्रिय आहेत असे समजले जाते .गांधीजींकडे राष्ट्रीय कार्याकरता सोपविले . ही जादू फक्त हिंदू स्त्रियांवरच झाली असे .च्या शब्दांनी जणू त्यांच्यावर जादू केली होतीगांधीजीं अमन बानू बेगम .मुसलमान व विदेशी महिलांचीही संख्या त्यांमध्ये मोठी आहे .नाहीस्वतः पडदा सोडता व इतर सजातीय महिलांना पडदा सोडून सामाजिक व राजकीय कार्यामध्ये समाविष्ट होण्यास प्रेरणा दिलीविदेशी .रहेना तय्यबजी या तर गांधीजींच्या एक जवळच्या स्नेही होत्या .कु . स्त्रियांनी भारत हाच देश आपला मानला व त्यातील सामाजिक व राजकीय सुधारणांसाठी कष्ट गांधीजींच्या आंदोलना .झेललेत देशी, विदेशी व सर्व धर्मातील स्त्रिया सामील झाल्या होत्या . सूनूत गातणे .स्त्रियांकरिता आंदोलनाचा एक स्वतंत्र कार्यक्रमच गांधीजींनी बनविला होता, खादी विणणे, स्वदेशीचा प्रचार करणे, अस्पृश्यता निर्मूलन साक्षरता अभियान, दारूच्या दुकानावर निदर्शने इत्यादी कार्यक्रम गांधीजींनी दिले व भारतीय स्त्रियांनी ते अंगीकारले.

समस्या सूत्रांग : स्त्रीला कन्या, पत्नी, माता, बहीण या भूमिकांमुळे स्वतंत्र व्यक्ती म्हणून अनुभवाचा अभ्यास केला जातो .अशा स्त्रीकेंद्रित दृष्टिकोनातून स्त्री जीवनाचा अभ्यास हे 1970 च्या दशकात चे फळ असले तरीही भूतकाळातील घटना साठीही हा दृष्टीकोन वापरून इतिहास विषयक लिखाणाचे पुनर्लेखन केले जाऊ शकते. इतिहास विषयातील अभ्यासामुळे स्त्रियांना आज पर्यंत मिळालेल्या वागणुकीबद्दल वाचा फोडता येते. इतिहासात आजपर्यंत स्त्री ही पडद्यामागे का राहिली ,स्त्रियांना इतिहासकारांनी का डावलले या सर्व प्रश्नांची उकल या अभ्यासातून होऊ शकते.



**संशोधनाचे महत्त्व :** नवराष्ट्र निर्मितीच्या महान कार्यात त्यांच्या आदर्शाची मदत होईल अशा थोर महिला स्वातंत्र्य सेनानी व क्रांतिकारी आपल्या जीवनाला तिलांजली देऊन देशाच्या स्वातंत्र्यलढ्यात विशिष्ट ध्येयाने झपाटून दुर्दम्य अशा अवघड व काटेरी वाटेने प्रवास करत शेवटी आपले ध्येय पूर्णत्वास नेले अशा असामान्य महिलांचे जीवन पुढील पिढीला प्रेरणादायी व मार्गदर्शक ठरेल.

**संशोधनाची व्याप्ती व मर्यादा:** सैद्धांतिक दृष्टीने भारतीय स्वातंत्र्यलढ्यातील महाराष्ट्रातील निवडक स्त्रियांचे योगदान हा अतिशय व्यापक विषय आहे. भौगोलिक व्यक्तीच्या दृष्टीकोनातून महाराष्ट्राचा या प्रादेशिक भागाचा सर्वसाधारण अभ्यास केल्या जाईल.

**संशोधनाची उद्दिष्टे:** या संशोधन पेपर मध्ये भारतीय स्वातंत्र्य लढ्यातील महाराष्ट्रातील स्त्रियांचे योगदान या मुद्द्यावर चर्चा करण्यात येणार आहे.

1) भारतीय स्वातंत्र्य लढ्यातील महाराष्ट्रातील निवडक स्त्रियांचे योगदान तपासत असताना त्यांचा स्वातंत्र्यलढ्यात कट कारस्थान शिवाय राजकारणात सहभाग हा सक्रिय होता याचा अभ्यास करणे.

2) या अभ्यासातून अनेक दुर्लक्षित परंतु कर्तबगार स्त्रीयांच्या कामगिरीवर प्रकाश टाकण्यात येईल.

3) पुरुषप्रधान संस्कृतीत स्त्रिया ह्या नेहमीच दुय्यम राहिल्या आहेत पण शोषित अंकित वर्गाचा अभ्यास करून एका अर्थाने सर्वसामान्यांचा इतिहास (subaltern studies) मांडण्याचा प्रयत्न केला जाईल.

**संशोधनाची गृहितके :**

1) अनेक स्त्रियांचे उल्लेख कदाचित कागदपत्रातून दुर्लक्षित अवस्थेत राहिलेले आहेत.

2) महाराष्ट्रातील स्त्रियांना आपले कर्तृत्व दाखवण्याच्या अनेक संधी मिळत गेल्या व स्त्रियांनी सर्व क्षेत्रात आपले कर्तृत्व सिद्ध करून दाखविले आहे.

**डॉ. उषा मेहता:**

मुंबईला उषा मेहता नावाची एक दहा वर्षांची मुलगी व तिच्या मैत्रिणी यांनी वानरसेनेच्या धर्तीवर मांजरसेना बनविली. मांजरसेनेत फक्त मुलीच होत्या. पोलिसांसमोर जाऊन त्या म्याऊ म्याऊ ओरडून त्यांना जेरीस आणीत. प्रभात फेरीतील मुलीच्या हातातले झेंडे काढून घेतले जात म्हणून मांजरसेनेतील मुलींनी आपले परकर-पोलके तीन रंगी कापडात बनविले. मुलींनी शाळा कॉलेजे सोडली दारू दुकानावर निदर्शने करणाऱ्या स्त्रियांची संख्या दिवसेंदिवस वाढू लागली. गृहिणी व उघडपणे चळवळीत भाग घेऊ न शकणाऱ्या मुली हस्तलिखित पत्रके तयार करीत. सार्वजनिक ठिकाणे, सिनेमागृहे इथे जाऊन त्या वाटीत असत डॉ. उषा मेहता या गांधीवादी विचारवंत म्हणून आज जगप्रसिद्ध आहेत. उषाताई 1942 मध्ये कॉलेजमध्ये शिकत होत्या.



त्यांनी मुंबईमध्ये भूमिगत रेडिओस्टेशन चालावेले. या रेडिओवरून, दुसऱ्या महायुद्धात इंग्रजांची कशी पिछेहाट चालली आहे, देशाच्या कोणत्या भागात चळवळ जोरात चालू आहे, देशभरच्या चळवळीचे स्वरूप काय आहे. हे त्या समजावून सांगत. नेताजी सुभाषबाबू यांनाही या रेडिओमुळे भारतातील चळवळीची माहिती समजत असे. रेडिओकेंद्र नेहमी एका ठिकाणाहून दुसरीकडे हलवावे लागे. पोलिसांनी हे केंद्र शोधून काढण्याचा चंगच बांधला होता. उषाताईच्या कामाबद्दल माहिती असणाऱ्या एका फितुराने घात केला. परिणामी त्या रेडिओवर बातम्या देत असतानाच पकडल्या गेल्या.

सुरवातीपासूनच मुंबई शहर स्वातंत्र्य आंदोलनाचे मुख्य केंद्र होते. महाराष्ट्रात तुलनेने स्त्रियांची सामाजिक स्थिती ही बरी त्यामुळे मुंबईतील स्त्रिया स्वातंत्र्य आंदोलनात सर्वात पुढे होत्या. मोर्चे काढणे, प्रभातफेऱ्या काढणे ही कामे तर नित्याची-ती तर सर्व देशात होतच. या शिवायही मुंबईच्या स्त्रियांनी आणखी काही महत्त्वपूर्ण कार्य केले. त्यांनी देशसेविका संघाची स्थापना केली. केशरी रंगाच्या गोल साड्या नेसून त्या रस्त्यावर संचलन करीत. त्यांची दुसरी संघटना "हिंदुस्थानी सेविकादल" या नावाने ओळखली जाई. दादाभाई नौरोजींची नात पेरीन व्हॅन, किसन घुमटकर, बच्चूबाई-वागळे अशा कितीतरी मुली या संस्थेच्या सदस्य होत्या. या दोन्ही संस्थांवर सरकारने बंदी घातली. सत्याग्रहात मोठ्या संख्येने स्त्रियांनी भाग घेतला. त्यांना ठेवायला तुरुंग अपुरे पडले. त्यामुळे काहीना सोडून द्यावे लागले.

येसू वहिनी सावरकर:

महात्मा गांधींच्या भारतातील आगमनापूर्वीही महाराष्ट्रात नाशिक शहरात स्वदेशीची शिकवण देणारी एक महिला सभा होती. स्वा. वीर सावरकर यांची वडील वहिनी येसू वहिनी सावरकर ह्या या सभेच्या संस्थापिका. सावरकर बंधू अंदमानच्या काळकोठडीत शिक्षा भोगत होते. अभिनव भारत या त्यांनी स्थापन केलेल्या संघटनेतील बहुतेक कार्यकर्ते तुरुंगात होते. त्यांच्या बायकांना बंडखोरांच्या बायका म्हणून पोलिसांकडून त्रास होई. सासरची व माहेरची माणसेही सरकारी भयामुळे त्यांना जवळ करीत नव्हती. येसू वहिनींनी या स्त्रियांची "आत्मनिष्ठ युवती संघ" नावाची संघटना स्थापली. या स्त्रियांनी स्वदेशीचे व्रत घेतले व त्याचा प्रसार केला. काचेच्या बांगड्याचा चुडा भरणे हे सुवासिनीचे प्रमुख लक्षण, आपल्या वेशात पूर्वी काच बनत नसे. बांगड्या विदेशी असल्यामुळे सुवासिनीचे बांगड्या हे आवश्यक लक्षण असूनही त्यांनी हातात काचेची बांगडी घालायचे सोडले. साखर परदेशी म्हणून तीही सोडली. मराठीतील त्या वेळेचे प्रसिद्ध कवी विनायक यांच्या देशभक्तीपर कवितांवर सरकारने बंदी घातली होती. आत्मनिष्ठ युवतींनी त्यांच्या कविता पाठ करून त्यांचा तोंडी प्रसार करून त्या लोकप्रिय करण्याचे फार मोठे देशकार्य केले. युवती संघातील स्त्रिया मध्यम व कनिष्ठ मध्यम वर्गातल्या होत्या. सरकारी नासाने गांजल्या होत्या, तरीही त्यांनी स्वदेशी जागरणाचे आपले काम चालू ठेवले.



अवन्तिकाबाई गोखले :

महात्मा गांधी यांनी भारतीय स्त्रीला तिच्या शक्तीची जाणीव करून दिली. आपल्या प्रत्येक भाषणात स्त्रियांकडे वळून ते म्हणत, महिलांनो, तुम्ही भारत देशाची अर्धी शक्ती आहात. या देशाच्या स्वातंत्र्यलढ्यात तुमचा सहभागही अर्धा असला पाहिजे." गांधीजींच्या आवाहनाला हाक देऊन महिला, काँग्रेसच्या कामात संथ गतीने का होईना पण येऊ लागल्या. देशभरातील स्त्रियांनी "नमक का कायदा तोड दो जंगल का कायदा तोड दो." अशा घोषणांनी सारा देश दुमदुमून सोडला. हजारो स्त्रिया सत्याग्रह करून तुरुंगात गेल्या त्यांनी तुरुंग भरून टाकले मुंबईतील एका मोर्चाचे नेतृत्व अवन्तिकाबाई गोखले या गांधीजींच्या पट्टशिष्येने केले. सभा व मोर्चेबंदी धुडकावून मोर्चा मुंबईच्या आझाद मैदानावर पोहोचला. महिलांना आपापल्या घरी जाण्याचा हुकूम पोलीस अधिकाऱ्यांनी दिला. पण काय आश्चर्य! झुरळालाही घाबरणाऱ्या या स्त्रिया पोलिसांच्या दंडेली हुकूमाला जराही घाबरल्या नाहीत. सगळ्याजणी शांतपणे उभ्याच राहिलेल्या पाहून पोलीस अधिकारी म्हणाला, "आता जाता की तुमच्या अंगावर घोडे सोडू?" तरीही बायका हलल्या नाहीत. लाठीहल्ला सुरू झाला. कृष्णाकुमारी सरदेसाई नावाची चौदा वर्षाची मुलगी मोर्चापुढे झेंडा येऊन उभी होती. तिच्यावर प्राणघातक लाठीहल्ला झाला तरी तिने हातातला झेंडा सोडला नाही. अवन्तिकाबाई मुंबईच्या रहिवासी गांधीजींच्या विचाराने भारावलेल्या अवन्तिकाबाईंनी गांधीजींबरोबर चंपारण्यात सत्याग्रह केला. त्यांनी मराठीत लिहिलेल्या गांधीजींच्या चरित्राला लोकमान्य टिळकांनी प्रस्तावना लिहिली होती. अवन्तिकाबाईंनी हिंद महिला- समाज नावाची संस्था स्थापन करून महिलांना काँग्रेसच्या विधायक कार्यक्रमासाठी संघटित केले. अवन्तिकाबाईंना 1930 साली व 1932 साली कारावासाची शिक्षा झाली होती. स्त्रियांचे अधिकार व कल्याण, मजूर वस्ती व इस्पितळे यांबाबत काम करून त्या मुंबई शहराचे भूषण ठरल्या तर नवल काय?

यशोदाबाई भटः आर्य महिला समाज, वनिता समाज, हिंद महिला समाज, बंगालमधील महिला कर्म समाज इत्यादी स्त्रियांच्या काही संस्थांची नावे सांगता येतील. या संस्थांच्या सदस्य स्त्रियांमध्ये राष्ट्रीय वृत्ती वाढीला लावण्याचे प्रयत्न केले जात. कथा-कीर्तनामध्ये इतिहासातील वीरांच्या कथा वर्तमान परिस्थितीशी सुसंगतपणे जोडून श्रोत्यांसमोर मांडण्याचे काम स्त्रिया करीत. यशोदाबाई भट नावाची मुंबईतील एक महिला अशा प्रकारची कीर्तने करण्यात प्रसिद्ध होती. यशोदाबाई आपल्या लहानग्या मुलीला घेऊन सत्याग्रह करीत व तुरुंगात जात.

सत्यभामाबाई कुवळेकरः

सत्यभामाबाई नावाची एक बालविधवा, 1920 ला गांधीजींचे भाषण ऐकलेव ती जणू आपल्या अंगावरचे सर्व दागिने उतरून तिने गांधीजींकडे राष्ट्रीय कामासाठी .संमोहित झाली गांधीजींच्या .म्हणून दिले व आजन्म सोने न वापरण्याची शपथ घेऊन पुढे ती पाळली.



देशभक्त कार्यक कार्यक्रमानुसार काम करता करता त्यांचा परिचय एकात्याशी झालाविनायकराव . विनायकरावांना बरोबर घेऊन पुढे सुमारे .हरोळीकर त्यांचे नाव 15 वर्ष त्यांनी ग्रामसुधाराचे काम केले.काँग्रेस वर्किंग कमिटीच्या सदस्यही त्या बनल्या .सविनय कार्यदेभंगातही भाग घेतला .

स्वातंत्र्यानंतर सातारा जिल्ह्याचे सातारा व सांगली दोन जिल्हे बनले. सातारा जिल्ह्याने आपले स्वातंत्र्य घोषित केले. आपले समांतर सरकार स्थापन केले. प्रतिसरकार. क्रांतिसिंह नाना पाटील यांनी या कामी पुढाकार घेतला. तुफानदल नावाची सैनिक व्यवस्था निर्माण झाली. तुफान दलाची स्त्री शाखाही होती. येरवड्याच्या कारागृहातून पळून सातार्याला आलेल्या खानदेशामधील लीला पाटील तुफानदलाच्या कप्तान होत्या. त्यांच्या पुढारीपणाखाली डोंगर कपारीतील महिला संघटित झाल्या. बंदुका चालवायला शिकल्या स्वयंचलित शस्त्रेही चालवू लागल्या. गुप्त बातम्या काढून आणू लागल्या. प्रतिसरकारच्या महिला कार्यकर्त्यांचा खूप छळ होई. काशीबाई हणवर नावाच्या एका महिलेच्या गुप्तांगात पोलिसांनी मिरची पावडर घातली. तिने हा अपमान, छळ व कौर्य सहन केले पण शेवटपर्यंत कुठल्याही कार्यकर्त्यांचे नाव अगर पत्ता सांगितला नाही. तुफान दलातील 95 टक्के स्त्रिया ग्रामीण होत्या. निरक्षर होत्या. परंतु त्यांचे धैर्य, सहनशक्ती व समयसूचकता कौतुकास्पद होती. स्वातंत्र्यानंतर परत त्या आपल्या संसाराला लागल्या. राजूताई बिरनाळे, उर्फ जैनाची ताई, हंसाताई पाटील यांनी व अशा अनेकींनी तुफान दलात मोलाची कामगिरी केली आहे. भूमिगतांना लपविले आहे. त्यांना जेऊ खाऊ घातले आहे. त्यांचे निरोप व चिड्ड्या पोहचविल्या आहेत. नाना पाटील स्वातंत्र्या नंतरच्या आपल्या एका सभेत म्हणाले होते. आमच्या भगिनी जर आम्हांला मदत करण्यासाठी खांद्याला खांदा लावून उभ्या राहिल्या नसत्या तर आम्हांला यश मिळणे कठीण होते.

#### जानकीदेवी बजाज:

विदर्भातील श्रेष्ठ स्वातंत्र्यसंग्राम सैनिक होत .त्यांनी 1925 पासून ते स्वातंत्र्यप्राप्ती पर्यंत अविरत देशसेवा केली. जन्म 07 फेब्रुवारी 1983 ला जावरा या राजस्थानातील गावात झाला. घरची आर्थिक परिस्थिती चांगली होती. जमनालालजि ना गांधीजींनी आपले पाचवा पुत्र मानले होते. त्यांनी देशाच्या स्वातंत्र्य संग्रामात तन-मन-धनाने झोकून दिले .1930 32 च्या लढ्यात तर केवळ वर्धा किंवा वर्धेच्या परिसरातच नव्हे तर त्यांनी विलेपार्ले मुंबई छावणीत जाऊन आपले प्रचार कार्य केले.

#### मालतीबाई थत्ते:

या विदर्भातील पहिल्या महिला सत्याग्रही होत. मालती ताई चे माहेर कोकणातील पाग गावचे. त्यांचा जन्म 19 मे 1919 ला झाला .वडील राष्ट्रीय वृत्तीचे होते .त्यांचे प्रेरणास्थान त्यांचे पती होते. दाम्पत्य वर्धेला आल्यावर मालती ताई विनोबांच्या सत्याग्रह आश्रमात दाखल झाल्या



.महात्मा गांधी आणि पू.बापू विनोबाजींच्या सहवासामुळे दांपत्याचा कायापालट झाला .महिलाश्रम या संस्थेत 1932 ते 1968 पर्यंत शैक्षणिक सामाजिक व राजकीय कार्य केली.

#### गंगुबाई वालुंजकर:

वर्धा जिल्ह्यात राष्ट्रीय प्रचार कार्य करणाऱ्या गंगुबाई गोपाळराव वालुंजकर आणि माहेरच्या गंगु उधळी कर. त्यांचा जन्म 8 सप्टेंबर 1909 ला सातवा विमोरा या भुसावळ जवळील खेड्यात झाला. राष्ट्रीय कार्यात आघाडीवर असलेल्या या दांपत्याचा विवाह खादी कपड्यावरचे झाला. त्या आयुष्यभर खादीधारी होत्या .1932 च्या कायदेभंग लढ्यात गंगुताई अन्य आश्रमवासी महिला बरोबर वर्धा येथे पकडल्या गेल्या. वर्षे वरून 80 महिलांची सहा महिन्यांनंतर आता नागपूर तुरुंगात बदली करण्यात आली होती .गंगुबाई अडीच वर्षांच्या मुलाला घेऊनच तुरुंगात तुरुंगात जाऊ लागल्या.

#### सावित्रीबाई बजाज:

यांचा जन्म 1919 सालचा .कमलनयन बजाज यांच्या पत्नी .संपूर्ण बजाज परिवारच 1920 पासूनच राष्ट्रीय स्वातंत्र्यलढ्यात सहभागी झालेला होता. 1942 च्या भारत छोडो लढ्यात या सहभागी झाल्या. झेंडा लावण्याकरता त्या लहान काठी आणि झेंडा घेऊन जात आणि ठराविक ठिकाणी अन्य देशांनी मुलीत झेंडा लावीत आणि भाषणाला सुरुवात होत असे.

#### शरयू ताई धोत्रे:

यांचा जन्म 1910 मध्ये पूर्व खानदेश मध्ये झाला .वडील अण्णासाहेब दास्ताने प्रख्यात वकील होते. महात्मा गांधींच्या हाकेला देऊन त्यांनी पुर्णवेळ देश कार्य सुरू केले .सेनापती बापट, महात्मा गांधी अशा अनेक पुढाऱ्यांची माहेरी लहान असताना संपर्कात आल्यामुळे त्या सर्व व्यक्तींचा प्रभाव त्यांच्या व्यक्तिमत्त्वाच्या घडणी वर झाला. त्या व्यक्तींच्या व्याख्यानाची दवंडी स्वतः देत असत. 1921 च्या असहकार आंदोलनात त्यांचा महत्त्वपूर्ण सहभाग होता .1922 मध्ये प्रथम घरच्या विदेशी कपड्यांची होळी नंतर घरोघरी जाऊन विदेशी कपडे आणण्याचे काम केले व कपड्यांची होळी केली. 1932 मध्ये जंगल कायदा मोडल्याबद्दल त्यांना सहा महिन्यांची राक्तमजुरीची शिक्षा झाली.

#### सारांश :-

पुरुषांच्या खांद्याला खांदा लावून त्यांनी सत्याग्रह केले.लाठ्या-गोळ्या खाल्ल्या, तुरुंगवास भोगले, ज्यांना काही अडचणीमुळे घराबाहेर येता आले नाही त्यांनी पत्रकांच्या नकला केल्या निरोप पोहोचविले, भूमिगतांना लपविले, सामग्री नेऊन पोहोचविली, गुप्त हेरगिरी केली. या देशाचे स्वातंत्र्य अशा ज्ञात व अज्ञात स्त्रियांच्या त्यागाच्या पायावर उभे राहिले. हे करत असताना त्यांच्या डोळ्यांसमोर, सर्वांच्या हातांना काम, राहायला घर, शिक्षणाची सोय, आरोग्याची काळजी लोकांच्या हातांत राज्य असे भारताचे चित्र होते. आज देशात माजलेली ठोकशाही, महिलांवर



होणारे अत्याचार, बोकाळलेला भ्रष्टाचाराचा दहशतवाद या सर्वांचा मोड करून स्वातंत्र्यसैनिक व हुतात्म्यांच्या स्वप्नातला भारत आपण उभा करणे हीच या स्वातंत्र्यसैनिकांना श्रद्धांजली होय. सर्वांच्या भगीरथ प्रयत्नाने भारताचे स्वातंत्र्य हे पूर्ण स्वातंत्र्य झाले. भारतातील स्त्रियांचा स्वातंत्र्य लढ्यातील सहभाग हे भारताच्या स्वातंत्र्य लढ्याच्या इतिहासातील सोन्याने लिहिलेले पान आहे.

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# लोककल्याणकारी राजा शिवछत्रपती

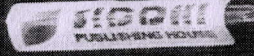
Benevolent King Shivchhatrapati



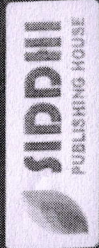
डॉ. बबुवान केरबाजी मोरे  
संपादक

लोककल्याणकारी राजा शिवछत्रपती  
Benevolent King Shivchhatrapati

संपादक : डॉ. बबुवान केरबाजी मोरे



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## शिवकालीन गुप्तचर यंत्रणा

डॉ. गोरखनाथ पांडुरंगराव फसले

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प्रस्तावना :

युगप्रवर्तक छत्रपती शिवाजी महाराजांनी आदर्श राज्यव्यवस्था निर्माण केली. शिवरायांसारख्या ब्रह्मा राजाचे 'गुप्तचर' या राज्याच्या महत्त्वाच्या अंगाकडे दुर्लक्ष होणे शक्यच नव्हते. त्यामुळेच शिवाजी महाराजांच्या राज्यव्यवस्थेत हेरव्यवस्थेला अतिशय महत्त्व होते. या व्यवस्थेस प्रबळ करण्याचे सर्व प्रयत्न राजांनी केलेले दिसतात. इंग्रज आणि फ्रेंच यांनीसुद्धा शिवरायांच्या हेरव्यवस्थेचे कौतुक केलेले आहे. शिवरायांचा जाणता राजा असा गौरव केला जातो. शिवरायांना सर्वच बाबतीत 'जाणते' ठेवण्याचे कार्य त्यांच्या हेरव्यवस्थेने चोखपणे बजावलेले दिसते. शिवाजी महाराजांच्या कल्पनेतील हेरव्यवस्थेला मूर्त स्वरूप देण्याचे श्रेय निःसंशय बहिर्जी नाईक यांच्याकडे जाते. कुशाग्र बुद्धिमत्ता, समयसूचकता यांना साहसाची जोड देऊन बहिर्जी नाईक जाधव यांनी शिवकाळात अचूक कामगिरी बजावली आहे. शिवाजी महाराजांच्या प्रत्येक रोमहर्षक विजयाचा पाया बहिर्जी नाईक आणि त्यांच्या हेरबात्याने घातला असे म्हणल्यास अविशयोक्तीचे ठरणार नाही. शिवाजी महाराजांनीदेखील त्यांचे महत्त्व ओळखून हेरबाते प्रबळ करण्यावर भर दिला. अष्टप्रधान मंडळात हेरबात्याला स्वतंत्र स्थान देण्यात आलेले नव्हते तरी बहिर्जी यांना सरदारकीचा दर्जा दिला आणि हेरबात्यास साधनसामग्री आणि द्रव्याची चिंता भासू दिली नाही.

भारतीय हेरगिरीची सुरवात होते ती पाच हजार वर्षांपूर्वी म्हणजे ऋग्वेद काळात, ते आपल्या तन्मास गुप्तहेरांचे पूर्वज होय. आता इथे प्रामुख्याने उल्लेख आहे तो म्हणजे आद्य गुप्तचर प्रमुख वरूण यांचा, त्या काळातल्या लोकांच्या दृष्टीने वरूण हा इंद्र, अग्नी प्रमाणेच यांचा रक्षणकर्ता होय. ऋग्वेदात वरूणदेवाची एक ऋचा येते, मित्रन् दुवे पुतदक्षन् वरूणच दिक्षदसम् धिय धृता ची साधन्त ऋग्वेद मंडळ (सुक्तर) याचा अर्थ असा कि मित्र आणि वरूणदेव यांनी उन्मृहला बलशाली बनवावे, वरूणदेवाने



आमच्या शत्रूंचा नाश करावा. अथर्व वेदातही वरूणदेवाचा उल्लेख आहे, त्यात म्हटले आहे. त्यांना हजार डोळे आहेत. यातून दिसून येते कि, त्याकाळी गुप्तहेर यंत्रणा कशी होती. यांनंतर गुप्तहेर संस्थेचा शेट आणि स्पष्ट उल्लेख आहे तो महाभारतामध्ये. यात महाराष्ट्री भीष्मांनी राजांची कर्तव्ये सांगितली आहेत. भीष्मांनी सांगितलेल्या कर्तव्यांपैकी प्राथमिक कर्तव्ये म्हणजे हेरांची नियुक्ती, हे हेर नगरात, प्रातांमध्ये ठेवावेत असेही भीष्म सांगतात. त्यांच्या नजरेतून काहीही सुद्ध नये अगदी राजपुत्र, राज्याचे नातेवाईक आणि मित्रसुद्धा, यावेळी भीष्मांनी हेरांनी काय करावे याबाबत सुद्धा मार्गदर्शन केले आहे. थोडक्यात गुप्तहेराने गुप्तचर आणि वार्ताहर म्हणून काम करावे असं ते सांगतात. यांनंतर अजून स्पष्ट आणि मुद्देसुद्द अशी माहिती मिळते ते चंद्रगुप्त मौर्यांना मार्गदर्शन करणाऱ्या चाणक्य कडून. त्यांनी लिहिलेल्या "कौटिलियम अर्थशास्त्रम्" ह्या ग्रंथामध्ये गुप्तचर यंत्रणा हा भाग आहेच. कौटिल्याने गुप्तहेरांचे तब्बल ९ प्रकार सांगितले आहेत. त्यांच्यानुसार हे गुप्तहेर विद्यार्थ्यांपासून संन्याशापर्यंत असतात. कौटिल्य सांगतात देशातील आणि परराज्यातील गुप्त आणि बाह्य गोष्टींची माहिती मिळविणे, परराज्यात फिरतुरी माजविणे हे हेरांचे मुख्य काम असते. याच्या पुढे कोणाला फिरतुर करायचे आणि त्याचे चार प्रकार सुद्धा सांगितले आहेत. यामध्ये क्रुद्ध, भयभीत, चौथी आणि मानी यांचा समावेश आहे. यांनंतर पुढे गुप्तहेर संस्था सम्राट अशोकाच्या काळातही पाहायला मिळते. कलिंगाच्या रक्तपातानंतर अशोकाने जरी अहिंसाप्रधान बौद्ध धर्म स्वीकारला असला तरी त्याने आपले सैन्य विसर्जित केले नव्हते. यांनंतर हेरगिरीचे एक उत्तम उदाहरण सापडते ते मगध मध्ये, अजातशत्रूने आपल्याच पित्याचा वध केला आणि त्या धक्याने विद्वीसारच्या पत्नीचे आणि प्रसेनजीतच्या बहिणीचे निधन झाले. बहिणीच्या निधनाने सतापलेल्या प्रसेनजितने युद्ध पुकारले पण पहिल्या युद्धात त्याचा पराभव झाला. यांनंतर मात्र प्रसेनजितने गुप्तहेरांचे जाळे पमळून बलाढ्य अजातशत्रूचा पराभव केला. मध्ययुगात गुप्तहेरांची नोंद आपल्याला सापडते ती कृष्णदेवराय यांच्या अमुक्तमाल्लद या ग्रंथामध्ये.

कृष्णदेवराय म्हणतात राजानेही राज्यातील समूक शत्रू उखडून टाकून पाहिजेत, त्यावर सतत आपली नजर ठेवली पाहिजे. आणि यानादी हवे ते गुप्तहेरांचे जाळे. सूर्यास्तानंतर मात्र त्याने हेरांशी सल्ला मनलन करायची त्यांच्या या उपदेशांमुळेच विजयनगर साम्राज्य निर्माण झाले. अनेक ठिकाणी 'जासूद' असा शब्द आढळतो, जासूद हा फार्सी शब्द आहे. पण जासूद म्हणजे गुप्तचर किंवा हेर असाच असेल असे नाही. किंबहुना नुसती बातमी किंवा निरोप एका ठिकाणाहून दुसऱ्या ठिकाणी नेणाऱ्यास मुद्धा जासूद म्हटले जात असे. हिदीत 'जासूस' हा शब्द गुप्तहेर अशा अर्थी वापरला गेलेला दिसतो. काही ठिकाणी यांना 'नजरवाजा' असा शब्द वापरलेला दिसतो, वाज म्हणजे गरड आणि गरड हा पक्षी त्याच्या तीक्ष्ण नजरेसाठी प्रसिद्ध आहे, कदाचित गरडासारखी तीक्ष्ण नजर असलेला म्हणून नजरवाज हा शब्द हेरांसाठी वापरला जात असावा. हे हेर किंवा गुप्तचर एकमेकांची ओळख पटावी म्हणून काही खुणा किंवा काही बन्न वापरत होते का याबद्दल फार तपशील मिळत नाहीत. परंतु सांकेतिक भाषेतील काही पत्रे पेशवेकाळात आढळतात; तथापि हेरखात्याबद्दल अतिशय कमी माहिती उपलब्ध असणे, हे तत्कालीन हेरखात्याचे यशच म्हणावे लागेल.

हेरगिरीला असेच महत्त्व देणारे आणि त्यांच्या राज्यकारभाराने मुखलांना सळो कि पळो करून सोडणारे थोर राज्यकर्ते म्हणजे छत्रपती शिवाजी महाराज. छत्रपतींच्या हेर खात्यांबद्दल दुर्दैवाने फार माहिती उपलब्ध नाही. शुक्रनीती या ग्रंथातून हेर व हेरगिरीचा उल्लेख आढळतो हेरगिरीचे महत्त्व छ. शिवाजी महाराजांनीही जाणले होते. त्यांच्या सैन्यातील बहिर्जी नाईक बाधव, विश्वासराव नानाजी प्रभू मुनेबजोरकर सुंदरजी प्रभू गुजराती, बल्लभदास गुजराती, महादेव भाळी अशी काही नावे आढळतात. हेरांकडून माहिती घेऊनच महाराज रणनीत ठरवीत असावेत. पण विविध बखरी, इंग्रज, फ्रेंच नोंदींपासून स्पष्ट होते कि, बहिर्जी नाईक स्वराज्याच्या हेर खात्याचे प्रमुख होते. शिवरायांच्या लष्कराने हेरांना जासूद या नावाने ओळखले जायचे. समानद त्यांचे प्रमुख म्हणजे बहिर्जी नाईक यांचा "शाहाणा" असा उल्लेख करत. मुरन प्रकरण अन्तिम



महाराजांची आगा येथून मुटका या दोन्ही प्रकरणात स्वराज्याच्या हेरांनी नवी कामगिरी केल्याच्या नोंदी आहेत. इंग्लिश फॅक्टरी रेकॉर्ड मध्ये सुद्धा शिवाजी महाराजांनी हेर वाढवल्याचा उल्लेख आहे. त्याच रेकॉर्डमधील त्या पत्रात एक विलक्षण उल्लेख आहे. त्यात इंग्रज अधिकारी म्हणतो, शिवाजीचे हेर सर्वत्र आहेत, त्यांच्या शत्रूला रसद कोण पुरवत हे त्यांना चांगलाच माहित असत. इंग्रज प्रवाशी अवे कॅरे जेव्हा स्वराज्यातील मन्दाराला भेटतो तेव्हा त्याने काही नोंदी करून ठेवल्या आहेत. तो म्हणतो शिवाजी महाराज वहादूर आहेतच ते बळाच्या जोरावर काहीही करू शकतात, पण ते हुशारही आहेत. त्यामुळेच त्यांनी प्रत्येक दरबारात आपली माणसे पेरली आहेत. यामुळेच खबर तातडीने समजतात आणि महाराज न्यावर हल्ला करण्यास सज्ज देखील असतात. छत्रपती शिवाजी महाराज लाच्या हेर यंत्रणेबद्दल जी काही माहिती मिळते त्यातून एक गोष्ट अभल्याला स्पष्ट होते कि, महाराजांनी कौटिल्याची युद्धनीती चांगलीच आत्मसात केलेली होती. गुप्तचर खाते राज्याचा तिसरा डोळा आहे हे शिवाजी महाराजांनी चांगलेच जाणले होते.

छत्रपती शिवाजी महाराजांच्या गुप्तहेर खात्यात जवळजवळ तीन ते चार हजार गुप्तहेर असायचे. गुप्तहेर खात्याचेही दोन विभाग होते. म्हणजे, खुद्द अधिकृत (ऑफिशियल) गुप्तहेर खात्यातील हेर आणि परराज्यात जाणाऱ्या वकील मंडळी ! जे खुद्द गुप्तहेर खात्यातच 'नोकरीला' असत त्या लोकांची ओळख फारशी कोणालाच पटत नसे. हे लोक इतके वेमालूम राहिलेले काम करीत की त्यांच्या घरच्यांनाही समोरचा माणूस आपलाच वाटलाही आहे हे ओळखता येत नसे. आता घरच्यांचीच ही अवस्था तर जवळ काय ओळखणार म्हणा. ह्या सर्वांचे नेतृत्व नाईकांकडे होते. हे सर्व गुप्तहेर नाईकांनी विजापूर, दिल्ली, कर्नाटक, पुणे इत्यादी शहरांत अगदी हुशारीने पसरवले होते. चुकीची माहिती देणाऱ्यास कडेलेट हा पर्याय बहिर्जींनी ठेवला होता. त्यांनी गुप्तहेर खात्याची जणू काही एक भाषाच नव्यार केली होती. ती भाषा फक्त नाईकांच्या गुप्तहेरांना, शिवाजी महाराज आणि नेमाजी महाराजांना कळे. त्यात पक्षांचे, बाऱ्यांचे आवाज असत. दुसऱ्याही नेत्रेण आवाचा अभल्यास त्या भाषेत दिला जाई. महाराज आज हुद्दल्या मोहिमेवर जाणार आहेत हे सर्वांत आधी बहिर्जींना माहिती

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अनायचे. त्या ठिकाणची खडानखडा माहिती बहिर्जी काढत व शिवाजी महाराजांपर्यंत लवकरात लवकर पोहचवीत. असे म्हटले जाणे की, महाराजांच्या दरबारात बहिर्जी जर वेशांतर करून आले असले तर ते फक्त महाराजच ओळखायचे. मोडक्यात दरबारात बहिर्जी नाईक जाधव नावाचा इसम नाहीच, अशी सर्वांची समजूत असायची. बहिर्जी नाईक जाधव हे फकीर, वासुदेव, केळी, भिकारी, संत, आदी कुठलेही वेशानगर करण्यात पटाईत होते. पण फक्त वेशांतरच नाही तर नेमोरच्या माणसाच्या नकळत त्याच्या तोंडातून शब्द चोरण्याचे चातुर्य त्यांच्याकडे होते. ते विजापूरचा आदिलशहा आणि दिल्लीचा बादशहा ह्यांच्या महालात वेशांतर करून जात व खुद्द अदिलशहा व बादशहा यांच्याकडून पक्की माहिती घेऊन येत. हेर असल्याचा संशय जरी आला तरी कसल करणारे हे दोन्ही बादशहा बहिर्जींना एकदा देखील पकडू शकले नाहीत, यातच बहिर्जी नाईक जाधव यांची बुद्धिमत्ता व चातुर्य दिभूत येते. हे गुप्तहेर निरनिराळ्या वेशात शत्रूच्या गोटातील बातम्या हरतहोताने महाराजांपाशी वा महाराज नसतील तर पंतप्रधान, सरसेनापती अथवा न्वराज्याच्या तिनक्याच तोंडामोलाच्या अधिकार्यांपाशी पोहोचवत असत. मग यात प्रसंगी संत, गोमाची-बैरागी, पीर, गारडी, कुड्मुडे ज्योतिषी, पाणक्ये, फिरूर म्हणून आलेले, शत्रूच्यांसार लागणारे, घोड्यांना नाल ठोकणारे, वेढविगारी अशी कोणतीही कामे करायला हे हेर तयार असत. हरप्रकारे, कोणालाही समजणार नाही याची काळजी घेत, सर्वत्र भिन्नीनी आणि तिखट नजर ठेवून हे न्वराज्याचे हेर आपली कामगिरी अतिशय चोख वजावीत असत. प्रत्येक वेळी शत्रूच्या गोटातील गुप्तहेरांना आपले काम सोडून बाहेर जाणे, अथवा न्वतःहून महाराजांकडे खबर पोहोचवायला जमत नसे. याकरताच, काही ठारान्विक अंतरावर, स्वराज्याच्या हेरखात्याची माणसे निरनिराळ्या कामांच्या निमित्तानेच तैनात केलेली असत. हे हेर एका साखळी पद्धतीने काम करून वानम्या अतिशय वेळच्या वेळी, अतिशय जलदगतीने महाराज कुडीही असतील तरी पोहोचण्या करून असत. शत्रूची शहरे लुटण्यापूर्वी हेरांच्या मदतीने कशी तयारी केली जात असे, याचा उल्लेख सभासद वखरीत आहे. त्यात असे लिहिले आहे की, 'पुढे जितकी मुखली शहरे होती, त्यात दोन चार माणसे वेयांतर करून पाळतीस

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ठेवली. दोघे खबर द्यावयास यावे, दोघांनी तेथे हुशार राहावे, मग लष्कर पाठवून हेवेलिया, शहरे मारावी, ही तजवीज केली.

शिवाजी महाराजांच्या आयुष्यातील प्रत्येक घटनेत गुप्तहेर म्हणून त्यांचा सहभाग असायचा. त्यात अफजलखानाचा वध, पन्हाळयावरून सुटका, शाहिस्तेखानाची बोट तोडणे, पुरंदरचा वेढा, किंवा सुरत असो, अशा प्रत्येक प्रसंगात बहिर्जी नाईक जाधव महाराजांचे अर्थ काम पूर्ण करत असत. ह्या प्रत्येक घटनेत बहिर्जींनी शत्रूची इत्थंभूत माहिती महाराजांना दिली होती. महाराज बहिर्जींनी दिलेल्या सल्ल्याचा विचार करून पाऊल टाकत. सर्व गुप्तहेर नाईकांनी विजापूर, दिल्ली, कर्नाटक, पुणे इत्यादी शहरांत अगदी हुशारीने पसरवले होते. चुकीची माहिती देणाऱ्यास कडेलोट हा पर्याय नाईकांनी ठेवला होता. त्यांनी गुप्तहेर खात्याची जणू काही एक भाषाच तयार केली होती. ती भाषा फक्त नाईकांच्या गुप्तहेरांना कळे. त्यात पक्षांचे, वाऱ्यांचे आवाज असत. कुठलाही संदेश द्यायचा असल्यास त्या भाषेत दिला जाई. महाराज आज कुठल्या मोहिमेवर जाणार आहेत हे सर्वांत आधी नाईकांना माहित असायचे. त्या ठिकाणची खडानखडा माहिती नाईक काढत व शिवाजी महाराजांपर्यंत लवकरात लवकर पोहचवीत. असे म्हटले जाते की, महाराजांच्या दरबारात नाईक जर वेशांतर करून आलेले असले तर ते फक्त महाराजच ओळखायचे. थोडक्यात दरबारात बहिर्जीनाईक नावाचा इसम नाहीच अशी सर्वांची समजूत असायची... मुंबईतील इंग्रजांची बातमी काढण्याच्या कामगिरीवर नेमणूक केलेल्या हेरांमध्ये सुंदरजी प्रभू हे नाव आढळते. हा सुंदरजी महाराजांचा दुतही होता, तसेच तो हेरगिरी देखील करीत असे. भिकाऱ्यांचे सोंग घेऊन हा अनेकदा मुंबई वेढ्यात फिरला, परंतु इंग्रजांना याचा संशय आल्यामुळे इंग्रजांनी त्यांना अटक केली.

बहिर्जी यांनी अफजलखान खानाच्या गोटाची इत्थंभूत माहिती काढली. खानाचे सैन्य किती आहे, त्यात पायदळ, घोडदळ, हत्ती, तोफा-दारुगोळा किती आहे, त्याच्या जवळचे लोक कोण इथपासून ते खानाची दिनचर्या, त्याच्या सवयी इ. विषयी खात्रीशीर माहिती बहिर्जींनी राजांपर्यंत पोहोचवली. इतकेच नव्हे तर खानाचा हेतू राजांस जीवे मारण्याचा आहे असा निःसंदिग्ध अहवाल बहिर्जी यांनी दिल्यानंतर

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शिवाजी महाराजांनी आपली व्यूहरचना पूर्णपणे बदलली. शिवाजी बाबरला आणि आता युद्ध होत नाही, अशी वावडी उठवून खानाचे सैन्य बेसावध ठेवण्याचे काम बहिर्जी बांध्या हेरखात्याने केले. प्रत्यक्ष भेटीच्या वेळी देखील 'खाना'ने चिलखट घातले नसल्याची आणि सप्यद बंडा धोकादायक असल्याची माहिती बहिर्जींनी पोहोचवली. पन्हाळयाहून शिवाजी महाराजांची सुखरूप सुटका करण्याचे श्रेय जसे दाजीप्रभू आणि शिवा काशीदकडे जाते तसेच ते बहिर्जी बांध्याकडे देखील जाते. शाहिस्तेखान प्रसंगातदेखील त्याच्या सैन्यात घुसून संपूर्ण माहिती अचूकपणे काढण्याचे काम बहिर्जी यांनी केले. उदा. रात्री पहाटे मुस्त असतात इथपासून ते खान कुठे झोपतो, भटारखान्यापासून जनानखान्यात जाणारा रस्ता कड्या विटांनी बंद केलेला आहे (हाच रस्ता महाराजांनी खानापर्यंत पोहोचण्यास वापरला पण तो बंद आहे हे ऐन वेळी समजले असते तर योजना फसण्याची नक्कल होती.). तसेच रमझानचा महिना चालू असल्यामुळे रात्री पहाटे सुस्तावलेले असतात इत्यादी तपशीलवार माहिती शिवाजी महाराजांपर्यंत पोहोचल्यानंतर त्यांनी शाहिस्तेखानावर हल्ला करायची योजना आखली आणि ती यशस्वी केली. कारतलव खान कोकणात जाण्यासाठी पुण्याहून नियाल्यापासून बहिर्जी आणि त्याचे हेर खानाच्या सैन्याच्या आजूबाजूला राहून माहिती काढत होते. खान वोनघाट मार्गाने कोकणात जाईल असा अंदाज होता, पण खानाने ऐनवेळी उंबरखिंडीचा मार्ग निवडला. याजांना ही माहिती मिळाल्यानंतर त्यांनी आपले सैन्य आधीच उंबरखिंडीज आणि आसपासच्या जंगलात पेरून ठेवले. खानाचे सैन्य खिंडीच्या मध्यावर येताच आघाडी आणि पिछाडीची नाकाबंदी करून खानाचा पूर्ण मराभव केला. बहिर्जी यांनी दिलेल्या अचूक आणि योग्य वेळी दिलेल्या माहितीचा यात निश्चितच मोठा वाटा होता. सुरत हे मोगलांचे एक मोठे व्यापारी ठाणे होते त्यामुळे वाहेरून कुमक मिळण्याआधी मोहीम पूर्ण करणे आवश्यक होते. म्हणूनच या लुटीची योजना ३-४ महिने आधीपासून सुरू होती. या योजनेचा एक भाग म्हणून बहिर्जी सुरतेत दाखल झाले.

बहिर्जी नाईक भिकाऱ्याच्या वेशात सुरतभर फिरत होते. या फिरस्तीत सुरतेच्या संरक्षण मज्जातेबरोबरच, संपत्तीच्या ठावठिकाणांची अचूक माहिती बहिर्जी यांनी संकलित केली. त्यामुळे सुरतेच्या वेगीवरून शिवाजी महाराजांनी इनायतखानास (सुरतचा सुभेदार) जे निवर्णणीचे पत्र दिले त्यात हाजी सप्यद बेग, वहरजी बोहरा, हाजी कामीम इ. धनिकांची नावेच दिली. इतक्या दूरवरून आलेल्या शिवाजीस आपली नावेदेखील

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माहीत आहेत हे जेव्हा या लोकांस कळले तेव्हा त्यांची भीतीने गाळण उडाली. हेरगिरी करताना वल्लभ गंगादास या व्यापाऱ्यास सुरतेच्या मोगल सुभेदाराने छ. शिवाजी महाराजांचा हेर असल्याच्या संशयावरून अटक केल्याचे दिसते. महाराजांनी १६६९ मध्ये चक्र दोन गोऱ्या सोर्तुंगीजांचाही हेर म्हणून वापर केल्याचा उल्लेख शिवकालीन महाराष्ट्र या ग्रंथात आहे.

आग्याहुन सुटका हा शिवाजी महाराजांच्या आयुष्यातील अत्यंत कठीण आणि रोमहर्षक प्रसंग मानला जातो. औरंगजेबासारख्या क्रूर शत्रूच्या हातून सुटका करून घेऊन सुमारे ७०० मैल लांब असलेल्या स्वराज्यात शिवाजीराजे सुबळरूप परत आले. या प्रसंगात बहिर्जी यांच्या बुद्धिमत्तेची जोड मिळाली नसती तर इतिहास काही वेगळा झाला असता. परराज्यात बोलणी करायला जाणारी वकीलमंडळीही उत्तमप्रकारे अतिशय अचूक बातम्या आणत असत. मूळत महाराज एखाद्या तिष्ठ नजरेच्या आणि अत्यंत मावध, आणि अत्यंत हुशार अशा माणसालाच आपला वकील म्हणून पाडवत असत. मोनोपंत विश्वनाथ डबीर पंतसुमंत, त्यांचे चिरंजीव ज्यंबक मोनदेव डबीर, सोनोपंतांचे जावई रघुनाथ बल्लाळ कोरडे, रघुनाथ बल्लाळ अत्रे पंतमबनिस, सखोपंत कृष्ण लोहोकरे, मुल्ला हैदर उर्फ काझी हैदर, पंताजी गोपिनाथ बोकील अशा वकीलमंडळीची नावे आपल्याला सापडतात. बहिर्जी यांच्या कारकिर्दीत त्यांना एकदाच ओळखले ते जॉर्ज ओग्वेन्डन या सुरतेच्या इंग्रज वखारवाल्याने..!(शिवराज्याभिषेकाचे जे चित्र आपण पाहतो त्यात महाराजांना लवून मुजरा करणाऱ्या हेन्री ओग्वेन्डनचा हा भाऊ). सुरतची लूट चालू असताना वखार वाचवण्यासाठी महाराजांची विनवणी करावयास गेला तेव्हा. महाराजांच्या बाजूला उभा असलेला इसम(बहिर्जी) आणि आपल्या वखारीसमोर भीक मागणाऱ्या भिकाऱ्यात त्याला साम्य आढळले हे त्याने ईस्ट इंडिया कंपनीला पाठवलेल्या अहवालात हे नमूद केले होते.

सारांश :-

तंत्रज्ञानाची माध्य नसताना बहिर्जी नाईक यांच्या हेरांनी माहितीचे संकलन, विश्लेषण इतक्या अचूकपणे कसे केले, भौगोलिक ज्ञान कसे मिळवले आणि ती माहिती योग्य वेळी इच्छित व्यक्तीपर्यंत कशी

पोहोचवली हे एक कोडेच आहे. इतिहास अनेक प्रश्न अनुत्तरित ठेवतो तसाच हाही प्रश्न इतिहासाने अनुत्तरित ठेवला आहे. बहिर्जी नाईक यांनी 'माहिती तंत्रज्ञानाची' एक अद्ययावत यंत्रणा निर्माण केली असे म्हटल्यास वाचगे ठरणार नाही. बहिर्जी नाईक आणि त्यांची यंत्रणा ही त्या काळातील सर्वश्रेष्ठ हेरयंत्रणा होती हे निर्विवाद सिद्ध होते. आज आपणास आदिलशहाचा हेर कोण होता? औरंगजेबाचा हेर कोण होता असे विचारले तर ते आपल्याला माहीत नसते. इतिहास संशोधक त्यांची नावे कदाचित सांगू शकतील पण हेच शिवाजी महाराजांचा हेर कोण असे विचारल्यावर पटकन आपल्यासमोर नाव येते ते 'बहिर्जी नाईक जाधव'.

गुप्तचर मग ते कोणत्याही काळातील असेत त्यांना मलमर नसते. कारण ते हातात नंगी तलवार घेऊन शत्रूस आव्हान देत नाहीत किंवा रोमहर्षक लढाया जिंकत नाहीत. त्यांचा पराक्रम लोकांसमोर येत नाही, कारण त्या पराक्रमाचे साक्षीदार नसतात. सेनानी लढाईत लढतात पण गुप्तचरांना शांततेच्या काळातदेखील लढावे लागते. ही लढाई बहुतेक वेळा संयम आणि बुद्धी यांची असते. सोंग घेणे, वेणांतर करणे सोपे असते पण ते सोंग वठवणे कठीण काम असते त्यानाठी जे सोंग आपण वठवणार आहेत त्याचा बारकाईने अभ्यास करावा लागतो. गुप्तचरांच्या कामात प्रतिस्पर्ध्यावर अव्याहतपणे बौद्धिक कुरघोडी करणे अपेक्षित असते. वरील सर्व बाबींचा विचार करता बहिर्जी हे एक असामान्य व्यक्तिमत्त्व होते हे मान्य करावे लागेल. परंतु दुर्दैवाची गोष्ट अशी की, शिवरायांचा 'तिसरा डोळा' म्हणून वावरलेले हे व्यक्तिमत्त्व आपल्या साहित्यात आणि दृक्शब्द माध्यमात दुर्लक्षित राहिलेले आहे. 'बहिर्जी नाईक' हा १९४६ सालचा सिनेमा, २-४छोटे छानी पुस्तके, भूपाळाड येथील समाधी आणि कुंभार किन्ही धरणांला दिलेले 'बहिर्जी नाईक सागर' हे नाव हीच काय ती आपण या 'सर्वोत्कृष्ट' हेरास वाहिलेली आदरांजली.. गुप्तचर यंत्रणांच्या यश-अपयशांचे एक महत्त्वाचे सूत्र मांडले आहे. ते सूत्र म्हणजे 'अज्ञात राहणे'. गुप्तचर जितका वेळ अज्ञात राहिल तितका तो यशस्वी होतो. बहिर्जी तसेच 'अज्ञात' राहिले. पण ते अज्ञात राहिले म्हणून यशस्वी झाले की यशस्वी होते म्हणून अज्ञात राहू शकले याचे उत्तर ना इतिहासकारांपाशी आहे ना दस्तुरखुद इतिहासापाशी.....!!!!



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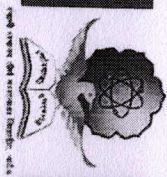
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## उदय प्रकाश की कहानियों में उपभोक्तावादी संस्कृति का चित्रण

प्रा. युवराज राजाराम मुळये

श्री. सिध्देस्वर महाविद्यालय, माजलगांव

उत्तर आधुनिकतावाद, पूंजीवाद, उदारीकरण और उपभोक्तावादी संस्कृति ने मनुष्य से को दूर कर दिया है। लोग रोजमर्रा की जिंदगी में इस कदर व्यस्त हो गए हैं कि एक मनुष्य का दूसरे मनुष्य से मिलने के लिए वक्त ही नहीं है। किसी के पास वक्त तभी होता है जब उनको किसी से कोई काम हो - "दिल्ली में ऐसे लोगों की संख्या इधर बहुत बढ़ गई थी, जो सिर्फ उसी से मिलते थे, जिनसे कोई काम होता था।" १

हमारे देश का मध्यवर्ग इस बाजार से सीधे तौर पर जुड़ा हुआ है। वह आधुनिकता की ओर बढ़ने वाला ऐसा वर्ग है जिसके बारे में पूंजीवादी ताकतें अच्छी तरह चाकिल हैं। यही कारण है कि उपभोक्तावादी संस्कृति का सबसे अधिक प्रभाव इसी वर्ग पर पड़ता है और यह वर्ग किस तरह से बदलता जाता है, इसे उदय प्रकाश अच्छी तरह समझते हैं। यही कारण है कि वे कहते हैं - "अभी आठ महीने पहले किशनगंज के जनता लैट में रहने वाले सर गंगाराम हॉस्पिटल के सफाई कर्मचारी राम औतार आर्य की सत्रह साल की बेटी सुनीला रातों-रात मालामाल हो गई थी क्योंकि किसी टी.वी. के विज्ञापन में वह आठ फुट बाई चार फुट साइज के विशाल ब्लेड के मॉडल पर नंगी सो गई थी। सुनीला को अपने चेहरे पर उस ब्रांड के ब्लेड से होने वाली शेविंग से उपजने वाले, चिड़ियों के पर के स्पर्श जैसे सुख और आनंदतिरेक को दस सेकेंड के भीतर-भीतर व्यक्त करना था। यह काम अपने चेहरे को ब्लोज शॉट में उसने इतनी निमग्न कुशलता और स्वप्नातीत भावप्रवणता के साथ किया था कि देश के एक सबसे बड़े चित्रकार ने एक अंग्रेजी अखबार में वक्तव्य दिया था कि वे एक हते में उस विज्ञापन को डेढ़ सौ बार देख चुके हैं और अब आने वाले दो वर्षों तक वे लगातार सुनीला के न्यूड्स ही बनाएंगे।" २

यह उपभोक्तावादी संस्कृति के जादू का परिणाम है जिसके कारण इस विज्ञापन की राफ़ी अंतर्राष्ट्रीय दोनों स्तरों पर चर्चा हुई थी। दूसरे शब्दों में कहा जाए तो विज्ञापन ही लोग की सोच को संचालित कर रहा था और इसी के कारण पूरे देश में बदलाव हो रहे थे। विज्ञापन ने उपभोक्तावादी संस्कृति का एक ऐसा वातावरण तैयार किया है जिससे कोई अछूता नहीं है। डॉ. निरंजन देव शर्मा उदय प्रकाश की कहानियों के बारे में कहते हैं - "उदय प्रकाश की कहानियां अपने समय के इतिहास के आइने में देखती हैं। आजादी के बाद जहाँ हम खड़े हैं वहाँ स्वतंत्रता जैसे शब्द फिताने प्रासंगिक हैं। ऐसा भी जाना जा सकता है कि कितना हिस्सा स्वतंत्रता को भोग रहा है। 'पॉल गोमरा का स्कूटर' कहानी भी कुछ

हिंदी साहित्य : विमर्श के विविध आयाम | ६९

असुविधाजनक सवाल हमारे सामने रखती है। मानव सभ्यता की कोमल भावना इंसानियत और मूल्यों को बचाए रखने की तीव्र उत्कंठा उदय प्रकाश की कहानियों में आती है। लेकिन उपभोक्तावाद के चरम पर पहुंच चुके उन्मादी समय में क्या यह मूल्य रह पाएंगे। यह सवाल भी बार-बार उठती है।" ३

भूमंडलीकरण, वैश्वीकरण तथा नव-उदारवाद ने पूरी दुनिया को बदल दिया विकसित देश तो देश, तिसरी दुनिया के देशों में उपभोक्तावादी संस्कृति की हवा तेजी से रही थी। ऐसे में हिंदुस्तान भला कैसे अपवाद रहता। देश में घटने वाली सारी घटनाओं प्रभाव दिल्ली के गाजियाबाद के कवि पॉल गोमरा के ऊपर पड़ रहा था। इसलिए 'रामगोपाल' से 'पॉल गोमरा' बना और इसी उपभोक्तावादी संस्कृति के कारण या यूँ कहें राज्य परिवहन की बस की भीड़-भाड़ से बचने के लिए, समय की बर्बादी से बचने के लिए स्कूटर लेने का निर्णय लिया। प्रो. जयमोहन इस संदर्भ में कहते हैं - "पॉल गोमरा : स्कूटर भूमंडलीकरण उपभोक्ता संस्कार का आम आदमी पर संघात, उसके टूटे अपन और विचित्र मनोविकारों का कथात्मक आख्यान है। दिल्ली के एक छोटे निकामे का रामगोपाल ने उत्तर आधुनिक बाजारवादी संस्कृति के लालच में पड़कर उपभोक्तावादी संस्कृति की बाजीगरी में फँसकर अपने आप को बदलने का प्रयत्न किया। अपने नाम का विखंड करके, खंडों को आगे-पीछे पलटकर उत्तर आधुनिक नाम स्वीकार किया 'पॉल गोमरा'।" ४

उदय प्रकाश ने 'वारेन हेस्टिंग्स का सांड' कहानी के माध्यम से मध्यवर्गीय समाज की स्थिति का बड़ा ही यथार्थ वर्णन किया है। आधुनिकता के नाम पर हमने सामाजिक एवं मानवीय मूल्यों को तहस-नहस कर दिया है। उदय प्रकाश रचित 'वारेन हेस्टिंग्स का सांड' एक ऐसी ही कहानी है जिसमें उन्होंने लूट-खसोट और बेईमानी की ऐसी दास्तान कही। जो नव-औपनिवेशिक मूल्य संकट के रूप में हमारे समाज और देश के सामने है।

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(गोवा)

मुख्य संयोजक एवं प्रबन्ध संपादक

जय कान्त मिश्रा



प्रधान संपादक

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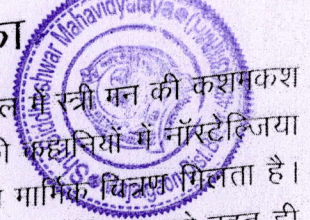
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22. दलित आत्मकथाओं का सामाजिकता के परिप्रेक्ष्य में अनुशीलन ('गैंगमैन' के विशेष संदर्भ में)	प्रा० राजेंद्र ज्ञानदेव ननावरे	132
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# प्रवासी साहित्य में महिला साहित्यकारों की भूमिका



**प्रस्तावना**—समकालीनता के इस साहित्य में प्रवासी साहित्य का दौर धीरे-धीरे विकसित होता जा रहा है। परंतु आदिकाल में मानव जब फल इकट्ठे करके और शिकार करके पेट भरता था, तब भोजन और सुरक्षित स्थान की तलाश में इधर-उधर भटकता था। जब उसने खेती करना और आग जला कर खाना बनाना सीख लिया, उसके बाद एक घर की जरूरत हुई इस तरह एक जगह टिककर लोग रहने लगे पर जब जमीन का उपजाऊपन समाप्त हो गया या वहाँ की जनसंख्या बहुत बढ़ गई या कोई प्राकृतिक विपदा आ गई तो उन्हें कहीं दूसरी जगह जाकर बसना पड़ा, अपना नया ठिकाना ढूँढना पड़ा। आज के संदर्भ में प्रवासी शब्द उन लोगों के लिये प्रयुक्त होता है जो अपना देश छोड़कर एक बेहतर जिन्दगी की तलाश में दूसरे देशों में जा बसते हैं।

‘प्रवास’ शब्द का अर्थ है, विदेश गमन, विदेश यात्रा। अतः किसी दूसरे देश में रहने वाला व्यक्ति प्रवासी है। वॉक्यूबलरी डिक्शनरी में प्रवासी की परिभाषा इस प्रकार दी गई है। “A diaspora is a large group of people with a similar heritage or homeland who have since moved out to places all over the world.” “अर्थात् प्रवासी ऐसे लोगों का एक बड़ा समूह है जिनकी विरासत या मातृभूमि एक समान है और जो विष्व के अन्य स्थलों में स्थानांतरित हो गए हैं।” प्रवासी साहित्य का संबंध प्रवासी लोगों द्वारा लिखे साहित्य से है। प्रश्न यह उठता है ये प्रवासी लोग कौन हैं और इनके साहित्य की विशेषता अथवा सुंदरता क्या है, इसी से जुड़ा है इस साहित्य का स्वरूप और साँदर्यशास्त्र।

आजकल साहित्य में कई विमर्श प्रचलित हैं। स्त्री विमर्श, दलित विमर्श की भांति इधर प्रवासी विमर्श ने भी जगह बनाई है। प्रवासी विमर्श की विशेषता यह है कि इसके अंतर्गत रचनात्मक साहित्य अधिक लिखा गया है। इसके आलोचनात्मक पक्ष पर उतना बल नहीं दिया गया है। अब हम यहाँ मॉरीशस के अभिमन्यु अनंत ही एक ऐसे लेखक हैं जिनको उल्लेखनीय माना जाता है। उनके उपन्यास ‘लाल पसीना’ ने काफी प्रशंसा पाई है। फिजी, त्रिनिडाड, अफ्रीका अथवा गुयाना से कोई ऐसा लेखक चर्चित नहीं हुआ जिसको प्रवासी लेखन में ख्याति प्राप्त हुई हो। राजेन्द्र यादव ने प्रवासी साहित्य को इसीलिए ‘संस्कृतियों के संगम की खूबसूरत कथाएँ’ कहा है।

प्रवासी साहित्य में कविता, कहानी, उपन्यास, गज़ल आदि विधाओं में मुख्यतः लिखा गया है। परंतु कहानी इस विमर्श की प्रधान विधा बन गई है। सुषम वेदी, सुधा ओम ढींगरा, जकिया जुवैरी, नीना गॉल, दिव्या माथुर, उषा वर्मा, जय वर्मा और उषा राजे सक्सेना ने प्रवासी लेखिकाओं के रूप में अपनी महत्वपूर्ण जगह बनाई है। सुषम वेदी का “हवन” और “मैंने नाता तोड़ा” उपन्यास काफी चर्चा में रहा। इसमें अमेरिका के परिवेश में एक विधवा स्त्री के जीवन को दिखाया गया है। इसके अलावा उनके कहानी संग्रह “चिड़िया और चील” ने भी व्याप्त ख्याति पाई है।

जकिया जुवैरी के कहानी संग्रह सांकल में स्त्री मन की कश्मकश को चित्रित किया गया है। जकिया जी की कहानियों में नॉस्टेलजिया और वहाँ परिवार के बीच की स्थितियों का मार्मिक चित्रण मिलता है। माँ और बेटी के अलावा, माँ और पुत्र के बीच स्वाभिमान को बहुत ही संवेदनशील ढंग से उकेरा गया है। “सांकल” के अलावा “मारिया” और “लौट आओ तुम” ऐसी ही कहानियाँ हैं।

नीना गॉल ने दो उपन्यास “तलाश” और “कुछ गाँव-गाँव कुछ शहर-शहर” लिखे हैं। इसके अलावा उनके दो कहानी संग्रह भी हैं। “कुछ गाँव-गाँव कुछ शहर-शहर” उपन्यास में इंग्लैंड के लेस्टर शहर के बनने की कहानी के साथ-साथ गुजरातियों के वहाँ जमने और संघर्ष करने को गुंथा गया है।

दिव्या माथुर की शुरुआती कहानियों में कहानी का शिल्प कम और संवेदना अधिक है अर्थात् कहानी में चरित्र-चित्रण, संवाद, वातावरण की अपेक्षा, वे कथ्य पर फोकस करती हैं। जो उन्हें कहना है, वही उनके लिए मुख्य रहता है। “तमन्ना” कहानी में एक ऐसी भारतीय बहू की कथा है, जो लगातार तनाव में है। झांसी में उसका एक सड़क छाप प्रेमी था, जो शादी के बाद भी उसे धमकी भरे खत लिखता है। सास उसे समझाती है। परंतु फिर भी वह मानता नहीं। “पंगा और अन्य कहानियाँ” तथा “2050” जैसी कहानियों तक पहुँचते-पहुँचते उनके कहानियों में शिल्प का प्रबल आग्रह दिखाई देने लगता है। शिल्प का ऐसा ही प्रयोग उन्होंने अपने पहले उपन्यास में किया है।

भारतीय संस्कृति पाश्चात्य संस्कृति से भिन्न है। भारतीय भोजन, पोशाक, धार्मिक आचार-विचार भाषा, रीति-रिवाज पाश्चात्य संस्कृति से हटकर एक पृथक पहचान स्थापित करती है। साथ ही प्रवासी हिंदी साहित्य हिंदी साहित्य की एक कड़ी बन चुकी है। इस विषय में डॉ० कमल किशोर गोयनका जी ने कहा है “अतः हिंदी के प्रवासी साहित्य की गति और विकास को अब कोई भी विरोधी शक्ति नहीं रोक सकती। वह हिंदी साहित्य की एक सशक्त धारा बन चुकी है और उसे हमें हिंदी साहित्य की प्रमुख धारा में सम्मानपूर्ण स्थान देना होगा।”

निष्कर्षतः हम यही कह सकते हैं कि आज के दौर में अगर देखा जाए तो एक परिघटना के रूप में यह साफ दिखाई देता है कि पूरे प्रवासी साहित्य की बागडोर स्त्री रचनाकारों के हाथ में है। साथ ही, नई नई रचनाएँ हमेशा पाठकों के सामने प्रस्तुत करके एक प्रभावशाली विचारधारा को झकझोरने की ताकद उनकी रचनाओं में दिखाई देती है। एक नई दुनिया का पता और उसकी आंतरिक गतिविधियों की सूचना इन कथाकारों की कहानियों और उपन्यासों से पाठकों को मिलती हैं। इन कथाकारों की रचनाशीलता ने हिन्दी साहित्य का परिदृश्य और विस्तृत किया है। इसमें दो राय नहीं हो सकती।

प्रा० युवराज राजाराम मुलये  
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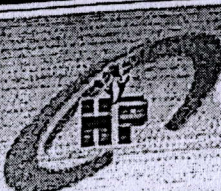
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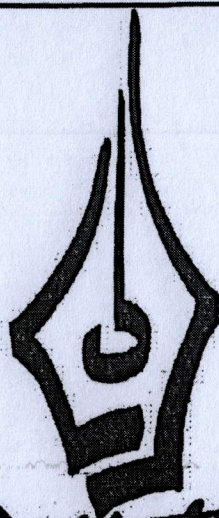
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80) फॉस उपन्यास में अभिव्यक्त भारतीय किसान जीवन का यथार्थ शिदे संतोष सखाराम, औरंगाबाद	281
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शिकंजे में बंधा हुआ है। इस तरह इस समाज व्यवस्था में किसान निरंतर पिसता रहा है।

इस उपन्यास में 'बनगाँव' का चित्रण किया गया है लेकिन इसमें पूरे किसान जीवन की त्रासदी दिखाई देती है। आज किसान की दशा, खेती से मिली असफलता के कारण किसान परेशान है।

इस तरह से कह सकते हैं कि 'फाँस' उपन्यास में किसान जीवन की दशा और दिशा को अभिव्यक्त किया है। किसान जीवन की व्यथा को बड़ी तार्किक दृष्टि से प्रस्तुत किया है। 'फाँस' का किसान खेती से उब चुका है। मोहन किसान से मजदूर बनना चाहता है। किसानों की फसल कभी-कभी ज्यादा बारिश होने के कारण तो कभी सुखे का शिकार होती रही है और हो रही है इसलिए आज भी किसान कर्ज के भयंकर आतंक में डूबते हुए दिखाई देता है।

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#### Footnote:

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## 'फाँस' उपन्यास में किसान जीवन का यथार्थ चित्रण

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भारत एक कृषि प्रधान देश है। यहाँ की *t urk d jlc d jlc* ६०-७० प्रतिशत प्रत्यक्ष और अप्रत्यक्ष रूप से कृषि पर निर्भर है। हिंदी उपन्यास के इतिहास में जहाँ तक किसानों की दयनीय स्थिति, कर्ज की समस्या तथा किसानों के प्रति हो रहे शोषण की अभिव्यक्ति का प्रश्न है तो मुंशी प्रेमचंद का नाम लिया जाता है। जो इक्कीसवीं शताब्दी में किसान जीवन का यथार्थ चित्रण प्रस्तुत करने वाले उपन्यासकार संजीव है। संजीव द्वारा लिखित उपन्यास फाँस है। फाँस उपन्यास में जो महाराष्ट्र राज्य के अंतर्गत विदर्भ क्षेत्र में निवास करने वाले किसानों के जीवन तथा उनके जीवन में आने वाले तमाम विनाशकारी समस्याओं पर आधारित है। यह उपन्यास सबका पेट भरने वाले और तन ढकने वाले देश के लाखों किसानों द्वारा किए जा रहे आत्महत्या पर केंद्रित है। आज हमें रोज अखबार और टीवी से पता चल रहा है। मीडिया पर आज के दौर में पूँजीवादी या औद्योगिक घरानों के भारी नियंत्रण के बाद भी पिछले बीस सालों में देश के तीन लाख से भी अधिक किसान आत्महत्या कर चुके हैं और आज भी उन्हें कोई रहत नहीं है, भले ही कोई हजार करोड़ मुआवजे बाँटे गए हैं किसानों की आत्महत्या या देश का कृषि संकट देश की भ्रष्ट व्यवस्था के कारण



आज भी कम होने की बजाय निरंतर बढ़ रहे हैं। इसका प्रभाव साहित्य के क्षेत्र पर भी पड़ा है। इसका चित्रण फॉस उपन्यास में दिखाई देता है।

किसान कर्ज की जाल में फंसकर आत्महत्या कर रहा है। जमींदार, राजकीय और व्यापार व्यवस्था किसानों के साथ छल कर रही है। साधारण किसान और मध्यम वर्गीय किसानों का हाल बेहाल हो रहा है। आज महंगाई आकाश चूम रही है। पहले किसानों को फसल बोनो के लिए अपने घर में ही रखे बीजों का प्रयोग करते थे। आज उत्पादन की दृष्टि के लिए नए-नए बीजों का प्रयोग करने के लिए किसान विदेशी बीजों खरीदी करने के लिए जमींदार, सावकारी या बैंकों में से कर्ज लेकर विदेशी कंपनी जैसे— नाथ सीड्स, अंकुर सीड्स कंपनियों के थैले लेकर बीज बोया जाता है और समय पर बारिश न होने के कारण फसलों को बदलने के लिए बात करते हैं। संजीव के शब्दों में— कापूस में क्या है? आत्महत्या हमने तो ताई कापूस छोड़कर ऊस (ईख) की शेती करने का निर्णय ले लिया है। आप बताओ सबको, सबका भला हो जाए। सिर्फ बताया ही नहीं, उत्साह में उसे सरपंच के घर तक लाकर ही दम दिया। सरपंच के यहाँ तीन धोतीधारी, दो पैट वाले चाय-पानी कर रहे थे। बीस एक शेतकरी पहले से हाजिर थे। यह माना जाता है कि दुनिया का सबसे ज्यादा कपास का उत्पादन करने वाला देश है। पूरे विश्व में होने वाले कपास उत्पादन का एक चौथाई भाग भारत के हिस्से में आता है। विश्व पटल पर खासकर चीन की तुलना में कपास उत्पादन और किसानों की बदहाली से संबंधित भारतीय आंकड़े चिंतनीय है। आखिर क्या कारण है कि इसी कपास की खेती करनेवाला चीन लगातार समृद्ध होता जा रहा है और भारतीय किसान लगातार आत्महत्या करने पर मजबूर हो रहा है। यह बात भारतीय लोगों को सोचने की विवश कर देता है।

पैसा तो पूंजीवादी के पास होता है या सरकारी के पास। आम लोगों के पास तो एक समय की रोटी

और तन ढकने के लिए पैसा नहीं है। फॉस उपन्यास में संजीव लिखते हैं— लगती तो है लेकिन यह पेड़ की छांव है न, इससे थोड़ा बचाव रहता है। फिर आंज तो आकाश बदरीला है। तनिक रुककर उसके चेहरे को देखते हुए कहा मुझे कोई काम चाहिए नाना। भारतीय किसानों की हाल बेहाल है। जहाँ पर कपास के उत्पादन होता है, वहाँ पर कोई मिल नहीं रहता है। महाराष्ट्र के विदर्भ क्षेत्र में सबसे ज्यादा कपास के उत्पादन का क्षेत्र रहकर भी वहाँ पर ज्यादा मात्रा में कपास की मिल नहीं है। किंतु जहाँ कपास की उत्पादन होता नहीं है। वहाँ पर ज्यादा मात्रा में कपास की मिल है। किंतु इचलकरंजी शहर के क्षेत्र में कपास की उत्पादकता नहीं परंतु वहाँ पर बड़े-बड़े कपास के मील है। वहाँ के लोगों को काम धंदा मिलता है। परंतु विदर्भ में एखादा साल बारिश न हुई तो यहाँ के लोगों को काम धंदा के लिए अन्य शहरों में जाना पड़ता है। सरकार ने जहाँ पर जो उत्पादन होता है वहाँ पर भी ही मिल होना चाहिए एखादा साल बारिश न हुई तो लोग काम धंदा करके अपना पेट पानी का समस्या हल कर सकते हैं। अन्य शहरों में काम करने की आवश्यकता नहीं है।

किसान अपनी छोटी-छोटी आवश्यकताओं को पूरा करने के लिए कर्ज लेता है। किसान अपनी फसल के भरोसे पर कर्ज लेता है। एक तो बारिश न होने के कारण फसल आता नहीं है। दूसरी और ज्यादा मात्रा में बारिश होने के कारण फसल आता नहीं है। जिसके भरोसे से कर्ज लिया था वही फॉस बना जाता है। किसान कर्ज लेता है पर चुका नहीं पाता और अंत में वह अपनी परिस्थिति से तंग आकर आत्महत्या कर लेता है। संजीव के शब्दों में— इस देश का किसान कर्ज में ही जन्म लेता है, कर्ज में ही जीता है, कर्ज में ही मर जाता है। किसान अपनी खेती बचाने के लिए तरह-तरह से लेता है और कर्ज लेकर भी अंत में निराश के बिना कुछ नहीं मिलता हर साल देश में कहीं न कहीं यही स्थिति है। जो अनाज



उत्पादन करता है वही अनाज खा सकता नहीं किंतु वह जहर पी सकता है यही हमारा भारत देश का हाल है। सरकार किसानों को मुफ्त में कर्ज देना चाहिए क्योंकि वही हमारे अन्नदाता और भगवान है।

सरकार को ही बताना चाहिए कि आत्महत्या करते वक्त किन-किन बातों का खयाल रखा जाए। कब और कैसे की जाती है आत्महत्या ? किस पंडित से पूछकर ? यह भी सिखाया जाए कि कैसे लिखी जाती है सुईसाइडल नोट ! लेखक संजीव के शब्दों में— किसान आपस में बात करते हैं—वह जो दिल्ली में पिलर-पिलर सजाकर मुकुट बनाकर बैठी है खपडोई (खोपड़ी) पर, जिसे पार्लियामेंट कहते हैं, वहीं राजा रहते हैं, रानी रहती है, वही फैसला करते हैं कि यह भी बोओगे कि वह बीज, हत्या है कि आत्महत्या, पात्र है कि अपात्र। राजनीतिक लोग किसान के तरह देखने का दृष्टि सिर्फ संसद में बोलबाला होता है। जो कुछ फैसला करते हैं वह कागज के टुकड़े बनाकर व्यापार करते हैं। वास्तव में किसान क्यों आत्महत्या करते हैं ? इसे क्या आवश्यकता है ? अभी तक स्वतंत्रता के बाद कौनसा ही सरकार किसानों को न्याय दिलाने का प्रयास किया है। राजनीति लोग किसान को भिकारी बनने पर मजबूर कर रही है। आज के युवा पीढ़ी इसी कारण खेती करने के लिए डर रहे हैं। सरकार नई पीढ़ी के किसानों को प्रेरणा देनी चाहिए तो आत्महत्याएँ रुक सकती है।

एक तरफ भारत महासत्ता बनने के लिए प्रयास जारी है। तो दूसरी तरफ भारत में किसान की पूरी जिंदगी कर्ज में ही पैदा हो रहा है और कर्ज कर्ज में ही डूब कर मर रहा है। गरीब किसान कीड़ों की तरह रेंग कर मरने के लिए मजबूर है। पेट भर खाना और तन ढकने के लिए कपड़ा ही नहीं है। गरीब किसानों के लिए स्वास्थ्य और शिक्षा प्राप्त करना उनके लिए असंभव की बात है। किसान की पेड़ों से झूलती लाशें केवल देश की व्यवस्था से और सरकार तो जिम्मेदारी है और उन्हीं के साथ साथ हमारी भी इस

व्यवस्था की जिम्मेदारी है। संजीव का उपन्यास फॉस तमाम भारतीय लोगों को सोचने के लिए विवश करता है। और भारतीय लोगों को इस गंभीर समस्या पर चिंतन और मनन करना चाहिए।

#### संदर्भ ग्रंथ सूची

- १) फॉस — संजीव, पृ.सं.१५५
- २) फॉस — संजीव, पृ.सं.३६
- ३) फॉस — संजीव, पृ.सं.१५
- ४) फॉस — संजीव, पृ.सं.११६

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## ROLE OF ENTREPRENEURSHIP IN RURAL DEVELOPMENT

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### **Introduction:**

India is a country of a villages and its development is synonymous with the development of people living in rural areas. India is a vast and second most populous country of the world. Rural entrepreneurship is generally defined as entrepreneurship emerging at village level which can take place in a variety of fields of endeavor such as business, industry, agriculture, and acts as a potent factor for economic development. MCED help development of entrepreneurship among rural population nearly 70% of its major population reside in villages and livelihood is supported by agriculture and allied activities. Thus the nation economic development depends largely on the standard of living of the people who live in the rural areas and the level of development which has actually taken place there. Indian agriculture is exposed to low productivity, natural calamities, agriculture and cash crop mismatch, disparities in various public private partnership. Since the land area for agriculture is limited not everyone is employed. This leads to migration of people from rural to urban areas. Rural development can be made possible through the growth of rural entrepreneurs which further would contribute in reducing level of poverty unemployment, etc. Rural entrepreneurship also means rural industrialisation.

### **Objectives of the study:**

- 1) To know the concept of Rural entrepreneurship
- 2) To study the role entrepreneurship rural development

### **Methodology:**

Present paper has been prepared through primary and secondary source of data collection, primary data collected through discussion with various farmers and the secondary data collected through books, articles, Journals and internet.



**Concept of Rural Entrepreneurship:**

Rural entrepreneurship refers to the development of a new enterprise which pioneers new product and services, creates a new market for its offerings or uses advanced Technology in the rural area.

In simple terms ,the entrepreneurship which springs up in non urban areas is termed as rural entrepreneurship. This is leads to the establishment of industrial units in rural areas.

**Need for Rural Entrepreneurship**

- 1) As the Rural industries are labour intensive,they tend to have a high possibility of generating employment. Which acts as a corrective measure to a number of problems causing due to unemployment stemming in the rural areas.
- 2) Rural Industries have a comparatively high potential of generating income, which reduces the disparities a midst income earned by people living in urban and rural areas.
- 3) Rural entrepreneurship, stimulates the dissemination of economic activities in the village areas, which ultimately results in balanced regional development.
- 4) It does not just protect but also promotes the art, culture and creativity, the varied heritage of that particular region.
- 5) When industries are set up in rural areas,in advances economic development which reduces migration of the villages to urban areas.
- 6) Curtails unequal growth in the urban areas, decreases the development of slums,environment pollution etc.

When industries which are environment friendly area established in rural areas. It results in development with out causing harm to nature and biodiversity

**Types of Rural Entrepreneurship :**

- 1) Agro-based Enterprises – As the name suggests,these enterprises indulgs in the direct selling or processing of agriculture products. for example- Sugar, dairy product, fruit, juice, spices, oils fromoilseeds.



- 2) Forest- based industries- industries dealings in the supply of wood product coir industry, beedi industry, honey making, bamboo product, etc. are covered under the forest based industry.
- 3) mineral based industries : cement industry, stone crushing, wall coating powders, etc. are included in the mineral based industry.
- 4) Textile industry : Industry in which weaving, spinning, tie and dye, colouring and bleaching of textile are carried out and is covered under this category.
- 5) Handicrafts : Craft items made of wood, bamboo, glass, jute, soil etc. are called as handicraft, more over, traditional decorative items. Toys, antiques etc. are also covered here.
- 6) Engineering Services: It may include tools and equipment used in agriculture such as tractors, pumps, pipes and fittings, repairs.etc

#### Role of entrepreneurship in rural development :

Rural development is more than ever before connected to entrepreneurship. entrepreneurship is an important driver of economic growth, productivity, innovation and job creation and as a key aspect of economic dynamism.

- 1) Support and inspiration to native people :  
Rural area people always motivate and support entrepreneurs to enrich their business to improve socio-economic status as balanced among rural and urban people.
- 2) Low establishment cost :  
Rural business people always planned with less budget and wastage to the urban areas.
- 3) Competitive advantages-the majority of rural people are involved in agro related work, but less income and recognition of the society they migrated as unskilled and semi skilled labour.
- 4) Government policies and subsidies : Indian government continuously involved in the development of sustainable policies and principle to meet the world market by providing less interest rate loans and subsidy.
- 5) Availability of raw material :



Raw materials are major essential and issue items in any production due to market risk and supply chain management, the availability of resources on time is hectic to no transportation cost and flotation cost.

6) Cost of production :

Entrepreneurs cost of production is very low when compared to the urban industries. The factors of production are available at low cost, Automatically the cost of production is also low. Because of this rural entrepreneurs can sell their goods and services at a cheaper cost.

7) Employment generation for rural youth :

Rural entrepreneurs are providing a hundred percent of jobs for rural youth. If the rural entrepreneurs are succeeding in this activity the migration of the people to urban from rural will be immediately stopped to a maximum extent.

**Conclusion:**

The rural entrepreneurship is a key aspect for any under developing to developed countries as per the latest economic figure. As they can help a country from developing to a developed one. This will ensure employment to the rural population which will not only remove poverty on large scale and increase their standard of living but also decrease the migration of poor people in search of jobs to the urban areas. This will help in balanced economic development and remove income disparity.

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- 4) [www.linkedin.com](http://www.linkedin.com)





## 4. Micropropagation Studies in *Kydia Calicina* Roxb

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### Abstract

The exposure to the foreign compounds may be through consumption of alien /contaminated foods from exposure to chemical substances in the occupation environment or through synthetic drugs consumed for various pathological conditions; these compounds have many toxic effects on the human liver. Liver plays a very important role in the metabolism of foreign compounds entering the body. The liver gets injured also by viruses, chemicals, alcohol and autoimmune diseases. Liver diseases remained one of the serious health problems, so medicinal plants and herbs have been use for treating such problems as in the Indian traditional systems of medicine, especially Ayurveda. Recently, a scientific basis was proved to justify the various medicinal uses of herbs like *kydia calicina*.

In present piece of work efforts have been made to regenerate the plant in vitro. Explants from mature plant of this species were collected and cultured on MS medium supplemented with various concentrations (0.5, 1.0 2.0 and 3.0 mg l<sup>-1</sup>) of cytokinins (BAP and Kn) and auxins (IAA, NAA and 2, 4-D) alone and in various combinations under controlled condition. Successful regeneration method was achieved by this method.

**Key Words:** *Kydia Calicina*, Regenerate, in Vitro

### Introduction

*Kydia calycina* Roxb (Malvaceae) synonyms *Kydia fraterna* Roxb, *Kydia roxburghiana* Wight are distributed in tropical Himalayas from the Indus eastwards to Myanmar (Burma) and in peninsular India from Northern Maharastra and Madhya Pradesh southwards, chiefly in mixed, moist and deciduous forests. The leaves of *K. calycina* were 7.5 to 15 cm long and wide, usually 3 to 7 lobed, apex angled or rounded, base cordate, palmately 7-nerved and hoary-tomentose beneath; petioles 2.5 to 5 cm (Parrot, 2001). Among the Santalis, a paste of the grounded leaves is applied to relieve body pains, arthritis and lumbago; a poultice of the leaves is traditionally used to treat skin diseases (Parrot, 2001; Ramarao and Henry, 1996). In the present



investigation, we have evaluated the hepatoprotective effect of methanolic extract of the leaves of *K. calycina* on carbon tetrachloride induced hepatotoxicity in albino rats.

### **Material and Method**

#### **Preparation of Explants**

Explants of *Kydia calicina* were collected from Botanical garden, Department of Botany Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. Apical shoot, Axillary bud, node and Meristematic tissue of *Kydia* were collected from two month old plants grown in the Botanical garden, department of Botany Dr. Babasaheb Ambedkar Marathwada University, Aurangabad. All these explants were used from donor plants during present study. The explants were washed carefully in running tap water for 10 minute and followed by distilled water for 5 minutes. For surface sterilization, chemical such as 70% ethanol,  $HgCl_2$  (0.3 %) was used. Explants were surface sterilized for 5 minute by 0.3% mercuric chloride followed by three subsequent rinses with sterilized double distilled water in a laminar flow. All these explants were dissected into small pieces and treated so that maximum part can be exposed to media.

#### **Culture Media**

MS medium (Murashige and Skoog, 1962) was used for multiple shooting for apical shoot, Axillary bud, node explants of *Kydia calicina*. Axillary bud, apical shoot tip multiplication of shoots was examined using MS medium variously supplemented with BA, KIN, for rooting, half strength MS medium Supplemented with various concentrations of auxins IAA, IBA, and NAA were examined.

#### **Culture Conditions**

MS medium contains with 3% sucrose and gelled with 3 gm/L solidified agent Clerigel, and the pH was adjusted to 5.8 after adding the growth regulators. The media were steam sterilized in an autoclave under 15 psi and 121° C. after the inoculation culture tubes and culture vessels were transfers to culture room under a 16 h photoperiod supplied by cool white fluorescent cool tubes light and  $25 \pm 0^\circ C$  temperature. At least ten cultures were raised for each treatment. Data were measured after 25days of five replicate for shoot multiplication and shoot length Mean ( $\mu$ ) values with the standard error (S.E.).

#### **Results and Discussion**

Apical shoot, Axillary bud and nodal explants of *Kydia* grown on hormone free MS medium no effect on multiple shoots formation. MS media with different concentrations of BAP



1.0, 1.2, 1.4, 1.6, 1.8, 2.0 mg/l and combination of IBA, NAA gives maximum average percentage of multiplication.

### Effect of BAP Shoots Multiplication

**Table 1:- Effect of BAP and IAA for Multiplication of Different Explant**

Explant	Conc. of growth regulator (mg/L)		Shoot length (Mean± SE)	% of shoot formation
	BAP	IAA		
apical shoot tip	1.0	0.2	1.88± 0.073	30
	1.2	0.2	2.64± 0.129	32
	1.4	0.2	2.52± 0.122	37
	1.6	0.2	2.90± 0.149	51
	1.8	0.2	2.16± 0.160	49
	2.0	0.2	2.24± 0.172	47
axillary bud	1.0	0.2	1.70± 0.130	35
	1.2	0.2	2.04± 0.143	37
	1.4	0.2	2.14± 0.140	44
	1.6	0.2	2.62± 0.139	52
	1.8	0.2	1.76± 0.214	50
	2.0	0.2	1.82± 0.149	49

After 25 days mean ± SE of 5 replicate

The presence investigation of an apical shoot tip, Axillary bud and nodal explant was essential for the development and formation of multiple shoots in Kydia. The two Cytokinins was tested viz. BAP and KIN respectively. BAP was more effective than KIN for multiplication. MS media containing 3% sucrose, 3 mg/L Clerigel and different concentration of BAP 1.0, 1.2, 1.4, 1.6, 1.8, 2.0 mg/l alone with IAA 0.2, 0.4, 0.6, 0.8, 1.0 mg/L, concentration of BAP with combination NAA 0.2, 0.4, 0.6, 0.8, 1.0 mg/L gives average percentage of multiple shooting of Kydia. (Fig.1) Maximum average percentage of multiple shoot was recorded BAP 1.6 mg/L, with combination IAA 0.2 mg/L.(Fig.2)



**Fig.1** Multiple shoots formation along with callus



**Fig.2** Multiple shoot formation



Apical shoot tip and Axillary bud explant were inoculated on MS medium supplement with 3% sucrose, 2.5% Clerigel and various combinations of growth hormones as shown in the table No. 1 Maximum average shoot length and multiple shoot formation percentage of *Kydia* was recorded in 1.6 mg/L BAP combination with 0.2 mg/L IBA. Repeated sub-culturing was said to be one of the methods of maintaining juvenility (Johnson, T. 1999). In the present work highest number of shoot percentage was recorded in third sub culturing. Somatic embryos were developed into plantlets and subsequently grown to maturity. These results indicate that nodal explants have high competence for somatic embryogenesis in *Eclipta alba* (Devendra et al 2011). Various combinations of IAA were added into the MS medium to achieve rooting. In vitro rhizogenesis was achieved by adding 0.5 mg/lit IAA. Plants were hardened and introduced in soil for in vivo trails. In vitro regenerated plants had shown 65 % viability in vivo.

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## 5.

**Bio-fertilizers play vital role for organic farming****G.B.Honna\*, S.V.Kirwale \*\***

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**Abstract :**

Bio-fertilizers being essential components of organic farming play vital role in maintaining long term soil fertility and sustainability by fixing atmospheric dinitrogen ( $N=N$ ) mobilizing fixed macro & micro nutrients to convert insoluble P in the soil in to forms available to plants, they by increases their efficacy and availability. Currently there is a gap of ten million tonnes of plants nutrients between removal of crops and supply through chemical fertilizers. In content of both the cost and environment impact of chemical fertilizers, excessive reliance on the chemical fertilizers is not viable strategy in long run because of the cost, both in domestic resources and foreign, exchange involved in setting of fertilizers plants and sustaining the production. In this context, organic manures (bio-fertilizers) would be the viable option for farmers to increase productivity per unit area.

Micro-organisms such as plant growth promoting Rhizobacteria and Mycorrhizal fungi have demonstrated their ability in the formulation of biofertilizers in the agricultural sector, proving plants with nutrients required to exchange their growth, increase yield, manage abiotic and biotic stress and prevent phytopathogens attack. Recently beneficial soil microbes have been reported to produce some volatile organic compounds, which are beneficial to plants and the smendent of these microbes with locally available organic materials and nanoparticles is currently used to formulate biofertilizers to increase plant productivity. This review focuses on the important role performed by beneficial soil microorganisms as a cost-effective, nontoxic and eco-friendly approach in the management of the rhizosphere to promote plant growth and yield.

**Key words** – Bio-fertilizers, Sustainability, Beneficial micro-organisms, Crop production, Soil fertility, Sustainable agriculture.

**Introduction-**

Bio-fertilizers are being essential component of organic farming are the preparations containing live or latent cells of efficient strains of nitrogen fixing, phosphate solubilizing or cellulosic micro-organisms used for application to seed, soil or composting areas with the objective of increasing number of such micro-organisms and accelerate those microbial processes which augment the availability of nutrients that can be easily assimilated by plants. Bio-fertilizers play a very significant role in improving soil fertility by fixing atmospheric nitrogen, both in association with plant roots and without it, solubilize insoluble soil phosphates and produces plant growth substances in the soil. They are in fact being promoted to harvest the naturally available, biological system of nutrient mobilization (Venkatashwarlu, 2008). The role and importance of biofertilizers in sustainable crop production has been reviewed by several authors



(Biswas et al 1985 ; Wani and Lee 1995 ; Katyal et al.1994). But the progress in the field of BF production technology remained always below satisfaction in Asia because of various constraints.

It may be need only 30% of India's total cultivable area is covered with fertilizers where irrigation facilities are available and the remaining 70% of the arable land. Which is mainly rain fed, very negligible amount of fertilizers are being used. Farmers in these areas often use organic manures as a source of nutrients that are readily available either in their own farm or in their locality. The North-Eastern region of India provides considerable opportunity for organic farming due to least utilization of chemical inputs. It is estimated that 18 million hectare of such land is available in the north east that can be exploited for organic production . With the sizable acreage under naturally organic cultivars. India has tremendous potential to grow crops organically and emerge as a major supplier of organic products in world's organic market . The report of task force on organic farming, appointed by the Government of India also observed that in vast area of the country. Where limited amount of chemicals are used and have productivity could be exploited as potential areas to develop into organic agriculture. Arresting the decline of soil organic matter is the most potent weapon in fighting against unabated soil degradation and imperiled sustainability of agriculture. In tropical regions of India, semi-arid and sub-humid climate. Application of organic manures particularly biofertilizer's is the only option to improve the soil organic and future agricultural productivity (Ramesh, 2008)

### Why using Bio-fertilizers—

More use of synthetic fertilizers has led to pollution and contamination of the soil, which has polluted water basins, destroyed micro-organisms and friendly insects making the crop more prone to diseases and reduced soil fertility. Following points are great concern

- Demand is much higher than the availability. It is estimated that by 2020 to achieve the targeted production of 321 million tones of food grain, the requirement of nutrient will be 28.8 million tones, while their availability will be only 21.6 million tones being a deficit of about 7.2 million tones.
- Depleting fossil fuels and increasing cost of fertilizers. This is becoming unaffordable by small and marginal farmers.
- Depleting soil fertility due to widening gap between nutrient removal and supplies.
- Increasing threat to sustainable agriculture.
- Growing concern about environmental hazards.

### Characteristics of Bio-fertilizers—

#### Nitrogen fixers

**Rhizobium:** belongs to family *Rhizobiaceae*, symbiotic in nature, fix nitrogen 50-100 kg/ha. With legumes only. It is useful for pulse legumes like chickpea, red-gram, pea, lentil, black gram, etc. oil-seed legumes like soyabean and groundnut and forage legumes like berseem and Lucerne. Successful nodulation of leguminous crops by *Rhizobium* largely depends on the availability of compatible strain for a particular legume. It colonizes the roots of a specific legumes to form tumour like growths called root production. *Rhizobium* has ability to fix association with legumes and certain non-legumes like Parasponia. *Rhizobium* population in the soil depends on the presence of legume crops in the field. In



absence of legumes, the population decreases. Artificial seed inoculation is often needed to restore the population of effective strains of the *Rhizobium* near the rhizosphere to hasten N-fixation. Each legume requires a specific species of *Rhizobium* to form effective nodules. Many legumes may be modulated by diverse strains of *Rhizobia*, but growth is enhanced only when nodules are produced by effective strains of *Rhizobia*. It is thus extremely important to match microsymbionts prudently for maximum nitrogen fixation. A strain of *Rhizobia* that nodules and fixes a large amount of nitrogen in association with one legume species may also do the same in association with certain other legume species. This must be verified by testing. Leguminous plants that demonstrate this tendency to respond similarly to particular strains of *Rhizobia* are considered "effectiveness" group (Wani and Lee, 2002).

***Azospirillum*:** belongs to family *Spirilaceae*, heterotrophic and associative in nature. In addition to their nitrogen fixing ability of about 20-40 kg/ha, they also produce growth regulating substances. Although there are many species under this genus like *A. amazonense*, *A. halopraeferens*, *A. brasilense*, but, worldwide distribution and benefits of inoculation have been proved mainly with the *A. lipoferum* and *A. brasilense*. the *Azospirillum* form associative symbiosis with many plants particularly with those having the C4-dicarboxylic pathway of photosynthesis (Hatch and Slack pathway), because they grow and fix nitrogen on salts of organic acids such as malic, aspartic acid (Arun 2007a). Thus it is mainly recommended for maize, sugarcane, sorghum, pearl millet etc. the *Azobacter* colonizing the roots not only remains on the root surface but also a sizable proportion of them penetrates into the root tissues and lives in harmony with the plants. They do not, however, produce any visible nodules or out growth on root tissue.

***Azobacter*:** belongs to family *Azotobacteriaceae*, aerobic, free living, and heterotrophic in nature. *Azobacters* are present in neutral or alkaline soils and *A. chroococcum* is the most commonly occurring species in arable soils. *A. vinelandii*, *A. beijerinckii*, *A. insignis* and *A. macrocytogenes* are other reported species. The number of *Azotobacter* rarely exceeds of 10

Of soil due to lack of organic matter and presence of antagonistic microorganism in soil. The bacterium produces anti-fungal antibiotics which inhibits the growth of several pathogenic fungi in the root region thereby preventing seedling mortality to a certain extent (Subba Rao, 2001a). The isolated culture of *Azotobacter* fixes about 10 mg nitrogen of carbon source under in vitro conditions. *Azotobacter* also known to synthesize biologically active growth promoting substances such as vitamins of B-group, indole acetic acid (IAA) and gibberelins. Many strains of *Azotobacter* also exhibited fungi static properties against plant pathogens such as *Fusarium*, *Alternaria* and *Helminthosporium*. The population of *Azotobacter* is generally low in the rhizosphere of the crop plants and in uncultivated soils. The occurrence of this organism has been reported from the rhizosphere of a number of crop plants such as rice, maize, sugarcane, bajra, vegetables and plantation crops, (Arun, 2007a).

#### ***Blue green algae (cyanobacteria) and Azolla:***

These belongs to eight different families, phototrophic in nature and produce Auxin. Indole acetic acid and Gibberlic acid, fix 20-30 kg N/ha in submerged rice fields as they are abundant in paddy, so also referred as paddy organisms N is the key input require in large quantities for low land rice production. Soil N and BNF by associated organisms are major sources of N for low land rice. The 50-60% N requirement is met



through the combination of mineralization of soil organic N and BNF by free living and rice plant association bacteria (Roger and Ladha, 1992). To achieve food security through sustainable agriculture, the requirement for fixed nitrogen must be increasingly met by BNF rather than by industrial nitrogen fixation. Most N fixing BGA are filamentous, consisting of chain of vegetative cells including specialized cells called heterocyst which function as micro nodule for synthesis and N fixing machinery. BGA form symbiotic association capable of fixing nitrogen with fungi, Liverworts, ferns and flowering plants, but the most common symbiotic association has been found between a free floating aquatic fern the *Azolla* and *Anabaena azollae* (BGA). *Azolla* contains 4–5 % N on dry basis and 0.2–0.4% on wet basis and can be the potential source of organic manure and nitrogen in rice production. The important factor in using *Azolla* as biofertilizer for rice crop is its quick decomposition in the soil and efficient availability of its nitrogen to rice plants (Kannaiyan, 1990). Besides N-fixation, these biofertilizers or biomanures also contribute significant amounts of P, K, S, Zn, Fe, Mn and other micronutrient. The fern forms a green mat over water with a branched stem, deeply boiled leaves and roots. The dorsal fleshy lobe of the leaf contains the algal symbiont within the central cavity. *Azolla* can be applied as green manure by incorporating in the fields prior to rice planting. The most common species occurring in India is *A. pinnata* and same can be propagated on commercial scale by vegetative means. It may yield on average about 1.5 kg per square meter in a week. India has recently introduced some species of *Azolla* for their large biomass production, which are *A. caroliniana*, *A. microphylla*, *A. filiculoides* and *A. mexicana*.

#### **Zinc solubilizers :**

The nitrogen fixers like *Rhizobium*, *Azospirillum*, *Azotobacter*, BGA and Phosphate solubilizing bacteria like *B. magisterium*, *Pseudomonas striata* and phosphate mobilizing Mycorrhiza have been widely accepted as bio-fertilizers (Rao subba, 2001). However these supply only major nutrients but a host of microorganism that can transform micronutrients are there in soil that can be used as bio-fertilizers to supply micronutrients like zinc, iron, copper etc, zinc being most important is found in the earth's crust to the tune of 0.008 percent but more than 50 per cent of Indian soils exhibit deficiency of zinc with content must be below the critical level of 1.5 ppm of available zinc. The plant constraints in absorbing zinc from the soil are overcome by external application of soluble zinc sulphate ( $\text{ZnSO}_4$ ). But the fate of applied zinc in the submerged soil conditions is pathetic and only 1-4 % of total available zinc is utilized by the crop and 75 % of applied zinc is transformed into different mineral fractions (Zn-fixation) which are not available for plant absorption.

#### **Phosphate absorbers Mycorrhizae :**

It is a symbiotic association between host plants and certain group of fungi at the root system in which the fungal partner is benefited by obtaining its carbon requirements from the photosynthates of the host and the host in turn is benefited by obtaining the much needed nutrients especially phosphorus, calcium, copper, zinc etc., which are otherwise inaccessible to it, with the help of the fine absorbing hyphae of the fungus. These fungi are associated with majority of agriculture crops. They are ubiquitous in geographic distribution occurring with plants growing in arctic, temperate and tropical regions alike VAM occur over a broad ecological range from aquatic to desert environments.



**Zinc solubilizers:**

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**Role of Bio-fertilizers in Agriculture****Nitrogen-fixers and Phosphate solubilizers:**

The use of bio-fertilizers plays major role in improving soil fertility, yield attributing characters and thereby final yield has been reported by many workers (Sabashini et al. 2007; Son et al. 2007). In addition, their application in soil improves soil biota and minimizes the sole use of chemical fertilizers (Subashini et al., 2007). Under temperate conditions, inoculation of *Rhizobium* improved number of pods plant<sup>-1</sup>, number of seed pod<sup>-1</sup> and 1000-seed weight (g) and thereby yield over the control. The number of pods plant<sup>-1</sup>, number of seed pod<sup>-1</sup> and 1000-seed weight (g) recorded were 25.5, 17.1 and 4.7 per cent more over the control, respectively which was statistically significant (Bhat et al, 2010). In rice under low land conditions, the application of BGA + *Azospirillum* proved significantly beneficial in improving LAI and all yield attributing aspects. Grain yield and harvest index also exhibit a discernable increase with use of bio-fertilizers. Field trials carried out in different locations have demonstrated that under certain environmental and soil conditions inoculation with *Azotobacteria* has beneficial effects on plant yields. Inoculation with *Azotobacter* + *Rhizobium* + VAM gave the highest increase in straw and grain yield of wheat plants with rock phosphate as a P-fertilizer concluded that with microbial inoculation rock phosphate could be used as a cheap source of P in alkaline soils and that combined inoculation could reduce the rate of fertilizer required to maintain high productivity. It is an established fact that the efficiency of phosphatic fertilizers is very low (15-20%) due to its fixation in acidic and alkaline soils and unfortunately both soil types are predominating in India accounting more than 34% acidity affected and more than seven million hectares of productive land salinity/alkaline affected. Therefore, the inoculations with PSB and other useful microbial inoculants in these soils become mandatory to store and maintain the effective microbial populations for solubilization of chemically fixed phosphorus and availability of other macro and micronutrients to harvest good sustainable yield of various crops.

**Mycorrhizae:** Arbuscular mycorrhizal (AM) fungi is most abundant in agriculture. They account for 5–50% of the biomass of soil microbes and some products formed by them may account for another 3000 kg (Lovelock et al, 2004). Pools of organic carbon such as glomalin produced by

AM fungi may even exceed soil microbial biomass by a factor of 10–20. The external mycelium attains as much as 3% of root weight. Approximately 10–100 m mycorrhizal mycelium can be found per cm root.



The mineral acquisition from soil is considered to be the primary role of mycorrhizae, but they play other various roles in Agriculture

1. Improved nutrient uptake (Macro and Micronutrients).
2. Better water relation and drought tolerance.
3. Soil structure.
4. Enhanced phytohormone activity.
5. Crop protection (Interaction with soil pathogens).

#### **Constraints in bio-fertilizer use**

##### **Production Constraints**

- \_ Unavailability of appropriate and efficient strains
- \_ Unavailability of suitable carrier
- \_ Mutation during fermentation

##### **Market level constraints**

- \_ Lack of awareness of farmers:
- \_ Inadequate and Inexperienced staff
- \_ Lack of quality assurance
- \_ Seasonal and unassured demand
- \_ Resource constraint
- \_ Limited resource generation for BF production

##### **Field level constraints**

- \_ Soil and climatic factors:
- \_ Native microbial population
- \_ Faulty inoculation techniques
- \_ Liquid Bio-fertilizers ( Break through in bio-fertilizer technology)

#### **Conclusion**

Biofertilizer is a substance which contains living microorganisms, used in the agricultural field as a replacement to conventional fertilizers. Those are not as effective as chemical fertilizers. So, farmers often try to use chemical fertilizers in the field for better crop development, but they are not environment friendly and responsible for water, air and soil pollution and can spread cancer-causing agents. Moreover, they may destroy the fertility of the soil in a long term manner. Therefore Scientists have developed Biofertilizer to prevent pollution and to make this world healthy in a natural way.

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# Effect of Medicinal Plants and Antagonists on Seed Mycoflora, Seed Germination and Vigour Index of Sunflower

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**Abstract:** Sunflower (*Helianthus annuus* L.) seeds were treated with fungal and bacterial antagonists. The seeds were soaked in fungal spores the bacterial suspension for 15 minutes. The treated seeds were incubated for 7-8 days. The percentage incidence of mycoflora, percentage of seed germination and vigour index were calculated in treated and controlled seeds. In treated seeds the percentage incidence of seed mycoflora decrease whereas percentage of seed germination and vigour index increases as compared to control. The seeds are treated with biocontrol agent like *Trichoderma harzianum*, *Trichoderma viride*, *Pseudomonas fluorescens* and *Bacillus subtilis*. Among these *Trichoderma harzianum* and *pseudomonas fluorescens* were most effective. The seeds were also treated with plant extracts like *Adirachta indica* A. Juss., *Ocimum sanctum* L., *Withania somnifera* (L) Dunal, *Polyalthia longifolia* (sonner), *Lantana camara* (L). And *Zingiber officinale* (Rosc.). Among these effective *Adirachta indica* A. Juss., was more effective than other plants.

**Keywords:** Sunflower, Medicinal plants, Antagonists, Mycoflora, Vigour index

## I. INTRODUCTION

India is striving hard to increase agricultural production with a view to accelerate food production to feed the ever increasing population though an integrated approach towards the application of farm technology (Neergaard, 1970; Dharamvir, 1974). Seed play an important role in disseminating pathogenic organism to areas from hitherto, they have been absent. To check the spreads of such pathogen, seed health testing procedure is necessary.

India is the third largest producer of oil seeds in the world. It ranks first in the production of ground nut and sesame. Oil seeds are grown in an area about 20 million hectares of which nearly 84% areas is rain fed. The vegetable oil is obtained from oil seed crop like sunflower.

About 90-95% areas under Oil seeds remain rain fed of which about 80% area comes under dry land where irrigation facilities do not exist at all. It has been observed that often absence of rains at critical growth stages of kharif oil seed crops, before maturity, causes significant reduction in yields and oil content.

Fats and oil are important ingredients of human food. Vegetable oil is extracted from seeds and fruits of different crops and trees. (Butt & Ali, 2005). Sunflower (*Helianthus annuus* L.) an important member of the family Asteraceae and is one of the major oil seed crops grown for edible oil in the world (Anon, 2007).

In India sunflower is an important oil seed crop popularly known as 'Surajmukhi'. It is one of the fastest growing oil seed crop in India. Sunflower was introduced in India as an oil seed crop for the first time in 1969. It is a drought tolerant crop due to its deep taproot, therefore, it is best substitute to all rain fed commercial crop.

Indian sunflower seed production ranges between 10-15 lakh tons. The major producer states are Karnataka (35%), Andhra Pradesh (30%), Maharashtra (15%), Punjab (4%) and Haryana (4%). Sunflower seeds contain 40-50% oil, 23% protein and constitute excellent source of unsaturated fats, crude protein and fibre and important nutrients like vitamin E, Copper, Zinc, Selenium, B-Complex vitamin.





Seeds are generally associated with certain saprophytic or parasitic micro-organisms which perpetuate in the seed lots on the advent of favourable conditions. Seeds are associated with pathogens like fungi, bacteria, nematodes etc. Pathogens present in almost any seed lot of economically important crop which may be disastrous if introduced into disease free areas. Therefore, seed must be "Substantially free" from inoculum with high level of germination and purity before sowing.

According to recent report of the World Health Organization (WHO), 1-4 % of the world's grain production is lost due to microbial spoilage.

Sunflower seed constitute an essential components of agriculture. About 90 percent of all food crop are propagated through seeds. They act as passive carries of fungi, bacteria, viruses and nematodes.

Bakers (1972) defined seed borne pathogens and a large number of pathogens belonging to 90 fungal and 5 bacterial genera are seed transmitted (Phatak, 1980 and Tomlinson, 1987). Among the various microorganisms associated with seeds, fungi play an important role in determining the quality of grains and seeds (Mirocha et al., 1976, Dennis, 1977 and Gupta, 1994).

Seed borne microorganisms considerably effect agricultural production in the field as well as reduce storage life of seed. In several cases such mycoflora is found to affect adversely the seed germination, vigour quality and quantity of oil. (ward and Diener, 1961; Kadian and Suryanarayana, 1972).

All India coordinated Research Project (AICRP) under Indian Agricultural Research Institute (IARI) has carried out interdisciplinary multilocal research since 1967, gradually leads to the standardization of appropriate production technology for different agro-ecological conditions. Accordingly, Indian agro-ecological condition has been divided into five zones i.e. Northern hill zone, Northern plane zone, Central zone, Southern zone and North-Eastern zone.

In the process of seed bio-deterioration the moulds have been found to cause qualitative and quantitative changes in chemical composition of the seed poisoning food and making them unsuitable for human and animal consumption. production of enzymes and toxins by the moulds have been found to be correlated with the degree of bio-deterioration. The major post-harvest bio-deterioration of sunflower was found to be fungi, which results in decrease germination. Hence an attempt has been made to increase the seed germination.

The seeds are treated with biocontrol agent like *Trichoderma harzianum*, *Trichoderma viride*, *Pseudomonas fluorescens* and *Bacillus subtilis*. Among these *Trichoderma harzianum* and *pseudomonas fluorescens* were most effective.

The seeds were also treated with plant extracts like *Adirachta indica* A. Juss., *Ocimum sanctum* L., *Withania somnifera* (L.) Dunal. *Polyalthia longifolia* (sonner.), *Lantana camara* (L.). And *Zingiber officinale* (Rosc.). Among these effective *Adirachta indica* A. Juss., was more effective than other plants.

## II. MATERIAL AND METHODS

Sunflower seeds were treated with fungal and bacterial antagonists. The seeds were soaked in fungal spores and bacterial suspension for 15 minutes. The treated seeds were incubated for 7-8 days. The percentage incidence of mycoflora, percentage of seed germination and vigour index were calculated in treated and controlled seeds. In treated seeds the percentage incidence of seed mycoflora decreases whereas of seed germination and vigour index increases as compared to control. Seeds were treated with antagonists fungi and bacteria. The antagonist fungi like *Trichoderma* species. The antagonists bacteria used were *Bacillus subtilis* and *pseudomonas fluorescens*.

### 2.1 Seed treatment with *Trichoderma* species

200 g of seeds were coated with 100mL aqueous spore suspension of *Trichoderma species* ( $8 \times 10^9$  spores/mL) by adding 1 mL of 0.5% carboxyl methyl cellulose (CMC) as sticker and 20 g of Bentonite powder as filler for seed dressing. Treated seeds were incubated for 7-8 days. The percent incidence of fungi, seed germination and vigour index were observed in seed samples.



**2.2 Seed treatment with Bacterial species**

The method of Weller and Cook (1983) was followed for seed bacterization. *Pseudomonas fluorescens* and *Bacillus subtilis* were separately grown in succinate broth for 24 hours at  $28 \pm 1^\circ\text{C}$  under shaking condition and finally centrifuged at 7000 rpm for 15 minutes at  $4^\circ\text{C}$ . The supernatant was discarded and pellets were washed with SDW and resuspended to obtain a population density of  $10^7 \text{ cfu/mL}$ . This suspension was mixed with 1% carboxyl methyl cellulose (CMC). Seeds were allowed to air dry overnight under aseptic condition after coating with CMC slurry of bacterial culture. Care was taken to avoid clumping of seeds. Seeds coated with slurry of CMC (without bacteria) served as control. The seeds were incubated on sterile blotter paper. The percent mycoflora, seed germination and vigour index were observed in seed samples.

**2.3 Effect of plant extract on seed mycoflora, seed germination and vigour index:**

During the present study six common plants namely *Azadirachta indica* A. Juss., *Ocimum sanctum* L., *Withania somnifera* (L.) Dunal, *Polyalthia longifolia* (sonner). Thw ; *Lantana camera* (L.) *Zingiber officinale* (Rosc.). were selected. The identification of plants was confirmed using the flora of Marathwada (Naik, 1998). These plants were surface sterilized with 0.1%  $\text{HgCl}_2$  and washed repeatedly with sterile distilled water for three times. The different concentrations prepared for seed treatment were from 1-10%.

**III. RESULTS AND DISCUSSION****Table 1:** Effect of antagonists on seed mycoflora, seed germination and vigour index of Sunflower Cv. Morden

Sr. No	Antagonists	Seed mycoflora (%)			Seed germination	Vigour index
		<i>A. flavus</i>	<i>F. moniliforme</i>	<i>A. alternata</i>		
1	<i>T. harzianum</i>	6	4	3	70	840
2	<i>T. viride</i>	7	5	5	65	800
3	<i>P. fluorescence</i>	8	6	6	67	700
4	<i>B. subtilis</i>	9	8	7	60	600
5	Control	70	50	40	55	150
	S.E $\pm$	11.21	7.95	6.25	2.38	11.38
	C.D at P=0.01	51.56	36.57	28.79	10.94	512.34
	C.D AT P=0.05	31.16	22.10	17.37	6.61	309.37

The table clear that after seed treatment of antagonists the percentage incidence of mycoflora decreases where as percentage of vigour index increases. The maximum inhibition of percentage of fungi was done by *Trichoderma harzianum* as compare with other antagonists all bio control agent are effective.

**Table 2:** Effect of *Azadirachta indica* A. Juss. On seed mycoflora, seed germination and vigour index of Sunflower Cv. Morden.

Leaf extract Conc. (%)	Seed mycoflora (%)	Seed germination (%)	Vigour index
<b>0.00 (Control)</b>	80	65	160
<b>1.0</b>	77	70	170
<b>2.0</b>	75	73	210
<b>3.0</b>	70	75	250
<b>4.0</b>	60	77	300
<b>5.0</b>	50	80	415
<b>6.0</b>	40	85	550
<b>7.0</b>	30	88	610



8.0	20	90	750
9.0	10	92	775
10.0	00	94	820
S.E. $\pm$	8.20	2.77	73.99
C.D. at 5%	18.28	6.17	164.99

From the Table 2 it can be concluded that of *Azadirachtaindica* A. Jussat 10% concentration the seed mycoflora decreases upto 00% over control 80%. At the same concentration, seed germination and vigour index were found to be 94% and 820 respectively. In control on the contrary, seed germination and vigour index were 65% and 160 respectively.

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## Effect of *Annona Squamosa* L On Root rot Disease of Mango *Mangifera indica* Caused by *Rhizoctonia Solani*

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### Research Paper - Botany

#### ABSTRACT

*In Latur District Mango Mangifera indica L is grown under a variety of soil The varies varieties of mango grown in Marathwada Almost all varieties of Mango Mangifera indica L was suffered from root rot Disease caused Rhizoctonia solani. The pathogen isolated on potato dextrose agar media[PDA].10% concentration of leaf extract of Annona squamosa L Jatropha curcas L, Parthenium hysterophorus tested against the Rhizoctonia solani showed inhibits the growth, the maximum inhibitory observed effect of Annona squamosa L leaf extract.*

**Keywords** -Mango root, Rhizoctonia solani, Annona squamosa L PDA,

#### Introduction :

Mango is the national fruit of India, known as the 'King of Fruits' and possess the Botanical name *Mangifera indica*. It is one of the most important and popular Asian fruits. Cultivation of Mangoes is deeply embedded in Indian history. Mangoes are mentioned in early Arian literature. Mangoes thrive in tropical regions, and are cultivated throughout India and even in home yards, along field boundaries and roadside avenues. They, later spread to the rest of Asia by themselves and with the help of humans. They





have been cultivated, praised and revered since ancient times. Usually all the quantity of food grown in a region cannot be consumed by the people there as there is usually excessive production. And the farmers usually transport the mangoes to other regions where there is need of mangoes or not availability of that particular variety. If the farmers don't do that the excess of production will rot and become waste. So the farmers can preserve the mangoes in the form of jam, squashes and as pickles. Most of the mango diseases in Marathwada region of Maharashtra are caused by fungi. However, bacterial and viral diseases have also been reported. Not all the mango diseases are equally serious in all yards and varieties.

Anthrachnose, powdery mildew and rust are managed by application of fungicides with Bordeaux mixture as leading one. Nowadays, a wide range of organo-phosphates, carbamates, thiocarbamates etc. are applied for the control of these diseases. These diseases can be kept under check by observance of strict sanitation and regular spraying during the rainy season. But present investigation observed that number of fungi seen on leaf which is harmful but some *Trichoderma* species are also seen on healthy yards.

The root rot Mango caused by *Rhizoctonia solani* in control unless systemic control is used. Once established in older tree, it becomes difficult to eradicate with only option to uproot the plant.

### **Material and Methods**

Infected roots of mango were collected in sterilized polythene bags separately in sterilized apparatus from the various mango yards of Marathwada region during 2019-20. Samples were sealed in separate polythene bags and stored in the freezer at 10 °C. The infected roots are rinsed in distilled water and from 1000 ml to 10 ml solution.

The 250 gm peeled potatoes were made into thin chips and boiled in 500 ml water and extracted. In this extract the weighed quantity of 20 gm dextrose was added. The 20 gm agar was melted in the other 500 ml water and mixed potato dextrose solution and sterilized adjusted pH 6 to 6.5.

For the present investigation potato dextrose agar media (PDA) were prepared and sterilized in autoclave at 15 lbs for 15 minutes and were used for isolation *Rhizoctonia solani*.



**EXPERIMENTAL RESULT**

Antifungal activity of extra *Annona squamosa* L. extracts of various plant parts were tested against fungal pathogen *Rhizoctonia solani* by zone of inhibition method. The results obtained against various dilutions of aqueous extract and Carbendazim used as standard antifungal agents for comparison and as control, are presented in table. It is evident from the results presented in Table that extracts of exhibited antifungal *Annona squamosa* L. activity. It was found that 15% aqueous extract were more inhibitory to pathogenic fungi and with increase in dilution, zone of inhibition of fungi was decreased. Seed extract showed maximum inhibition followed by root and bark extract and it was least in leaf extract. The seed extract was more effective in both the test organisms compared to control.

**Table: Effect of *Annona squamosa* L. extracts on growth of pathogen**

Sr. No.	Plant parts	Zone of inhibition (mm) <i>Rhizoctonia solani</i>			
		15%	10%	5%	C
1	Leaves	20	18	14	12
2	Bark	22	20	16	12
3	Root	24	22	19	12
4	Seeds	28	24	20	12

C - Carbendazim

**Result & Discussion**

- \* Mango fruit is one of the most important fruit crop in Marathwada region of Maharashtra. It makes financial backbone of the farmers.
- \* The leaves, bark, root and seed extracts of tested against the *Jatropha curcas* L. *Annona squamosa* L. fungal pathogens *Fusarium oxysporum*, *Pythium*





debarynum and Rhizoctonia solani.

- \* The seed extracts of Annona squamosa L Jatropha curcas L more effective both pathogens for inhibition of growth.
- \* The leaves, bark ,root and seed extracts of Annona squamosa L Jatropha curcas L inhibits growth of Rhizoctonia solani.

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# Molecular Structure, Vibrational Assignments and Nonlinear Optical Properties of Borazine by DFT Calculations

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## ABSTRACT

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In this work, density functional theory (DFT) combined with the finite field (FF) method has been adopted to study the molecular structure, vibrational assignments and nonlinear optical (NLO) properties of borazine. The geometrical parameters, vibrational frequencies and NLO properties have been obtained at B3LYP/6-311++G\*\* level of theory. The optimized geometries and vibrational frequencies for borazine are in excellent agreement with the available experimental determinations. The B-N stretching mode observed is the most intense vibrational mode for borazine. The NLO properties of borazine have been investigated by using finite field method. The  $\beta$  and  $\gamma$  values are calculated at field strength of 0.006 a.u. for borazine using different methods and different basis sets.

**Keywords :** Borazine, Vibrational spectra, Finite field method, NLO properties.

## I. INTRODUCTION

Molecules are the promising materials for the development of photonic devices. This is due to the fact that they have large nonlinear optical (NLO) response with an applied field [1-3]. First and second hyperpolarizabilities of molecules are the origin of macroscopic second and third nonlinear optical response of molecules to the applied field. The possible applications of the NLO materials are in the development of photonic devices, optical processing, optical storage of data/images, optically based computers and telecommunication systems etc. [4-13]. Extensive efforts have been made to understand the NLO properties of donor-acceptor type molecules with conjugated chain in between [14-20].

Theoretical prediction of NLO properties of molecules and their suitability for the photonic applications can be tested with the help of quantum chemical methods. Once a suitable material is found with high NLO properties, one can go for its synthesis.

Borazine, the inorganic analogue of benzene, can be obtained by replacing each carbon with alternating boron and nitrogen atom. Borazine has been known for more than 30 years.

The inorganic analogue of benzene is the borazine which can be obtained by replacing each carbon with alternating boron and nitrogen atom. Borazine is more reactive than the prototype of aromatic systems. The vibrational spectrum of borazine was examined by Niedenzu et al. using isotropically labeled



derivatives and identified the two B-N ring vibrations at 1465 and 1406  $\text{cm}^{-1}$ . [21] Johnson and Zoellner have investigated the novel conformers of smallest possible borazine-fused Cyclacenes, Cyclo-BN-anthracene and Cyclo-BN-tetracene using Hartree-Fock and density functional theory and determined their structure and properties. [22] Erkoç has used the semiempirical molecular orbital self consistent field calculations at AM1 level within RHF formulation for the investigation of structure and electronic properties of borazine cyclacenes and found that the structure becomes more exothermic with an increase in number of borazine rings in the arenoid belt. [23] The evidence for the ionic nature of B-N bond has been provided by Shen et.al. by studying the electronic structure, geometries and aromaticity of borazine and its fused ring derivatives using density functional theory. [24] The substituent effect on molecular geometry and aromaticity of the symmetric B-trisubstituted borazine was studied by Miao et.al. and found that the electron withdrawing substituents have shortened the B-N bonds, decrease the  $\angle\text{B-N-B}$  and increases  $\angle\text{N-B-N}$  whereas for the electron donating substituents the opposite is true. [25] Ab initio and SCF calculations have been performed by Byod et.al. for benzene, s-triazine, borazine and boraxine. [26] They found that the delocalization of the  $\pi$ -electrons decreased and the polarity of ring bonds increased by substantially as the atoms in the ring become more dissimilar. The aromaticities between the carbon cyclacene and borazine cyclacene have been compared by Yang et.al. using ab initio and density functional theory calculations. [27]

The aim of this work is to study the molecular structure, vibrational assignment and nonlinear optical properties of borazine using density functional theory method.

## II. METHODS

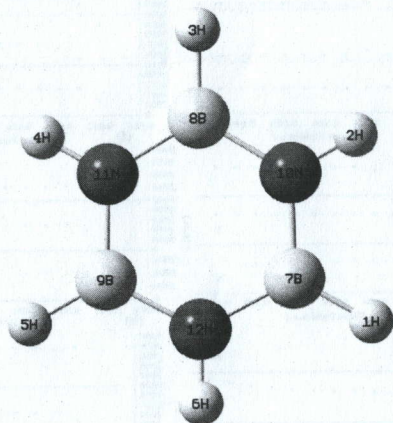
The Density Functional Theory (DFT) with B3LYP exchange and correlation functional has been used for the optimization of borazine. We have used amino groups as a donor and  $-\text{NO}_2$ ,  $-\text{C}\equiv\text{N}$ ,  $-\text{COCl}$  and  $-\text{NMe}_2$  groups as acceptors. These molecules are optimized at B3LYP/6-311++G\*\* level of theory. The geometrical parameters of borazine at this level are compared with the available experimental determinations. [41] The vibrational frequencies are also obtained at the same level of theory. A scaling factor of 0.97 has been used for the vibrational frequencies. The vibrational frequencies of borazine are compared with the available experimental determinations. [36] The static hyperpolarizabilities  $\beta$  and  $\gamma$  are calculated using the Finite-Field method. [45] The field is applied either in X, Y or Z direction. The stable hyperpolarizabilities are obtained using different field strengths to avoid numerical instability. The static hyperpolarizabilities  $\beta$  and  $\gamma$  are also obtained for various methods and basis sets for the fixed field strength. Time dependent density functional theory (TDDFT) method has been used to obtain the absorption spectra of the molecules. All the calculations are carried out using Gaussian 03 suit of programme. [28]

## III. RESULTS AND DISCUSSION

The optimized structures of borazine at B3LYP/6-311++G\*\* level are shown in fig.1 and their geometrical parameters are represented in Table 1 alongwith the available experimental values for borazine. All the calculated geometrical parameters for borazine are in excellent agreement with the available experimental determinations. [26] The calculated bond length of B-N is elongated by 0.009, 0.009, 0.011 and 0.005 Å for  $\text{NO}_2$ ,  $\text{C}\equiv\text{N}$ ,  $\text{COCl}$  and  $\text{NMe}_2$  as acceptor groups respectively in borazine with  $\text{NH}_2$  as donor. The B-H bond length is shortened by 0.011, 0.006, 0.01 and 0.002 Å for  $\text{NO}_2$ ,  $\text{C}\equiv\text{N}$ ,  $\text{COCl}$  and  $\text{NMe}_2$  as acceptors in borazine with  $\text{NH}_2$  as donor. There is almost no change in the N-H bond length in



borazine upon donor and acceptor substitution. The C≡N bond length in NH<sub>2</sub>-B-CN is 1.15 Å whereas C-Cl, C-O bond lengths are 1.82, 1.18 Å respectively in NH<sub>2</sub>-B-COCl. As can be seen N-B-N angle is decreased by 1.1 and 0.3° in NH<sub>2</sub>-B-NO<sub>2</sub> and NH<sub>2</sub>-B-CN respectively than the borazine. B-N-B angle is increased by 1.1 and 0.3° in NH<sub>2</sub>-B-NO<sub>2</sub> and NH<sub>2</sub>-B-CN respectively than the borazine. H-B-N angle is increased by 0.4° in NH<sub>2</sub>-B-NO<sub>2</sub> and decreased by 0.2, 0.5 and 0.4° in NH<sub>2</sub>-B-CN, NH<sub>2</sub>-B-COCl and NH<sub>2</sub>-B-NMe<sub>2</sub> respectively than the borazine. All H-N-B angles are decreased by 0.9, 0.7, 0.8 and 0.2° respectively in NO<sub>2</sub>, C≡N, COCl and NMe<sub>2</sub> as acceptors in borazines than the borazine. The calculated dipole moments are listed in Table 1. The dipole moment of borazine is close to zero whereas the substituted borazines have large dipole moment.



### Infrared spectra

The calculated and experimental vibrational frequencies for borazine are in excellent agreement. Comparative vibrational spectra of borazine is shown in fig. 2. As can be seen from Fig. 2, the vibrational spectra of borazine has three vibrational modes of significant IR intensity. The most intense mode is the B-N stretching mode observed at 1435 cm<sup>-1</sup> which is in close agreement with the experimental value of 1456 cm<sup>-1</sup>. Other than this, the B-H stretching and N-H & B-H out-of-plane stretching modes are the second and third intense modes respectively appeared at 2533 and 905 cm<sup>-1</sup>. These two modes are also in close agreement with the experimental determination

of 2520 and 927 cm<sup>-1</sup> respectively. Also, the N-H out-of-plane stretching and N-H stretching modes are also intense and appeared at 703 and 3521 cm<sup>-1</sup> respectively.

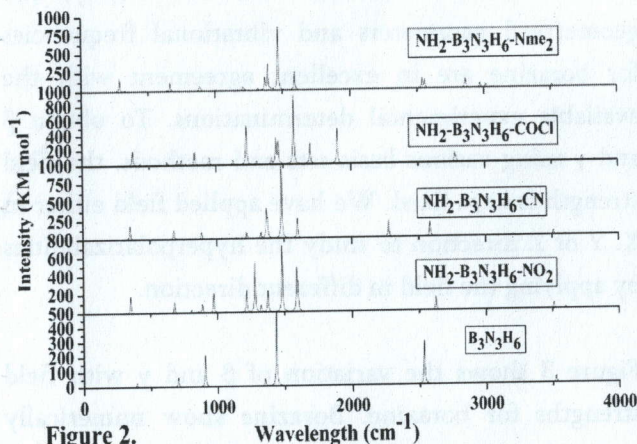


Figure 2.

Table 1 Optimized geometries for borazine at B3LYP/6-311++G\*\* level alongwith experimental values. Bond lengths in Å, angle in degrees and dipole moment in debye.

Parameters	Expt.*	Borazine (B <sub>3</sub> N <sub>3</sub> H <sub>6</sub> )
B-N	1.436 ±0.004	1.431
B-H	1.258 ±0.020	1.191
N-H	1.050 ±0.020	1.008
<N-B-N	117.7 ±2.0	117.0
<B-N-B	121.1 ±2.0	122.9
<H-B-N	----	121.4
<H-N-B	----	118.5
Dipole moment	----	0.01D

Abbreviation: B- B<sub>3</sub>N<sub>3</sub>H<sub>6</sub> \* Experimental values from ref [26].

### Nonlinear Optical Properties

The static hyperpolarizabilities (β and γ) have been calculated by using energy based equations. We have used the finite field method, for obtaining the hyperpolarizabilities. First we applied different field strengths to calculate β and γ and to avoid numerical instability. Since the finite field equations are



sensitive to the precision in the energy calculations. We have also used  $\beta$  and  $\gamma$  for various methods and basis sets. The optimized structures at B3LYP/6-311++G\*\* level of theory is used for  $\beta$  and  $\gamma$  calculations since at this level of theory, the geometrical parameters and vibrational frequencies for borazine are in excellent agreement with the available experimental determinations. To obtain  $\beta$  and  $\gamma$  using various basis sets and methods, the field strength is kept fixed. We have applied field either in X, Y or Z direction to study the hyperpolarizabilities by applying the field in different direction.

Figure 3 shows the variation of  $\beta$  and  $\gamma$  with field strengths for borazine. Borazine show numerically stable hyperpolarizability about field strength of 0.006 a.u. applied either in X, Y or Z direction. Therefore for the calculation of  $\beta$  and  $\gamma$  using various methods and basis sets, the field strength of 0.006 a.u. is used applied in X direction since application of field in X direction gives higher  $\beta$  and  $\gamma$  than Y or Z direction.

Figure 4 shows the variation of  $\beta$  and  $\gamma$  for borazine obtained using different methods and basis sets with the field of 0.006 a.u. applied in X-direction. In the Fig. 4 when diffuse function are added to the 6-311G basis set, the magnitude of  $\beta$  and  $\gamma$  obtained using different methods changes significantly. The magnitude of  $\beta$  is higher where there is no inclusion of diffuse function in the basis set. The values of  $\beta$  obtained using MP2 are slightly higher than the DFT method. The correlation effect by the MP2 method increases the  $\beta$  at the HF level. The  $\beta$  values using DFT with different exchange and correlation functional viz. PBE1PBE, PBEPBE, B3PW91 and BLYP are nearly equal for all the basis sets with the same method. As seen in Fig. 4(b) when diffuse functions are added to the split valence triple zeta basis set (6-311G), the magnitude of  $\gamma$  obtained using different methods changes significantly. The  $\gamma$  obtained by adding diffuse and polarization functions

to the 6-311G basis sets are found to be higher than those with the 6-311G basis set for all the methods used here. The correlation effect by the MP2 and DFT method increases the  $\gamma$  at the HF level. For both  $\beta$  as well as  $\gamma$ , the basis set effects are more than the methods.

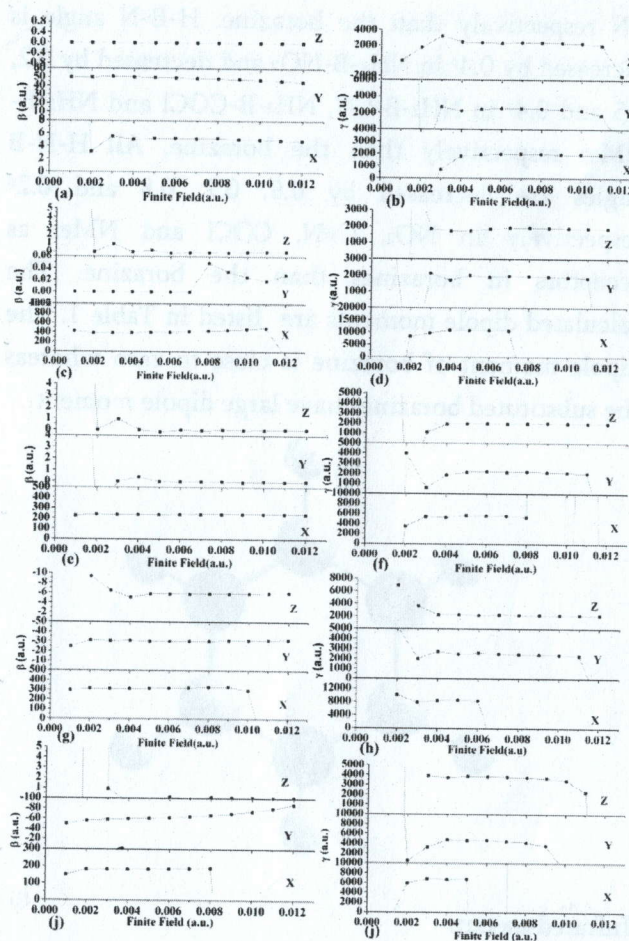
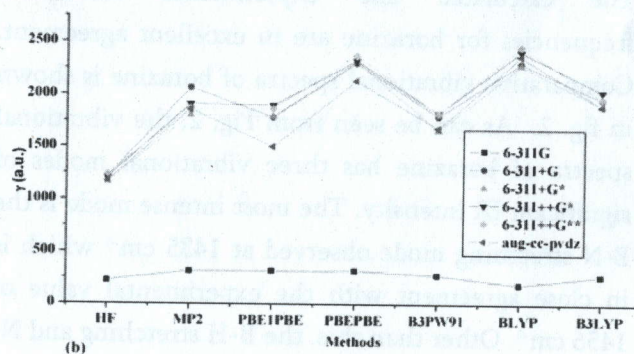


Figure 3.





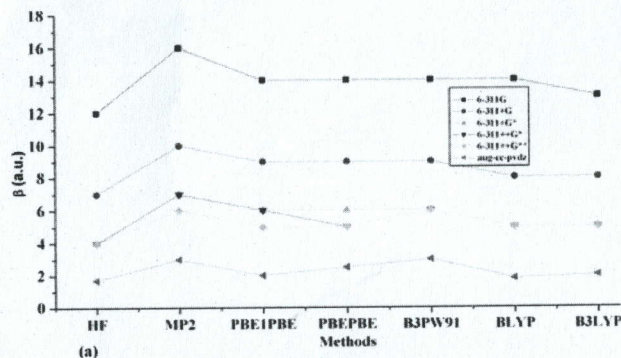


Figure 4.

#### IV. CONCLUSION

We have performed DFT calculations for the study of first and second hyperpolarizabilities ( $\beta$  and  $\gamma$ ) of borazine. The optimized geometries and vibrational frequencies for borazine are in excellent agreement with the available experimental determinations. The B-N stretching mode observed is the most intense vibrational mode for borazine molecule and is in the excellent agreement with the experimental determinations. The substituent effect on NLO properties of borazine has been investigated by using finite field method. The  $\beta$  and  $\gamma$  values are calculated at field strength of 0.006 a.u. for borazine using different methods and different basis sets. The  $\text{NO}_2$  as acceptor and  $\text{NH}_2$  as donor gives highest  $\beta$  and  $\gamma$  values among the substituents used here at B3LYP/aug-cc-pvdz level of theory. A large change in dipole moment is observed upon donor-acceptor substitution in borazine.

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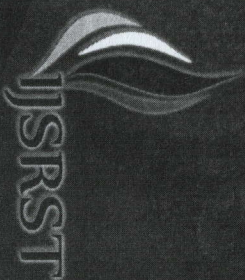


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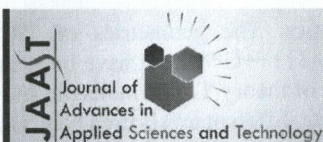
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## NONLINEAR OPTICAL PROPERTIES (NLO) OF 1, 3, 5-TRIAMINO-2, 4, 6-TRINITROBENZENE (TATB) USING QUANTUM CHEMICAL METHODS

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**Abstract:** Vibrational and nonlinear optical properties of 1,3,5-Triamino-2,4,6-Trinitrobenzene (TATB) have been investigated using quantum chemical methods. The Finite-Field approach has been used to obtain the static first and second hyperpolarizability components ( $\beta$  and  $\gamma$ ) by applying field either in X, Y or Z direction. The geometries of TATB are optimized using quantum chemical methods with different exchange and correlation. The geometrical parameters and vibrational frequencies obtained at B3LP/6-311++G\*\* level are in excellent agreement with the experimental determinations.

**Keywords:** TATB, nonlinear optical properties, finite field method, Quantum chemical methods,

### 1. INTRODUCTION

1,3,5-Triamino-2,4,6-trinitrobenzene (TATB) is an important molecular crystal widely used in high-performance energetic applications. Nonlinear optical (NLO) materials have attracted much interest because of their potential applications in optoelectronic technology. In particular organic molecules are very suitable in this field owing to their fast electronic responses to external stimuli, ease and flexibility of chemical design, lightweighting materials, good processability in devices, etc.[1] In this context, two-dimensional (2D) octopolar molecules, with 1,3,5-triamino-2,4,6-trinitrobenzene (TATB) being the prototypical example, are shown to exhibit second-order NLO features similar to those of their one-dimensional (1D) D- $\pi$ -A dipolar homologues, overcoming their intrinsic limitations.[2]

Several efforts have been made to understand the NLO properties of organic molecules for the last two decades [3-12]. NLO properties are important for the development of photonic devices, optically based computers, optically based telecommunication systems, and other applications such as optical processing and storage of data/images etc. Several studies have been performed on donor-acceptor type molecules with conjugated chain in between and their NLO properties [13-19]. Theoretical methods such as quantum chemical methods play an important role for the prediction of NLO

properties of a material and its suitability for photonic applications.

TATB, a 1,3,5-triamino-2,4,6-trinitro substituted benzene, is a high energy material and has attracted substantial interest recently due to its stability under thermal, impact or shock initiation conditions and may have high NLO properties [27-42]. Due to various competing effects such as electron transfer between amino and nitro group, hydrogen bonding between these groups and steric effect, it is difficult to determine the structure of TATB [34-36,43]. Both planar as well as nonplanar structures of TATB are suggested. Planar structure of TATB, predicted by X-ray crystallographic study, has been confirmed using Hartree-Fock and Local density functional methods [43,44]. Voigt-Martin et. al. have reinvestigated the structure of TATB using electron diffraction, high resolution imaging, simulation of electron patterns and images and packing energy calculations [30]. Several theoretical studies have also been performed which have focused largely on push-pull and/or steric effects to determine the molecular structure of TATB [34,36,43]. Roszak et. al. have studied the molecular structure of TATB monomer and dimer using MP2 and Density Functional Theory (DFT) method with different exchange and correlation functionals and various basis sets [32]. Gee et. al. have presented all-atom force field for TATB using high level ab initio single point energy calculations of TATB dimers [45].

The aim of this work is to study TATB molecule at various levels to obtain vibrations and nonlinear



optical properties at different level of theory.

## 2. Computational details

Geometry optimizations were carried out using Gaussian suit of program [22]. The geometries of TATB molecule have optimized using quantum chemical methods with different basis set. DFT with B3LYP, B3PW91 and PBEPBE exchange and correlation functionals have been used for the geometry optimization of TATB molecule. Using these calculations we decided the level of theory at which TATB molecule show the lowest energy and the minimum energy structure. These minimum energy structures are then used to calculate NLO properties of TATB at various levels of theory.

## 3. RESULTS AND DISCUSSION

We first optimized the geometries of TATB molecule at different levels to obtain the lowest energy structure. We have used DFT method with different exchange and correlation functionals. It is found that the TATB molecule shows the lowest energy at B3LYP/6-311++G\*\* level among different levels of theories used here. Table I represents bond lengths and angles for TATB at different levels used here alongwith the experimental determinations [17].

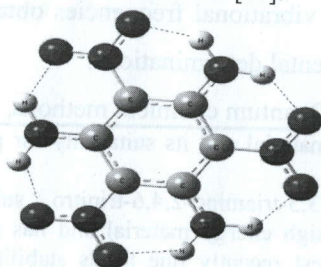


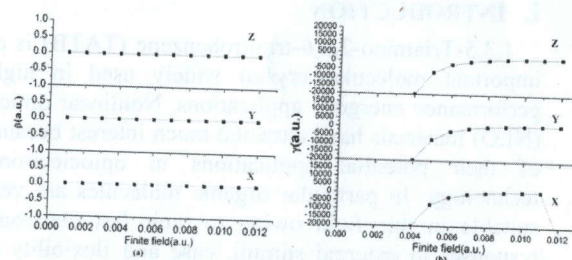
Fig. 1.

**Table 1.** Geometrical parameters for TATB obtained using different methods with 6-311++G\*\* basis set alongwith experimental values. Bond lengths in Å and angles in degree.

Bond length/angle	B3LYP	B3PW91	PBEPBE	HF	Expt.*
C-C	1.395	1.392	1.400	1.386	1.397 <sup>a</sup>
C-H	1.084	1.085	1.092	1.075	1.102 <sup>a</sup>
C-N (C-NH <sub>2</sub> )	1.327	1.323	1.333	1.325	1.314
C-N (C-NO <sub>2</sub> )	1.436	1.430	1.439	1.440	1.419
N-O	1.242	1.237	1.256	1.194	1.243
<C-C-C	120	120	120	120	---
<C-C-H	120	120	120	120	---

We have also used here various basis sets viz. 6-311G, 6-311+G, 6-311+G\*, 6-311++G\*, 6-311++G\*\* with different methods to obtain NLO properties of TATB. We have applied Finite-Field of different strength either in X, Y or Z direction for the TATB molecule to decide the suitable field strength in order to obtain the numerical

stable hyperpolarizabilities. The geometries of TATB optimized at B3LYP/6-311++G\*\* level have been used here since at this level of theory TATB molecule shows the lowest energy among different levels used here. Once the suitable field strength is decided to prevent the numerical instability, we then obtained hyperpolarizabilities of TATB using different methods and basis sets. Figure 2(a) and 2(b) shows the variation of  $\beta$  and  $\gamma$  respectively of TATB with field strengths applied either in X, Y or Z direction using the Finite-Field method. In Fig. 2, the hyperpolarizability values after certain field strength are the large negative values which are not shown in Fig. 2. We have shown only positive values in Fig. 1. Figure 2 shows that the necessity of applying different field strengths in order to avoid the numerical instability. From Figure 2, it can be said that TATB molecule shows numerical stable hyperpolarizabilities at a certain range of field strength applied either in X, Y or Z direction. Therefore we have chosen field strength of 0.008 a.u. to calculate the hyperpolarizabilities of TATB using different methods and basis sets. We have obtained hyperpolarizabilities using different levels of theory in addition to B3LYP/6-311++G\*\* level with field strength of 0.008 a.u. applied either in X, Y or Z direction. We can consider hyperpolarizabilities obtained at B3LYP/6-311++G\*\* level as the reference since at this level of theory the TATB molecule show the lowest energy, geometrical parameters and vibrational frequencies are in excellent agreement with the experimental determinations.



**Fig. 2** Variation of  $\beta$  and  $\gamma$  for TATB with field strength at B3LYP/6-311++G\*\* level.

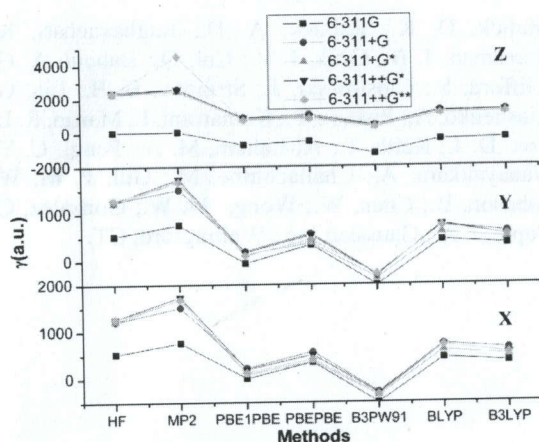
The  $\beta$  values are zero irrespective of the level of theory and direction in the applied field. However  $\gamma$  values are nonzero for TATB as can be seen from Fig. 3. Figure 3 shows the variation of  $\gamma$  of TATB obtained using different methods and basis sets with field strength of 0.008 a.u. applied either in X, Y or Z direction.



Hada, M.; Ehara, M.; Toyota, K.; Fukuda, R.; Hasegawa, J.; Ishida, M.; Nakajima, T.; Honda, Y.; Kitao, O.; Nakai, H.; Klene, M. Li. X.; Knox, J. E.; Hratchian, H. P.; Cross, J. B.; Bakken, V.; Adamo, C.; Jaramillo, J.; Gomperts, R.; Stratmann, R. E.; Yazyev, O.; Austin, A. J.; Cammi, R.; Pomelli, C.; Ochterski, J. W.; Ayala, P. Y.; Morokuma, K.; Voth, G. A.; Salvador, P.; Dannenberg, J. J.; Zakrzewski, V. G.; Dapprich, S.; Daniels, A. D.; Strain, M. C.; Farkas, O.;

Malick, D. K.; Rabuck, A. D.; Raghavachari, K.; Foresman, J. B.; Ortiz, J. V.; Cui, Q.; Baboul, A. G.; Clifford, S.; Cioslowski, J.; Strfanov, B. B.; Liu, G.; Liashenko, A.; Piskorz, P.; Komaromi, I.; Martin, R. L.; Fox, D. J.; Keith, T.; Al-Laham, M. A.; Peng, C. Y.; Nanayakkara, A.; Challacombe, M.; Gill, P. M. W.; Johnson, B.; Chen, W.; Wong, M. W.; Gonzalez, C.; Pople, J. A.; Gaussian Inc.: Wallingford, CT.





**Fig. 3** Variation in  $\gamma$  for TATB obtained using various methods and basis sets using field strength of 0.008 a.u..

#### 4. CONCLUSIONS

NLO properties of TATB molecule are studied systematically. The field is applied either in X, Y or Z direction. TATB shows zero  $\beta$  values irrespective of the applied field direction. There is no large change in  $\beta$  values of TATB. However a significant increase in  $\beta$  values is obtained for the field applied in X direction. Large  $\gamma$  values are also obtained for the TATB. Among different levels of theory used here for obtaining the hyperpolarizabilities, MP2 level shows higher  $\beta$  and  $\gamma$  values than the DFT method with different exchange and correlation functionals. The optimized geometries obtained at B3LYP/6-311++G\*\* level of theory are in excellent agreement with the experimental determinations.

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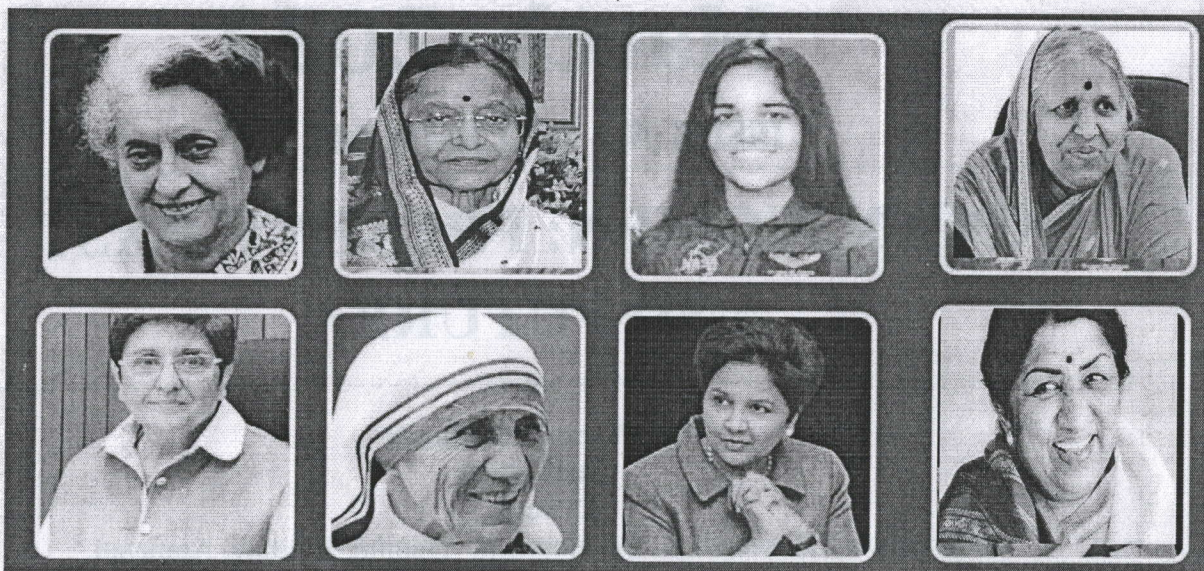
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## Role Of Women For Freedom Struggle In India And Their Contribution

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### Abstract:

The history of Indian Freedom Struggle would be incomplete without mentioning the contributions of women. The sacrifice made by the women of India will occupy the foremost place. They fought with true spirit and undaunted courage and faced various tortures, exploitations and hardships to earn us freedom. The role of Indian women freedom fighters in the journey of freedom struggle. Everyone speaks about the prominent role played by the male freedom fighter. However, without female freedom fighters achieving Independent India would remain a dream. From being considered as second citizens, being victims of domestic violence, uneducated population, practicing sati system to transforming themselves into great freedom fighter leaders has remained unknown to a lot of people. Indian women have played an impactful role in this journey from being part of the non-cooperation movement to practicing satyagraha and promoting Khadi and picketing up of liquor shops. Their participation in all the freedom struggle is significant and respectful.

**Keywords:** Indian women, Freedom struggle, Independent India Women movement

### Introduction:

The history of Indian Freedom Struggle would be incomplete without mentioning the contributions of women. The sacrifice made by the women of India will occupy the foremost place. They fought with true spirit and undaunted courage and faced various tortures, exploitations and hardships to earn us freedom.

When most of the men freedom fighters were in prison the women came forward and took charge of the struggle. The list of great women whose names have gone down in history for their dedication and undying devotion to the service of India is a long one.

Woman's participation in India's freedom struggle began as early as in 1817. Bhima Bai Holkar fought bravely against the British colonel Malcolm and defeated him in guerilla warfare. Many women including Rani Channama of Kittur, Rani Begam Hazrat Mahal of Avadh fought against British East India company in the 19th century; 30 years before the "First War of Independence 1857"

The role played by women in the War of Independence (the Great Revolt) of 1857 was creditable and invited the admiration even leaders of the Revolt. Rani of Ramgarh, Rani Jindan Kaur, Rani Tace Bai, Baiza Bai, Chauhan Rani, Tapasvini Maharani daringly led their troops into the battlefield.

Rani Lakshmi Bai of Jhansi whose heroism and superb leadership laid an outstanding example of real patriotism. Indian women who joined the national movement belonged to educated and liberal families, as well as those from the rural areas and from all walk of life, all castes, religions and communities.

Sarojini Naidu, Kasturba Gandhi, Vijayalakmi Pundit and Annie Beasant in the 20th century are the names which are remembered even today for their singular contribution both in battlefield and in political field.

Let us elucidate the role of Indian women who participated in the freedom struggle against British East India Company and British Empire and made great and rich contributions in various ways.



**Research Methodology:**

For the purpose of this exploration, I have used a amalgamation of two of the archetypical social sciences research tools application –as they are authentic and brilliant method to assemble statistics from multiple appellant in an methodical and convenient way. Question was asked to the parents and their children, survey, interviews –consisting of several interrogation which were dispersed among representative of each contender group and Qualitative analysis to congregate extensive perception of the stumbling block.

**Result and Discussions:**

Woman's participation in India's freedom struggle began as early as in 1817. Bhima Bai Holkar fought bravely against the British Colonel Malcolm and defeated him in guerrilla warfare. Rani Lakshmi Bai of Jhansi whose heroism and superb leadership laid on outstanding example of real patriotism. Sarojini Naidu, Kasturba Gandhi, Vijay Lakshmi pundit, Annie Besant etc. in the 20th century are the names which are remembered even today for their singular contribution both in battlefield and in political field.

**Bhima Bai Holkar**

Women's participation in the freedom struggle began as early as 1817 when Bhīma Bai Holkar fought against the British Colonel Malcolm and a defeated him in guerrilla warfare. At a very critical time for our motherland when the British East India Company was fast expanding its empire in India.

When Tipu Sultan had been eliminated (1799), the proud Marathas had been humbled (1815), Chenamma the widowed queen of Raja Malla Sarja frustrated the machinations of British to annex her kingdom Kittore, a tiny principality in the present Belgaum District of Karnataka. She fought against the mighty British army and scored initial success.

**Rani Lakshmi Bai**

Rani of Jhansi Rani Lakshmi Bai whose heroism and superb leadership laid an outstanding example for all future generations of women freedom fighters. Married to Gangadhar Rao head of the state of Jhansi. She was not allowed to adopt a successor after his death by the British, and Jhansi was annexed. With the outbreak of the Revolt she became determined to fight back. She used to go into the battlefield dressed as a man. Holding the reins of their horse in her mouth she used the sword with both hands. Under her leadership the Rani's troops showed undaunted courage and returned shot for shot.

Considered by the British as the best and bravest military leader of rebels this sparkling essence of courage died a hero's death in the battlefield. The first name that comes to the mind is that of famous Rani Lakshmi Bai of Jhansi. Dressed in the men's clothes, she led her soldiers to war against the British. Even her enemies admired her courage and daring. She fought valiantly and although beaten she refused to surrender and fell as a warrior should, fighting the enemy to the last. Her remarkable courage inspired many men and women, fighting the enemy to the last. Her remarkable courage inspired many men and women in India to rise against the foreign rule.

**Begam Hazrat Mahal**

Begam Hazrat Mahal was a great Indian freedom-fighter who played a major role during India's First War of Independence. She was also known as Begum of Awadh and the wife of Nawab Wajid Ali Shah, ruler of Lucknow. She led a band of her supporters against the British, and was even able to seize the control of Lucknow. She worked in closed association with other leaders of the India's First War of Independence, including Nana Sahib. Begum was not only a strategist but also fought on the battlefield. When the forces under the command of the British re-captured Lucknow and most of the part of Awadh, she was forced to retreat. When her forces lost ground, she fled Awadh





and organized soldiers again in other places. She turned down all offers of amnesty and allowances by the British rulers. Finally, she took refuge in an asylum in Nepal, where she died in the year 1879. To acknowledge her endless efforts in fighting for the freedom of country, the Government of India issued a stamp on 10th May 1984.

#### **Madam Cama**

Madam Cama fought for the freedom of the country till the last in her own way, and helped many revolutionaries with money and materials. She unfurled the first National Flag at the International Socialist Conference in Stuttgart (Germany) in 1907. She declared "The flag is of Indian Independence! Behold it is born! It has been made sacred by the blood of Young Indians who sacrificed their lives. I call upon you, gentlemen to rise and salute this flag of Indian Independence. In the name of this flag, I appeal to lovers of freedom all over the world to support this flag. "A thousand representatives from several countries were attended. She travelled a lot of places including America and propagates Americans about Indians struggling for Independence.

#### **Annie Besant**

Annie Besant an Irish Lady the leader of the Theosophical Society joined the Indian National Congress and gave it a new direction. She was the first women president of the congress and gave a powerful lead to Women's movement in India. She soon became a leading labour organizer, strike leader and reformer. She also became involved in Indian Nationalism and in 1916 established the Indian Home Rule League of which she became President. She started a newspaper, "New India", criticized British rule and was jailed for sedition. She got involved in Political and educational activities and set up a number of schools and colleges, the most important of which was Central Hindu College and School in Banaras which she started in 1913.

#### **Sarojini Naidu**

Sarojini Naidu had known as "Cuckoo of India". She was a distinguished poet; renowned freedom fighter. Her father was principal in Nizam College. At that time Nizam was not in favour of Women's education, hence Sarojini was sent to Madras for schooling. She topped the matriculation examination at the age of twelve. She met English authors Arthur Simon and Edmond Gausse. It was Gausse who convinced Sarojini to stick to Indian themes-India's great mountains, rivers, temples, social milieu, to express her poetry.

Sarojini Naidu was elected as a president of Indian National Congress. Dramatic meeting with another respected leader of time, Gokhale, in 1906 was to change her life forever. His response to her fiery speech brought into her life the impact of a visionary who saw in her oratory and brilliance a leader of the future. The period from 1917 to 1919 was the most dynamic phase of Sarojini's career. During this time, she campaigned for the Montagu Chelmsford Reforms, the Khilafat issue, the draconian Rowlett Act and the Satyagraha. When Gandhi launched the Civil Disobedience Movement, She proved a faithful lieutenant. With great courage she quelled the rotors, sold proscribed literature, and addressed frenzied meetings on the carnage at Jallianwala Bag in Amritsar. In 1930 when Mahatma Gandhi chose her to lead the salt Satyagraha the stories of her courage became legion.

After Gandhi's arrest she had prepared 2,000 volunteers under the scorching sun to raid the Dahrsana Salt Works, while the police faced them half a mile up the road with rifle, lathis (canes) and steel tipped clubs. The Volunteers wildly cheered when she shook off the arm of the British police officer who came to arrest her and marched proudly to the barbed wire in full force and she came under the influence of Gopal Krishna Gokhale and Gandhi. Gokhale advised her to spare all her energy and talents for the nation's cause. She gave up writing poetry and fully devoted herself to emancipation of women, education, Hindu-Muslim unity etc. She became a follower of Gandhi and





accompanied him to England. Whenever in England, she openly criticized British rule in India which caught the attention of scholars and intellectuals.

### **Vijay Lakshmi Pandit**

Vijay Lakshmi Pandit is a daughter of Motilal Nehru, were the president of congress and brother of Jawaharlal Nehru, India's first Prime Minister. She was inspired by Rani Lakshmi Bai of Jhansi and impressed by Sarojini Naidu. She entered the Non Co-operation Movement to fight against the British rule. Vijay Lakshmi represented India in many of the Conferences abroad. She attended numerous public lectures and challenged the British dominated delegate's rights to represent India therein. She was a great fighter and took parts in many of the freedom movement. She was arrested in 1932 and sentenced to one year's rigorous imprisonment. She was arrested in 1940 and yet again during the Quit India Movement in 1942.

### **Indira Gandhi**

Indira Gandhi was a most remarkable woman in Modern India. She became a member of Indian National Congress in 1938. Soon after her return to India in March 1941, she plunged into political activity. Her public activity entered a new phase with India's Independence in 1947. She took over the responsibility of running the Prime Minister's House. The Congress, which had been her political home ever since her childhood, soon drew her into leading political roles, first as a member of the Congress Working Committee in 1955 and later as a member of the Central Parliamentary Board in 1958. In 1959, she was elected President of the Indian National Congress.

In the eventful years of her leadership as Prime Minister, Indian Society underwent profound changes. She was unrelenting in her endeavor for the unity and solidarity of the nation. A staunch defender of the secular ideals of the Constitution, she worked tirelessly for the social and economic advancement of the minorities. She had a vision of a modern self-reliant and dynamic economy. She fought boldly and vigorously against communalism, obscurantism, revivalism and religious fundamentalism of all types. She laid down her life in defense of the ideals on which the unity of India will reverberate across the centuries. She became the indomitable symbol of India's self-respect and self-confidence. Death came to her when she was at her peak, when her stature and influence were acclaimed the world over.

### **Durgabai Deshmukh**

She was imprisoned for three years for participating in the Salt Satyagraha. During this Satyagraha when leaders like Rajaji and T. Prakasam in south were busy in organising other facts of the movement, it was Durgabai who led a group of salt law breakers to Marina Beach at Madras. She was instrumental in initiating 'Andhra Mahila Sabha' and 'Hindi Balika Patasala' at a very young age.

### **Mridula Sarabai**

During Partition she fought at great personal risk to save girls abducted by mobs and to prevent refugees, both Hindu and Muslim from being hurt or killed. In 1934 she was elected to the All Indian Congress Committee as a delegate from Gujarat.

### **Basanti Das**

She was an Indian Independence activist during the British rule in India. She took an active part in various political and social movements. She herself took active part in freedom activities and was arrested during non-cooperation movement. She received Padma Vibhushan in 1973.

### **Suceta Kriplani**

In 1932, she entered public life as a social worker and in 1939 entered politics and joined the Indian National Congress. In 1940, she offered individual satyagraha at Faizabad and was imprisoned for two years. During the Quit India Movement, she went underground and rendered remarkable service of secretly organizing anti-British resistance.



**Kamala Das Gupta**

She has been a brilliant luminary among the Indian women freedom fighters. She belongs to the militant section and was an active member of the 'Jugantar Party'. In 1942, she was arrested in connection with the Quit-India movement and lodged in the Presidency jail.

**dr. s. muthulakshmi reddy**

She was the first Indian women who for her merit and services in the field of social service and medicine was nominated to the Madras Legislative Assembly in 1926. As a protest against torturing women and use of repressive measures against female agitators during Salt Satyagraha and Noncooperation Movement, she resigned her offices and jumped into the freedom struggle.

**Margaret Cousin**

An Irish woman crusader, after fighting for the voting right for women in Ireland, arrived in India along with her husband and advocate the same causes for Indian women. She joined hand with Annie Besant and Sarojini Naidu and helped in the founding of many women association to bring about an awakening among them.

**Rajkumari Amrit Kaur**

She belong to the ruling house of Kapurthala. She was inspired by Gandhi and joined Congress during the Salt Satyagraha. She was arrested in Bombay for violating the Salt law, when she went to the North west frontier province to advocate the causes of freedom struggle, she was arrested and convicted on a charge of sedition. She was the President of All India Women conference for seven years.

**Conclusion:**

The story of women's participation in India freedom struggle is the story of making bold choices, finding themselves on streets, inside jail and in legislature. After so many efforts India achieved Independence on August 15, 1947. Thousands of Indian women dedicated their lives for obtaining freedom of their motherland. The nonviolent movement that gained India her freedom not only took women along but was dependent for its success on the active participation of women. Perhaps for the first and the only time in world history, the power of a mighty global empire on which the sun never set had been challenged and overcome by the moral might of a people armed only with peace, ideas and courage. In the end we can say that in the last fifty-year, women movement has matured and has progressively deepened its relationship with other movement like trader unions, environmental movements and other progressive movements which fight against all forms of oppression, injustice and degradation.

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## Laplace Transform And Its Application

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### Abstract:-

Laplace Transform has in recent years become an essential part of mathematical background required of engineering and scientists because transform methods provide an easy and effective means for the solution of many problems arising in engineering. Laplace Transform help in solving complex problems with a very simple approach just like the application of transfer functions to solve ordinary differential equations. This paper will discuss some basic concepts of Laplace Transform and its application in the areas of Physics, several well-known electric circuits.

### Introduction :-

#### 1. The Laplace Transform:-

The Laplace transform  $F(s)$  of some function  $f(t)$  is defined as:

$$F(s) = L\{f(t)\} =$$

where  $t$  is a real number and  $s$  is a complex number. Again, as in the recurrence relation case, convince yourself that this has meaning: As long as  $s$  is positive, will decay to 0 as  $t \rightarrow \infty$ , and the product of  $e^{-st}$  and  $f(t)$  will converge so long as  $f(t)$  doesn't grow at some crazy rate.

One important property of the Laplace transform is that it is a linear operator. That is, if  $a$  and  $b$  are constants:

$$L\{a f(t) + b g(t)\} = aL\{f(t)\} + bL\{g(t)\}$$

This follows because integration is a linear operator:

$$\begin{aligned} L\{a f(t) + b g(t)\} &= \int_0^{\infty} e^{-st} [a f(t) + b g(t)] dt \\ &= a \int_0^{\infty} e^{-st} f(t) dt + b \int_0^{\infty} e^{-st} g(t) dt \\ &= aL\{f(t)\} + bL\{g(t)\} \end{aligned}$$

#### 2. Example: The Laplace Transform of 1

Let's start with a very simple example,  $f(t) = 1$ . By the definition of the Laplace transform,



$$L\{1\} = F(s) = \int_0^{\infty} e^{-st}(1) dt$$

Of course, the integral is improper, so this is actually:

$$F(s) = \lim_{T \rightarrow \infty} \int_0^T e^{-st} dt$$

We can find the anti-derivative easily:

$$F(s) = \lim_{T \rightarrow \infty} \left[ -\frac{1}{s} e^{-st} \right] \text{ where } t \rightarrow 0 \text{ to } T$$

Evaluating the anti-derivative at the endpoints, we find:

$$F(s) = \lim_{T \rightarrow \infty} -\frac{1}{s} [e^{-sT} - e^{-s(0)}]$$

$e^0$  is obviously 1, and so

$$F(s) = -\frac{1}{s} \left[ \lim_{T \rightarrow \infty} e^{-sT} - 1 \right]$$

When evaluating the limit, we can regard  $s$  as a constant, so  $\lim_{T \rightarrow \infty} e^{-sT}$  is 0, but only if  $s > 0$ . So we have:

$$L\{1\} = \frac{1}{s}, \quad s > 0$$

Notice that a constant function in the  $t$ -domain is not a constant function in the  $s$ -domain.

### 3. Laplace Transform of a derivative:-

Suppose we want the Laplace transform of  $f'(t)$ , but we don't know  $f(t)$ . Can we find the transform in terms of  $L\{f(t)\}$ ?

We have a product of two functions of  $t$  that we need to integrate. We can use integration by parts to find:



$$L\{f'(t)\} = [e^{-st}f(t)]_0^{\infty} + \int_0^{\infty} e^{-st} f'(t) dt$$

The remaining integral is clearly  $L\{f(t)\}$ , so:

$$L\{f'(t)\} = sL\{f(t)\} - f(0)$$

We can use this rule to find higher order derivative. For example:

$$\begin{aligned} L\{f''(t)\} &= L\{f'(t)\} - f'(0) \\ &= s[sL\{f(t)\} - f(0)] - f'(0) \\ &= s^2 L\{f(t)\} - s f(0) - f'(0) \end{aligned}$$

#### 4. The Laplace Transform of an Integral

If we have some function  $g(t)$  which contains an integral:

$$g(t) = \int_0^t f(u) du$$

Then:

$$G(s) = \frac{1}{s} F(s)$$

So with the Laplace transform, derivatives and integrals turn into algebraic factors.

#### 5. Common Laplace Transform :-

$$L(1) = \frac{1}{s}$$

$$L(t) = 1/s^2$$

$$L(t^n) = n!/s^{n+1}$$

$$L(e^{at}) = 1/s-a$$

$$L\{\sin(at)\} = a/s^2+a^2$$

$$L\{\cos(at)\} = s/s^2+a^2$$

If we have some function  $g(t)$  which contains an integral:

#### 6. The Heaviside Function

In order to have discontinuous forcing terms, we can make use of the so-called "Heaviside function"  $H(t)$ :





## Role of ICT in Primary and Secondary Education of Remote Area

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### ABSTRACT

#### Article Info

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ICT (Information and communication Technology) is playing important role in the development of areas like education, health, business, entertainment, manufacturing industries, etc. Use of ICT various areas gets different types of opportunities such as creating more opportunities for an effective and efficient way of handling their businesses, facilitating knowledge in the education, Various ways for Communication, Artistic ways of written communication, growth of Electronics, Entertainment, Medicine, providing lifelong learning. Since education play role in the economic development and improvements in human welfare, ICT's in the education sector to promote the education quality in teaching-learning to assessment and evaluation and accessibility is unquestionably becoming indispensable. This paper attempts to discuss the role of effective integration of ICT in education, particularly in primary and secondary schools, pointing out current challenges and opportunities. Finally, what are major precaution taken by each stakeholders and also contribute for the effective integration of ICT in education in primary and secondary schools.

**Keywords :** ICT, education, lifelong learning

### I. INTRODUCTION

ICT: Information and communication technology is the tool for computing and communicating. Using computers, networks, software and related systems, people can access, create, exchange, analyze and use data, information and knowledge in very good manner.

Electronic tools, systems and resources are generating for the storage and process the data in this Digital Technologies. Which include multimedia, PowerPoint presentation, social media, online games and mobile devices.

In all these tools and techniques of ICT are used to became the effective and efficient. Also ICT gets main role in the aspects of human life such as education, health, transport, business, entertainment etc, thereby creating more opportunities for enhancement of the education.

As per the Literature, ICT is used in communities for sharing and facilitating knowledge which is helps to enhance the quality of life. ICT develops the ares like economic, social services, arts, culture, governance etc, it means it helps to **enhance the Quality of Life through** all above area development. ICT produces formal and informal skill among the people. ICT is



used in the training which is technical and vocational as formal and non-formal at all places and all times. ICT will improve quality, learning pathways and further groups including rural youth and adults, out-of-school youth and also people with disabilities. It means it play the overall role in the fulfillment of human life well.

Development in the areas like economic and human welfare takes places because of Education. The Economic growth will be attract jobs and investment for the countries. with this countries see raising education and tackling poverty and deprivation. The main thing is the ICT in education reduce the costs, improve the quality, efficiency in the administration, teaching and learning etc.

This review presentation focuses on the effective integration of ICT in education with an emphasis on primary and secondary schools which learning Mathematics. It attempts to point out how ICT's can effectively be integrated in the teaching learning, the challenges and issues that need to be addressed by the various stakeholders to overcome from these challenges in achieving the benefits which ICT's can offer.

## II. ROLE IN PRIMARY AND SECONDARY EDUCATION OF THE ICT

ICTs is emerging new things and increasing the adoption and acceptance by the society will increase level of education on a large scale "There is general consensus among practitioners and academics that integration of ICTs in education as a positive impact on the learning environment" (Prince Waterhouse coopers, 2010). Increase in the use of ICTs in education is large scale which will be greater impact in this education sector.

Teacher provided the digital tools such as Computers, Laptops, LCD projectors, smart boards etc. the use of such things in education in the teaching learning process gives higher benefits. "Research shows that ICTs can contribute to enhancing education in

development context in a number of ways." (Julian M. Bass (2007)).

1. By making teaching learning more interesting it reduce the drop-out rates.
2. Distance education remove the big obstacles of Geographical area.
3. Accelerating Teacher training which increases the more qualified teachers.
4. Removal of adverse factors like poor physical infrastructure, less basic teaching materials and high ratio of student-teacher by ICT.
5. One can access material from Experts in their fields of interest among the world only because of ICT. Before this they are only dependent on physical printed textbooks.
6. Teacher can adopt new technique in the teaching using reliable educational contents to enhance teaching methods.
7. The use of various Digital tools, computer application, videos, television, text, images will increase learner motivation towards learning and also facilitate the all age student in engaging learning environment

ICT put the impact in the primary and secondary schools in the developing countries. While in traditional education systems has less resources, not qualify teacher etc., Every Government has first priority as the quality of education because is the base of each country development in the future.

Many countries having the national agenda as the good education. the country like Ethiopia running the Programme EFA (Education For All). In India Government run the Program (ESDP) in 1997 with the Education Training Policy. They introduce the following goals:

1. Ensuing that adults are not use equipments in learning and life skills so, learning needs for young people
2. Gender equality in education with a focus on girl's



- education will be increase level of education quality.
3. Expanding and enhancing comprehensive early childhood care.
4. In 2015 girl have access to get free and compulsory good quality of primary education then they expands this free education up to secondary school this is particularly for minorities.
5. By achieving a 50% adult literary level in 2015 for women then the equal access to basic and continuing education for adults.
6. The measuring level of literacy by numeracy and basic life skills are improved by all aspects of quality of education.

Expenses made by Government on two component is as follows

#### 1. ICT infrastructure

On an average, 20 devices for high school and 10 devices for higher primary schools and 3 devices for lower primary schools

ICT Infrastructure – India			
Institution	Number	Initial Investment	Recurring
Schools – 'Only LPS' (Government and aided)	677,648	186,353,250,930	54,211,854,816
Schools – Only HPS and Only HPS + LPS (Government and aided)	346,363	161,058,733,992	48,490,801,632
Schools – HS (Government and aided) – all other than above two	198,907	198,907,276,400	59,672,182,920
Cluster Resource Centres (CRC)	76,333	76,333,000,000	22,899,900,000
Block Resource Centres + BEO	13,500	13,500,000,000	4,050,000,000
No. of DIETs/DRCs + DEO	1,280	1,280,000,000	384,000,000
IASEs, CTEs (excludes private teacher education institutions)	135	135,000,000	40,500,000
SCERTs and state level institutions	40	40,000,000	12,000,000
National level institutions	10	10,000,000	3,000,000
Source - (MHRD annual report 2015-16, 12 Plan TE guidelines for number of institutions)			
Private (unaided) schools have been excluded from the school count in the table.			
Only government institutions have been considered in the count of teacher support institutions.			
Grand Total	0	637,617,261,322	

#### 2. TPD

INDIA - Teacher Professional Development			
Institution	Number	Initial year	Subsequent years
Teachers – Only LPS (Government and aided)	1,804,738	9,023,690,500	4,511,845,250
Teachers - HPS, HS (Government and aided – non Only LPS)	4,214,418	21,072,089,425	10,536,044,713
Cluster Resource Centres (CRC)	76,333	381,665,000	190,832,500
Block Resource Centres + BEO	13,500	303,750,000	151,875,000
No. of DIETs/DRCs + DEO	1,280	160,000,000	80,000,000



AIASEs, CTEs (excludes private teacher education institutions)	135	27,000,000	13,500,000
SCERTs and state level institutions	40	20,000,000	10,000,000
National level institutions	10	5,000,000	2,500,000
<b>Grand Total</b>		<b>30,993,194,925</b>	<b>15,496,597,463</b>
<b>in crores</b>		<b>3,099</b>	<b>1,550</b>

(Source : ICT implementation in school education in India- a report by Tata Trusts and IT for Change)

After 2015 many countries Government has adopted Universal access to basic education by reducing the adult illiteracy.

Following are ten key strategies.

1. To connect hospitals from villages, town, and city with each other with ICTs.
2. To connect all the Research Centre working in different area with ICTs.
3. To connect Post Offices, public libraries, cultural centers, banks, insurance traders for sharing information with ICTs.
4. To connect primary, secondary schools, colleges, universities, educational hubs, technical institutes with ICTs.
5. To connect every village, with community access point by using the ICTs.
6. To connect by e-mails and web address the all local and central Government Departments.
7. Change the curricula of primary and secondary schools in consideration of challenges of society, considering national circumstances.
8. To ensure that more than 50 % population of the world using ICTs very frequently.
9. To ensure that all world's population have habit to use Radio and television for getting the information.
10. To encourage the development of content in all languages mainly used by more people and put this material at place from which it facilitate the other people which want.

Every nation has to decide that it operate using their own economic strengths and made action plan considering a global information society.

Stakeholders expecting more gain and benefits from ICT as compare to the any educational policy in the education.

### Challenges, Opportunities and Expectation of Stakeholders Form ICT in Primary and Secondary Schools

Following are some challenges in the way of effective use of ICT in education in primary and secondary education consideration.

The main challenges are Digital divide, insufficient infrastructure, competences of the student and teachers in using ICT. Other factors like cultural and social change to each other.

1. The major challenges in India is the existing infrastructure for implementation of ICT. In India urban areas have good infrastructure like Modern computer, good connectivity but most of the schools are from Rural areas which are facing this problem. So demand for increased development of infrastructure must have first priority. for such thing school management must have financial plans to fulfill the requirements of improvement of ICT tools like Software, hardware and networks etc.,
2. The problem is digital divide in the development of ICT in school. It means the disparity between the peoples having and also using the tools and techniques verses those who are fail to se these tools and techniques because of many reasons. One of the characterized to the Digital divide is unequal access to ICT. National Policy Makers



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# **INTERLINK RESEARCH ANALYSIS**

**Editor In Chief  
Dr. Balaji Kamble**





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## Integrating Factor - A Simple Method of Solving Differential Equations



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2

Research Paper - Mathematics

### ABSTRACT

*In this Paper, focus on history of differential equations with definitions & method of solving differential equations, with some simple examples of Integrating Factor. In Mathematics, an Integrating factor is a function that is chosen to facilitate the solving of a given equation involving differentials. In 1692 James Bernoulli made known the method of an integrating the homogeneous differential equation of the first order.*

**Keywords :** Differential equation, Integrating Factor, homogeneous differential equation, F-luxional Equation, separation of variables, linear equations

### The Place of Differential Equations in Mathematics :

Analysis has been the dominant branch of mathematics for 350 years & differential equations is the heart of analysis. This subject is the natural goal of elementary calculus & the most important part of mathematics for understanding the physical science.

In mathematics history of differential equations traces the development of "Differential Equations" from calculus, it self independently invented by English physicist Isaac Newton (1676) & Gottfried Liebnez (1693)

Differential Equations began with Leibniz, the Bernoulli brothers, & other from the 1680s, not long after Newton's 'F-luxional Equations' in 1670s.

**Definitions :** A Differential Equation is mathematical equation that relates some function with its derivatives.



**First order Differential Equations :**

Contains only first derivatives.

**Second order Differential Equations :**

Contains Second derivatives (and possibly first derivatives also).

**Degree :** The highest power of the highest derivative which occurs in the Differential Equations.

**Differential Equations Solutions :**

To find solution of Differential Equations, there are two methods to solve differential equation.

- 1) Separation of Variables
- 2) Integrating factor

Out of above two method the focus on an Integrating Factor.

**Linear Equation :**

A differential equation is said to be linear when the dependent variable & its derivatives appear only in the first degree. The form of the linear equation of the first order is,

$$\frac{dy}{dx} + Py = Q$$

where P & Q are function of x or Constants.

We can solve these differential equations using the technique of an Integrating Factor.

We multiply both side of the differential equation by the integrating factor I.F.

Which is defined as,

$$I.F. = e^{\int p dx}$$

**General Solution,** Multiplying our Original differential equation by I.F.

We get that,





$$\Rightarrow \frac{dy}{dx} = +Py = Q$$

$$\Rightarrow \text{I.F.} \frac{dy}{dx} + \text{I.F.} Py = \text{I.F.} Q$$

On integrating both side

$$\Rightarrow \int (\text{I.F.} \frac{dy}{dx} + \text{I.F.} Py) dx = \int \text{I.F.} Q dx$$

$$\Rightarrow \text{I.F.} Y = \int \text{I.F.} Q dx \quad \text{since}$$

$$\Rightarrow \frac{d}{dx} (\text{I.F.} Y) = \text{I.F.} \frac{dy}{dx} + \text{I.F.} Py \quad \text{by the product rule.}$$

As both I.F. & Q are functions involving only x in most of the problems you are likely to meet, I.F., can usually be found. So the general solution to the differential equation is found by integrating I.F. Q & then re-arranging the formula to make Y the subject.

**Some example of linear differential equations :**

1) Solve  $\frac{dy}{dx} + \frac{1}{x}y = 3x$

**Solution :** This is a linear differential equation of type  $\frac{dy}{dx} + Py = Q$

Here  $P = \frac{1}{x}$ ,  $Q = 3x$

$$\therefore \int P dx = \int \frac{1}{x} dx$$

$$\therefore \text{I.F.} = e^{\int P dx} = e^{\int \frac{1}{x} dx} = e^{\log x} = x$$

$$\therefore \text{I.F.} = x$$

General solution is,

$$\text{I.F.} \left( \frac{dy}{dx} + \frac{1}{x}y \right) = \text{I.F.} \times 3x$$

$$x \left( \frac{dy}{dx} + \frac{1}{x}y \right) = x \times 3x$$

$$\frac{d}{dx} (x \cdot y) = 3x^2$$

On integrating above equation





$$\Rightarrow \int \frac{d}{dx}(xy) = \int 3x^2 dx$$

$$\therefore xy = \frac{3x^3}{3} + C,$$

Where C is integrating constant.

$$xy = x^3 + C$$

$$\text{or } y = x^2 + Cx^{-1}$$

2) Solve  $\frac{dy}{dx} + y = e^{-x}$

Solution - This is linear differential equation of type

$$\frac{dy}{dx} + Py = Q$$

Here  $P = 1$ ,  $Q = e^{-x}$

$$\therefore \text{I.F.} = e^{\int P dx} = e^{\int 1 dx} = e^x$$

$$\therefore \text{I.F.} = e^x$$

General solution is,

$$\text{I.F.} \left( \frac{dy}{dx} + y \right) = e^{-x}$$

$$e^x \left( \frac{dy}{dx} + y \right) = e^x e^{-x}$$

$$= e^0 = 1$$

$$\frac{d}{dx}(e^x y) = 1$$

On integrating both side

$$\Rightarrow \int \frac{d}{dx}(e^x y) = \int 1 dx$$

$$\Rightarrow e^x y = x + C \quad \text{Where C is integrating constant.}$$

$$\Rightarrow y = x e^{-x} + C e^{-x}$$

$$\Rightarrow y = (x + C) e^{-x}$$

3) Solve  $\frac{dy}{dx} - 5y = e^x$





Solution - This is linear differential equation of type

$$\frac{dy}{dx} + Py = Q$$

Here  $P = -5$ ,  $Q = e^x$

$$\therefore \text{I.F.} = e^{\int P dx} = e^{\int -5 dx} = e^{-5x}$$

$$\therefore \text{I.F.} = e^{-5x}$$

General solution is,

$$\text{I.F.} \left( \frac{dy}{dx} - 5y \right) = \text{I.F.} e^{-x}$$

$$e^{-5x} \left( \frac{dy}{dx} - 5y \right) = e^{-5x} e^x$$

$$\frac{dy}{dx} (e^{-5x} y) = e^{-4x}$$

On integrating both side.

$$\Rightarrow \int \frac{d}{dx} (e^{-5x} y) = \int e^{-4x} dx$$

$$\Rightarrow e^{-5x} y = -\frac{1}{4} e^{-4x} + C \quad \text{Where } C \text{ is integrating constant.}$$

$$\rightarrow y = \frac{1}{4} e^x + C e^{5x}$$

4) Solve  $\sin x \frac{dy}{dx} + 3y \cos x = \operatorname{cosec} x$

Solution - Divide given equation by  $\sin x$  both side

$$\frac{dy}{dx} + 3y \frac{\cos x}{\sin x} = \frac{\operatorname{cosec} x}{\sin x}$$

$$\frac{dy}{dx} + 3 \frac{\cos x}{\sin x} y = \frac{1}{\sin^2 x}$$

This equation becomes of the form  $\frac{dy}{dx} + Py = Q$

Here  $P = 3 \frac{\cos x}{\sin x}$

$$Q = \frac{1}{\sin^2 x}$$

$$\therefore \text{I.F.} = e^{\int P dx} = e^{\int 3 \frac{\cos x}{\sin x} dx} = e^{3 \ln \sin x} = e^{\ln \sin^3 x} = \sin^3 x$$

$$\therefore \text{I.F.} = \sin^3 x$$

General solution is,





$$\text{I.F.} \left( \frac{dy}{dx} - 3 \frac{\cos x}{\sin x} y \right) = \text{I.F.} \frac{1}{\sin^2 x}$$

$$\sin^3 x \left( \frac{dy}{dx} + 3 \frac{\cos x}{\sin x} y \right) = \sin^3 x \frac{1}{\sin^2 x}$$

$$\frac{d}{dx} (\sin^3 x y) = \sin x$$

On integrating both side.

$$\Rightarrow \int \frac{d}{dx} (\sin^3 x y) = \int \sin x \, dx$$

$$\Rightarrow \sin^3 x y = -\cos x + C \quad \text{Where } C \text{ is integrating constant.}$$

$$\Rightarrow y = \frac{1}{\sin^3 x} (-\cos x + C)$$

These are few very easy examples of integrating factors. It is commonly used to solve ordinary differential equations.

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## Solutions for nonlinear Caputo fractional differential equations

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### Abstract

In this paper, nonlinear Caputo fractional differential equations is studied. The existence and uniqueness of a solution are investigated by using Krasnoselskii and Banach fixed point theorems and the method of lower-upper solutions.

**Keywords:** Existence and uniqueness solution, lower-upper solutions, fractional differential equations, fixed points.

**Subject Classification Code:** 34A08, 26A33, 47H10.

## 1 Introduction

Theory of fractional differential equations occur frequently in different research areas and engineering, such as Physics, Chemistry, Biology, medicine, aerodynamics, fields of control, electromagnetic etc. (see in [4, 10, 9] and references therein). In recent years, the theory of fractional differential equations has been given a great interest, especially in finding sufficient conditions for existence and uniqueness of the solutions of nonlinear fractional differential equations ([1, 2, 5, 6, 7, 8]).

In [11] S. Zhang investigated the existence and uniqueness of positive solutions for the nonlinear fractional differential equations by using the method of the upper and lower solution. In [3], Boulares et al. investigated existence and uniqueness of positive solutions for nonlinear fractional differential equations by using the method of the upper and lower solution and Banach fixed point theorem.

In this paper, using the method of upper and lower solutions and the Krasnoselskii and Banach fixed point theorems, we study the existence and uniqueness of solutions of the nonlinear fractional differential equation

$$\begin{cases} {}^C D^\mu z(r) = \mathcal{F}(r, z(r)) + {}^C D^{\mu-1} \mathcal{H}(r, z(r)), & 0 < r \leq 1, \\ z(0) = \zeta_1, \quad z'(0) = \zeta_2 \geq \mathcal{H}(0, \zeta_1) > 0, \end{cases} \quad (1.1)$$

where  $1 \leq \mu \leq 2$  and  $\mathcal{F}, \mathcal{H} : [0, 1] \times [0, \infty) \rightarrow [0, \infty)$  are continuous functions and  $\mathcal{H}$  is non-decreasing on  $z$ .

In the process we convert the given fractional differential equation into an equivalent integral equation. Then we construct appropriate mapping and employ Krasnoselskii fixed point theorem and the method of upper and lower solutions to show the existence of a solution of this equation. We also use the Banach fixed point theorem to show the existence of a unique positive solution.



## 2 Preliminaries

Let  $B = C([0, 1])$  be the Banach space of all real-valued continuous functions defined on the compact interval  $[0, 1]$ , endowed with the maximum norm. Let  $K$  be a nonempty closed subset of  $B$  defined as  $K = \{z \in B : \|z\| \leq l, l > 0\}$ .

We give some definitions and their properties for our main results.

**Definition 2.1** The fractional integral of order  $\mu > 0$  of a function  $z : \mathbb{R}^+ \rightarrow \mathbb{R}$  is given by

$$I^\mu z(r) = \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} z(s) ds,$$

provided the right side is pointwise defined on  $\mathbb{R}^+$ .

**Definition 2.2** The Caputo fractional derivative of order  $\mu > 0$  of a function  $u : \mathbb{R}^+ \rightarrow \mathbb{R}$  is given by

$${}^c D^\mu z(r) = \frac{1}{\Gamma(n-\mu)} \int_0^r (r-s)^{n-\mu-1} z^{(n)}(s) ds,$$

where  $n = [\mu] + 1$ , provided the right side is pointwise defined on  $\mathbb{R}^+$ .

**Lemma 2.1** ([10]) Let  $\text{Re}(\mu) > 0$ , suppose  $z \in C^{n-1}([0, \infty))$  and  $z^{(n)}$  exists almost everywhere on any bounded interval of  $\mathbb{R}^+$ . Then

$$I^\mu ({}^c D_0^\mu z)(r) = z(r) - \sum_{k=0}^{n-1} \frac{z^{(k)}(0)}{k!} r^k.$$

In particular, when  $1 < \text{Re}(\mu) < 2$ ,  $I^\mu ({}^c D_0^\mu z)(r) = z(r) - z(0) - z'(0)r$ .

**Lemma 2.2** Let  $\eta \in C^1([0, 1])$ ,  $z^0$  and  $\frac{\partial \mathcal{H}}{\partial r}$  exist, then  $z(r)$  is a solution of (1.1) if and only if

$$z(r) = \zeta_1 + (\zeta_2 - \mathcal{H}(0, \zeta_1))r + \int_0^r \mathcal{H}(s, z(s)) ds + \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} \mathcal{F}(s, z(s)) ds \quad (2.1)$$

**Proof:** Let  $z$  be a solution of (1.1). First we write equation (1.1) as

$$I^\mu {}^c D^\mu z(r) = I^\mu (\mathcal{F}(r, z(r)) + {}^c D^{\mu-1} \mathcal{H}(r, z(r))), \quad 0 < r \leq 1$$

Using lemma [2.1], we have

$$\begin{aligned} z(r) - z(0) - z'(0)r &= I^{\mu-1} {}^c D^{\mu-1} \mathcal{H}(r, z(r)) + I^\mu \mathcal{F}(r, z(r)), \\ &= I^{\mu-1} [{}^c D^{\mu-1} \mathcal{H}(r, z(r))] + I^\mu \mathcal{F}(r, z(r)), \\ &= I({}^c \mathcal{H}(r, w(r)) - \mathcal{H}(0, w(0))) + I^\mu \mathcal{F}(r, w(r)), \\ &= \int_0^r \mathcal{H}(s, w(s)) ds - \mathcal{H}(0, \zeta_1)r \\ &\quad + \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} \mathcal{F}(s, w(s)) ds \end{aligned}$$

then we obtain equation (2.1). Conversely, suppose that  $w(r)$  satisfies equation (2.1). Then applying  ${}^c D^\mu$  to both sides of equation (2.1), we obtain  ${}^c D^\mu z(r) = \mathcal{F}(r, z(r)) + {}^c D^{\mu-1} \mathcal{H}(r, z(r))$ ,  $0 < r \leq 1$  and boundary conditions  $z(0) = \zeta_1$ ,  $z'(0) = \zeta_2 \geq \mathcal{H}(0, \zeta_1) > 0$  holds.



Lastly, we state the fixed point theorems which enable us

**Definition 2.3** Let  $(B, \|\cdot\|)$  be a Banach space and  $\varphi : B \rightarrow B$ . The operator  $\varphi$  is a contraction operator if there is an  $\gamma \in (0, 1)$  such that  $u, v \in B$  implying  $\|\varphi u - \varphi v\| \leq \gamma \|u - v\|$

**Theorem 2.3** [12]. Let  $K$  be a nonempty closed convex subset of a Banach space  $B$  and  $\varphi : K \rightarrow K$  be a contraction operator. Then there is a unique  $z \in K$  with  $\varphi z = z$ .

**Theorem 2.4** (Krasnoselskii fixed point theorem) ([12]). Let  $K$  be a nonempty closed convex subset of a Banach space  $B$  and let  $P$  and  $Q$  two operators defined on  $K$  with values in  $B$  such that  $Pu + Qv \in K$ , for every pair  $u, v \in K$ , the operator  $P$  is completely continuous and the operator  $Q$  is a contraction. Then there exist  $x \in K$  such that  $x = Px + Qx$ .

### 3 Existence and uniqueness of solutions

In this section, first we need to construct two mappings such as, one is contraction and other is completely continuous. First we define the operator  $\varphi : K \rightarrow K$  such as

$$(\varphi z)(r) = \zeta_1 + (\zeta_2 - \mathcal{H}(0, \zeta_1))r + \int_0^r \mathcal{H}(s, z(s)) ds + \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} \mathcal{F}(s, z(s)) ds, \quad (3.1)$$

where the operator  $\mathcal{P} : K \rightarrow B$  defined as,

$$(\mathcal{P}z)(r) = \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} \mathcal{F}(s, z(s)) ds,$$

and the operator  $\mathcal{Q} : K \rightarrow X$  defined as,

$$(\mathcal{Q}Z)(r) = \zeta_1 + (\zeta_2 - \mathcal{H}(0, \zeta_1))r + \int_0^r \mathcal{H}(s, z(s)) ds.$$

Throughout this paper, we assume that the following condition holds

(C1)  $\mathcal{H}, \mathcal{F} \in C([0, 1] \times [0, \infty), [0, \infty))$  and  $\mathcal{H}$  is non-decreasing on  $z$ .

(C2) For  $u, v \in B$  and  $r \in [0, 1]$ , there exist  $\alpha \in (0, 1)$  and  $\beta > 0$  such that

$$|\mathcal{H}(r, u) - \mathcal{H}(r, v)| \leq \alpha |u - v|,$$

$$|\mathcal{F}(r, u) - \mathcal{F}(r, v)| \leq \beta |u - v|.$$

**Lemma 3.1** Assume that [C1] holds. Then the operator  $\mathcal{P} : K \rightarrow B$  is completely continuous.



**Proof:** By [C1],  $\mathcal{F}$  is continuous and nonnegative function, we get that  $\mathcal{P} : K \rightarrow B$  is continuous. The function  $\mathcal{F} : [0, 1] \times [0, \infty) \rightarrow [0, \infty)$  is bounded then  $\exists \lambda > 0$  such that  $|\mathcal{F}(r, z(r))| \leq \lambda$ . We obtain

$$\begin{aligned} |(\mathcal{P}z)(r)| &= \left| \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} \mathcal{F}(s, z(s)) ds \right| \\ &\leq \frac{1}{\Gamma(\mu)} \int_0^r (r-s)^{\mu-1} |\mathcal{F}(s, z(s))| ds \\ &\leq \frac{\lambda}{\Gamma(\mu)} \left[ \frac{(r-s)^\mu}{-\mu} \right]_0^r = \frac{\lambda r^\mu}{\Gamma(\mu+1)} \leq \frac{\lambda}{\Gamma(\mu+1)}. \end{aligned}$$

Thus  $\|(\mathcal{P}z)(r)\| \leq \frac{\lambda}{\Gamma(\mu+1)}$ . Hence  $(\mathcal{P}w)(r)$  is uniformly bounded.

Now we will prove equicontinuity of  $\mathcal{P}$ . Let  $z \in K$  and for any  $r_1, r_2 \in [0, 1]$  with  $r_1 < r_2$  then we have

$$\begin{aligned} |(\mathcal{P}z)(r_1) - (\mathcal{P}z)(r_2)| &= \frac{1}{\Gamma(\mu)} \left| \int_0^{r_1} (r_1-s)^{\mu-1} \mathcal{F}(s, z(s)) ds - \int_0^{r_2} (r_2-s)^{\mu-1} \mathcal{F}(s, z(s)) ds \right| \\ &\leq \frac{1}{\Gamma(\mu)} \int_0^{r_1} |(r_1-s)^{\mu-1} - (r_2-s)^{\mu-1}| |\mathcal{F}(s, z(s))| ds \\ &\quad + \frac{1}{\Gamma(\mu)} \int_{r_1}^{r_2} (r_2-s)^{\mu-1} |\mathcal{F}(s, z(s))| ds \\ &\leq \frac{\lambda}{\Gamma(\mu)} \left[ \int_0^{r_1} |(r_1-s)^{\mu-1} - (r_2-s)^{\mu-1}| ds + \int_{r_1}^{r_2} (r_2-s)^{\mu-1} ds \right] \\ &= \frac{\lambda}{\Gamma(\mu)} \left\{ \left[ \frac{(r_1-s)^\mu}{-\mu} \right]_0^{r_1} - \left[ \frac{(r_2-s)^\mu}{-\mu} \right]_0^{r_1} + \left[ \frac{(r_2-s)^\mu}{-\mu} \right]_{r_1}^{r_2} \right\} \\ &= \frac{\lambda}{\Gamma(\mu+1)} \{0 + (r_2-r_1)^\mu + r_1^\mu - r_2^\mu + (r_2-r_1)^\mu\} \\ &\leq \frac{2\lambda}{\Gamma(\mu+1)} (r_2-r_1)^\mu \end{aligned}$$

Thus  $|(\mathcal{P}z)(r_1) - (\mathcal{P}z)(r_2)| \rightarrow 0$  as  $r_2 \rightarrow r_1$ . Therefore  $\mathcal{P}$  is equicontinuous on  $K$ . Then by Arzela-Ascoli theorem,  $\mathcal{P} : K \rightarrow B$  is completely continuous.

**Lemma 3.2** Assume that [C1] and [C2] holds. Then the operator  $\mathcal{Q} : K \rightarrow K$  is contraction.

**Proof:** By [C1] and boundary conditions of problem-(1.1), the operator  $Q : K \rightarrow K$  is continuous. For  $u, v \in K$ , we have

$$\begin{aligned} |(\mathcal{Q}u)(r) - (\mathcal{Q}v)(r)| &= \left| \int_0^r \mathcal{H}(s, u(s)) ds - \int_0^r \mathcal{H}(s, v(s)) ds \right| \\ &= \int_0^r |\mathcal{H}(s, u(s)) - \mathcal{H}(s, v(s))| ds \leq \alpha r \|u - v\|. \end{aligned}$$

Thus

$$\|(\mathcal{Q}u)(r) - (\mathcal{Q}v)(r)\| \leq \alpha r \|u - v\|.$$

Hence  $Q$  is contraction.



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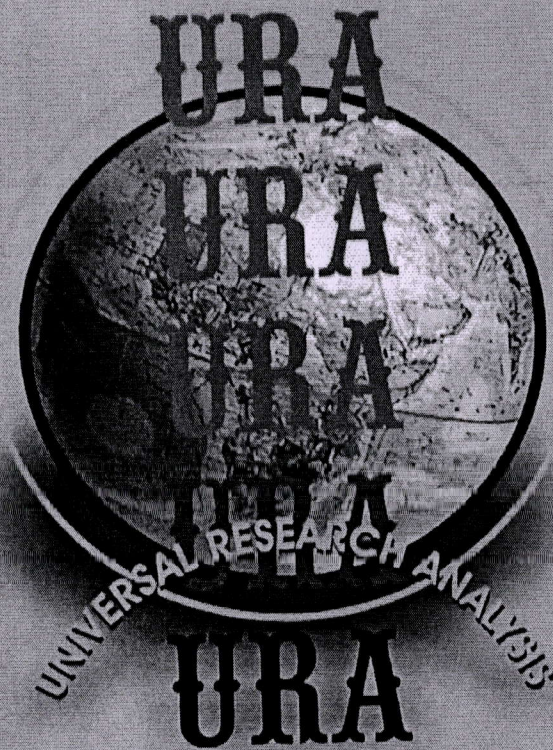
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## **RESEARCH ANALYSIS**

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## Evaluation energy technologies using graph theory

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### Research Paper - Mathematics

#### ABSTRACT

*The evaluation and selection of energy technologies involve a large number of attributes whose selection and weighting is decided in accordance with the social, environmental, technical and economic framework. In the present work an integrated multiple attribute decision making methodology is developed by combining graph theory and analytic hierarchy process methods to deal with the evaluation and selection of energy technologies. The energy technology selection attributes digraph enables a quick visual appraisal of the energy technology selection attributes and their interrelationships. The preference index provides a total objective score for comparison of energy technologies alternatives. Application of matrix permanent offers a better appreciation of the considered attributes and helps to analyze the different alternatives from combinatorial viewpoint.*

#### Introduction:

The study of thermal engineering began with man's desire to convert heat into work and to produce desired changes in the system by means of exchange of heat or work in the most economical way. Solid, liquid and gaseous fuels are basic sources of heat energy which can be converted into mechanical work and further into electrical energy, the cleanest and most versatile form of energy available today. Demand of





electricity is doubling virtually every decade. For this reason, it is important that the conversion process by which it is produced be operated as efficiently as possible if the nation is to make maximum use of its finite fuel resources. It thus becomes an immense challenge to future engineers to improve upon the performance of today's power generation equipments so that the world's finite resources can be used most efficiently.

Energy conversion deals with the principles of conversion of naturally available energy into a useful form (usually electrical or mechanical) as well as the devices used in such conversion process. The study of energy conversion therefore involves familiarization with various energy forms, their availability, collection and utilization. The use of ever increasing amount of energy has freed man from drudgery and has considerably improved standard of living all over the world.

Population and societal growth coupled with technological progress, have all lead to a rapid increase in energy usage and consequent depletion of fossil fuel reserves. At the same time, there is a growing belief that the use of fossil fuel and the consequent release of greenhouse gases are mainly responsible for the observed global warming trend. Hence there is a big push for developing new sources of clean, alternative energy for replacing the fossil fuels. In addition, if the source is renewable, that will further help provide a long term solution. Thus energy source has become an important commodity for survival and progress and has to be evaluated on thermoeconomic and socioeconomic bases. It requires 21st century cutting edge science, technology and systems for harvesting energy from the available sources and transforming it efficiently and economically into electricity, heat or power required for human consumption with minimal perturbation to the ecology. It is also important to note that the present energy crisis has occurred mainly because of dependence on only a few sources. Three main options have to be considered (i) improve existing energy technologies and reduce their environmental impact, (ii) develop innovative technologies for better energy management and promote energy efficiency and (iii) develop advanced energy technologies such as renewable energies and new energy carriers.

## 2. Literature review:

Many multiple criteria based decision making methods for evaluation and selection



of energy technologies has been developed. Analysis and synthesis of parameters under information deficiency (ASPID) methodology was adopted to evaluate the combined heat and power (CHP) system options (Pilavachi et al., 2006) and power system options (Begic and Afgan, 2007). The methodology comprised the system of stochastic model of uncertainty and normalization of indexes by using non-numeric, non-exact and non-complete information with respective reliability and probability. However, this approach has its limitations due to the lack of data for serious consideration of the system. Also, no method was proposed to deal with non-numeric information. A multiple criteria methodology called novel approach to imprecise assessment and decision environments (NAIADE) was presented to select and rank the natural gas turbines (Dinca et al., 2007).

Decision support models based on sustainability index rating method have been proposed to evaluate different energy systems such as hydrogen energy systems (Afgan and Carvalho, 2004), natural gas energy systems (Afgan et al., 2007), hydrogen production processes (Afgan et al., 2007) and hybrid energy systems (Afgan and Carvalho, 2008). The analysis was based on determination of general index of sustainability composed of linear aggregative functions of all indicators with respective weighting function. Analytic hierarchy process (AHP) had been employed for the evaluation and selection of hydrogen production processes (Pilavachi et al., 2009a), hydrogen and natural gas fuelled power plants (Pilavachi et al., 2009b) and space heating systems for an industrial building (Chinese et al., 2011). Amir and Daim (2011) applied AHP for the selection and prioritization of various renewable energy technologies for electricity generation in Pakistan. Wind energy, solar photovoltaic, solar thermal and biomass energy were the options assessed from technical, economical, social, environmental and political aspects.

Rastogi et al. (2015) carried out performance assessment of phase change materials (PCM) for heating, ventilation and air-conditioning (HVAC) applications. The performance of PCMs was graded using figure of merits (FOM) which were further subjected to Pareto Optimality test. The graded PCMs were ranked using TOPSIS (Technique for Order of Preference by Similarity to Ideal Solution) method. The relative weights for the different attributes were calculated using Shannon's entropy method.



Garg et al. (2007) suggested elimination search method for identification and coding of the thermal power plant selection attributes and employed TOPSIS approach for the selection of power plants. A five point scale was adopted for coding of the attributes.

Cavallaro (2009) employed a methodology based on the method of outranking called PROMETHEE (Preference Ranking Organisation Method for Enrichment of Evaluations) for the assessment of concentrated solar thermal technologies. Three economic and four technical criteria were identified for comparison and assessment of twelve different alternatives. Simos technique was applied to compute the criteria weights and the alternatives were ranked on the basis of preference flows derived using PROMETHEE. A comparative evaluation of four different scenarios for the development of power generation sector in Greece was carried out using CBA (cost based analysis) and PROMETHEE (Diakoulaki and Karangelis, 2007). Renewable energy was reported as the best option for power generation under economic, technical and environmental consideration.

Another outranking methodology, ELECTRE III (ELimination Et Choix Traduisant la REalite), was proposed by Cavallaro (2010) to evaluate the production processes of thin film solar cells. Eight different production processes were examined with respect to utilization rate of material, cost of material, thickness of material, cost of the module and state of art of technology. Simos method was used to calculate the weights of criteria having quantitative and qualitative measures. Avgelis and Papadopoulos (2009) utilized ELECTRE III method for the assessment of HVAC (heating, ventilation and air conditioning) systems with respect to economic, energy, environmental and user's satisfaction criteria. A sensitivity analysis was also performed by changing the weights of the criteria to examine the stability of the results. Computation using ELECTRE III is too complex and is not normally used for actual selection of alternatives but may be suitable for the initial screening process. Kabak and Dagdeviren (2014) proposed a hybrid decision model based on BOCR (benefits, opportunities, costs and risks) and analytic network process (ANP) to prioritise alternative renewable energy sources among hydro, geothermal, solar, wind and biomass energy with regards to 19 criteria.

Kahraman et al. (2009) suggested a combined fuzzy AHP and fuzzy axiomatic



use of computer and permits to solve the problem with any large number of attributes.

The proposed method can take into account large number of attributes as well as alternatives, offering very simple and computationally efficient approach by using fewer formulations.

The measures of the attributes and their relative importance are used together to rank the alternatives and hence it provides a better evaluation of the alternatives.

The proposed method allows the decision maker to systematically assign relative importance to the attributes using AHP. The check of consistency in the judgement of relative importance of attributes adds advantage to the proposed methodology and reflects its robustness.

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## RESEARCH REVIEW



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## Johannes Kepler : An Astronomer



**Dr. Premdas Manohar Rathod**

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Shri Siddheshwar Mahavidyalaya,  
Majalgaon, Dist. Beed

### Research Paper - Mathematics

#### ABSTRACT

*This article is devoted to the life and works of Johannes Kepler (1571-1630) a German Astronomer, Mathematician and Philosopher. He is considered as founder of physical astronomy. He is famous for the three Laws of planetary motion. The first law is that the planets move in ellipses with the Sun in one focus. Before this law it was assumed the planets move in circles. Despite his physical weakness, harassment of not getting arrears of salary, living in poverty and other domestic troubles, this genius astronomer worked hard and discovered great astronomical facts.*

**Key words :** Johannes Kepler, Tycho Brahe, Laws of planetary motion.

Johannes Kepler (1571-1630)

#### Childhood and Education

Johannes Kepler was born on 27th December 1571 in longitude  $290^{\circ} 7'$ , latitude  $48^{\circ} 54'$  in the city of Weil der Stet, Württemberg, Holy Roman Empire, Germany. His parents were in good condition but by some reason, the father lost all his slender income. His father left home when Johannes was five years old and never returned. His mother was the daughter of an innkeeper. Johannes was employed in inn as a pot-boy between



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the ages of nine and twelve. He was sickly lad and suffered violent illness which affected his life. Childhood small-pox made his vision weak.

At his childhood he developed love for astronomy. At the age of six he observed the Great Comet of 1577. At the age of nine he observed Lunar Eclipse in 1580. After completing school education he went to the University of Tübingen, where he graduated second on the list.

His connection with astronomy was through Copernican theory heard in University lectures. Johannes had been offered an astronomical lectureship at Graz. Astronomy in those days was supposed to be a minor science and had little of the special dignity.



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### Early Work

Kepler struggled hard in different ways to find law governing orbits of planets and their distances from the sun. One of his ideas was based on inscribing a large number of equilateral triangles in a circle. They envelop another circle bearing a definite ratio to the first. This does for the orbit of two planets (see figure:1 ). Then he tried inscribing and circumscribing squares, hexagons and examined if the circles thus defined would correspond to the several planetary orbits. But they would not give any satisfactory result.



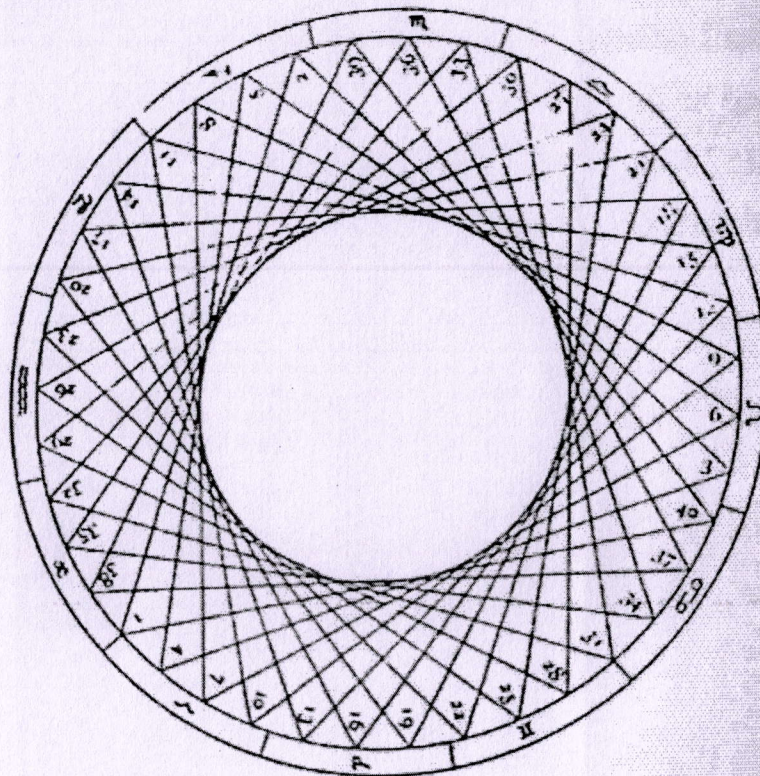


Figure 1 : Number of equilateral triangles inscribed in a circle

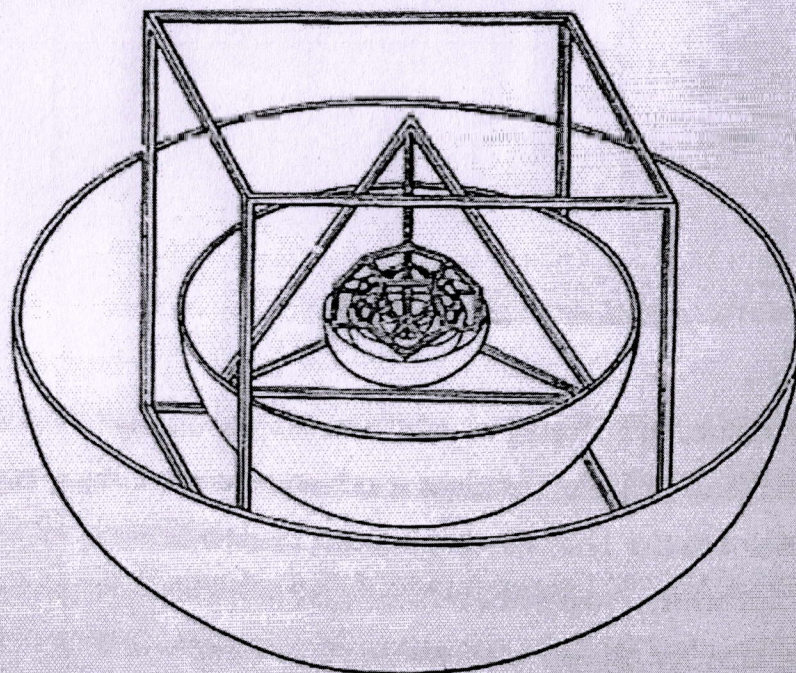


Figure 2: Framework with inscribed and circumscribed spheres and other regular solids  
Kepler thought plane figures will not do with the celestial orbits. He suddenly got a brilliant idea of inscribing the regular solids (see figure: 2). He represented the earth's





orbit by a sphere as the norm and measured of all six planets known at that time. Around earth he circumscribed a dodecahedron and puts another sphere round that which is approximately the orbit of Mars, round that a tetrahedron which marked the sphere of the orbit of Jupiter, round that sphere he placed a cube which roughly gives the orbit of Saturn. On the other hand he inscribed in the sphere of the earth's orbit an icosahedrons and inside the sphere determined by that an octahedron which figures he takes to enclose the sphere of Venus and Mercury respectively. This discovery was purely fictitious and accidental. First of all, eight planets are known and secondly their real distances agree only very approximately with hypothesis. But this idea gave him great delight. Kepler then worked on to predict the cause of the planet's motion. He thought of some propelling force originated from the Sun, like the spokes of a windmill.

### Work with Tycho Brah

When Kepler's first book was published he get introduced Tycho and Galileo. Tycho Bray (1546 - 1601) was well-known Danish astronomer. He was at Prague and he had best planetary observations at that time. Tycho invited Kepler and offered him the post of mathematical assistant. Kepler accepted it. Kepler says "for observations his sight was dull , for mechanical operations his hand was weak". But in mathematical skills he was superior to Tycho. Because of physical and financial weaknesses, Kepler sought help from Tycho and Tycho helped him with kindness. The Emperor Rudolph did a good work in maintaining these two eminent astronomers Tycho Brahe and Kepler.





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# **INTERLINK RESEARCH ANALYSIS**

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# The Lower and Uppear Solutions Method for First Order Differential Inclusions with Nonlinear Boundary Conditions

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Majalgaon, Dist. Beed



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## Research Paper - Mathematics

### ABSTRACT

*In this paper a fixed point theorem for condensing maps combined with upper and lower solutions are used to investigate the existence of solutions for first order differential inclusions with general nonlinear boundary conditions.*

**Key words :** Initial value problem, Convex multivalued map, Differential inclusions, Nonlinear boundary conditions, Condensing map, Fixed point, Truncation map, Upper and lower solutions.

### Introduction

This paper is concerned with the existence of solutions for the boundary multivalued problem :

$$(1.1) \quad y'(t) \in F(t, y(t)), \text{ for a.e. } t \in J = [0, T]$$

$$(1.2) \quad L(y(0), y(T)) = 0$$

Where  $F : J \times \mathbb{R}^n \rightarrow 2^{\mathbb{R}^n}$  is a compact and convex valued multivalued map and  $L : \mathbb{R}^n \times \mathbb{R}^n \rightarrow \mathbb{R}$  is a continuous single-valued map.

The method of upper and lower solutions has been successfully applied to study the existence of multiple solutions for initial and boundary value problems of first and second order.

This method has been used only in the context of single-valued differential equations. We refer to the books of Bernfeld-Lakshmikantham [4], Heikkila-Lakshmikantham [13], Ladde-Lakshmikantham-Vatsala [16], to the thesis of De Coster [7], to the papers of Carl-Heikkila-Kumpulainen [6], Cabada [5], Frigon [9],





Frigon-O'Regan [10], Heikkila-Cabada [12], Lakshmikanthan-Leela [17], Nkashama [20] and the references therein.

Using this method the authors obtained in [2] and [3] existence results for differential inclusions with periodic boundary conditions, for first and second order respectively.

In this paper we establish an existence result for the problem (1.1) - (1.2). Our approach is based on the existence of upper and lower solutions and on a fixed point theorem for condensing maps due to Martelli [19].

### PRELIMINARIES

We will briefly recall some basic definitions and facts from multivalued analysis that we will use in the sequel.

$AC(J, \mathbb{R})$  is the space of all absolutely continuous functions  $y: J \rightarrow \mathbb{R}$ .

$y \leq \bar{y}$  if and only if  $y(t) \leq \bar{y}(t)$  for all  $t \in J$

Defines a partial ordering in  $AC(J, \mathbb{R})$ . If  $\alpha, \beta \in AC(J, \mathbb{R})$  and  $\alpha \leq \beta$ , we denote

$$[\alpha, \beta] = \{y \in AC(J, \mathbb{R}) : \alpha \leq y \leq \beta\}$$

$W^{1,1}(J, \mathbb{R})$  denotes the Banach space of functions  $y: J \rightarrow \mathbb{R}$  which are absolutely continuous and whose derivative  $y'$  (which exists almost everywhere) is an element of  $L^1(J, \mathbb{R})$  with the norm

$$\|y\|_{W^{1,1}} = \|y\|_{L^1} + \|y'\|_{L^1} \text{ for all } y \in W^{1,1}(J, \mathbb{R})$$

$L(X, \|\cdot\|)$  be a normed space, A multivalued map  $G: X \rightarrow 2^X$  is convex (closed) valued if  $G(x)$  is convex (closed) for all  $x \in X$ .  $G$  is bounded on bounded sets if  $G(B) = \bigcup_{x \in B} G(x)$  is bounded in  $X$  for all bounded subsets  $B$  of  $X$  (i.e.  $\sup_{x \in B} \{\sup\{\|y\| : y \in G(x)\}\} < \infty$ ).  $G$  is called upper semi-continuous (u.s.c.) on  $X$  if for each  $x_0 \in X$  the set  $G(x_0)$  is a nonempty, closed subset of  $X$ , and if for each open set  $V$  of  $X$  containing  $G(x_0)$ , there exists an open neighbourhood  $U$  of  $x_0$  such that  $G(U) \subseteq V$ .

$G$  is said to be completely continuous if  $G(B)$  is relatively compact for every



bounded subset  $B \subset X$ .

If the multivalued map  $G$  is completely continuous with nonempty compact values, then  $G$  is u.s.c. if and only if  $G$  has a closed graph (i.e.  $x_n \rightarrow x_*$ ,  $y_n \rightarrow y_* \in G(x_n)$ ) imply  $y_* \in G(x_*)$ ).

$G$  has a fixed point if there is  $x \in X$  such that  $x \in G(x)$ .

In the following  $CC(X)$  denotes the set of all nonempty compact and convex subsets of  $X$ .

An upper semi-continuous map  $G : X \rightarrow 2^X$  is said to be condensing [19] if for any bounded subset  $B \subseteq X$ , with  $\mu(B) \neq 0$ , we have  $\mu(G(B)) < \mu(B)$ , where  $\mu$  denotes the Kuratowski measure of noncompactness [1]. We remark that a compact map is the easiest example of a condensing map. For more details on multivalued maps see the books of Deimling [8] and Hu and Papageorgiou [15].

The multivalued map  $F : J \rightarrow CC(\mathbb{R})$  is said to be measurable, if for every  $y \in \mathbb{R}$ , the function  $t \rightarrow d(y, F(t)) = \inf\{|y - z| : z \in F(t)\}$  is measurable.

**Definition 2.1.** A multivalued map  $F : J \times \mathbb{R} \rightarrow 2^{\mathbb{R}}$  is said to be an  $L^1$ -Caratheodory if see here

- (i)  $t \rightarrow F(t, y)$  is measurable for each  $y \in \mathbb{R}$ ;
- (ii)  $y \rightarrow F(t, y)$  is upper semicontinuous for almost all  $t \in J$ ;
- (iii) For each  $k > 0$ , there exists  $h_k \in L^1(J, \mathbb{R}_+)$  such that  $\|F(t, y)\| = \sup\{|v| : v \in F(t, y)\} \leq h_k(t)$  for all  $|y| \leq k$  and for almost all  $t \in J$ .

So let us start by defining what we mean by a solution of problem (1.1) – (1.2).

**Definition 2.2.** A function  $y \in AC(J, \mathbb{R})$  is said to be a solution of (1.1) – (1.2) if there exists a function  $v \in L^1(J, \mathbb{R})$  such that  $v(t) \in F(t, y(t))$  a.e. on  $J$ ,  $y'(t) = v(t)$  a.e. on  $J$  and  $L(y(0), y(T)) = 0$ .

The following concept of lower and upper solutions for (1.1) – (1.2) has been introduced by Halidias and Papageorgiou in [14] for second order multivalued boundary





value problems. It will be the basic tools in the approach that follows.

**Definition 2.3.** A function  $\alpha \in AC(J, \square)$  is said to be a lower solution of (1.1)–(1.2) if there exists  $v_1 \in L^1(J, \square)$  such that  $v_1(t) \in F(t, \alpha(t))$  a.e. on  $J$ ,  $\alpha^1(t) \leq v_1(t)$  a.e. on  $J$  and  $L(\alpha(0), \alpha(T)) \leq 0$ .

Similarly, a function  $\beta \in AC(J, \square)$  is said to be upper solution of (1.1)–(1.2) if there exists  $v_2 \in L^1(J, \square)$  such that  $v_2(t) \in F(t, \beta(t))$  a.e. on  $J$ ,  $\beta^1(t) \geq v_2(t)$  a.e. on  $J$  and  $L(\beta(0), \beta(T)) \geq 0$ .

For the multivalued map  $F$  and for each  $y \in C(J, \square)$  we define  $S \frac{1}{F, y}$  by

$$S \frac{1}{F, y} = \{v \in L^1(J, \square) : v(t) \in F(t, y(t)) \text{ for a.e. } t \in J\}$$

Our main result is based on the following :

**Lemma 2.1.** [18]. Let  $I$  be a compact real interval and  $X$  be a Banach space. Let  $F : I \times X \rightarrow CC(X); (t, y) \rightarrow F(t, y)$  measurable with respect to  $t$  for any  $y \in X$  and u.s.c. with respect to  $y$  for almost each  $t \in I$  and  $S \frac{1}{F, y} \neq \emptyset$  for any  $y \in C(I, X)$

and let  $\Gamma$  be a linear continuous mapping from  $L^1(I, X)$  to  $C(I, X)$  then the operator  $\Gamma \circ S \frac{1}{F} : C(I, X) \rightarrow CC(C(I, X)), y \mapsto (\Gamma \circ S \frac{1}{F})(y) := \Gamma \left( S \frac{1}{F, y} \right)$

is a closed graph operator in  $C(I, X) \times C(I, X)$ .

**Lemma 2.2.** [19] Let  $G : X \rightarrow CC(X)$  be an u.s.c. condensing map. If the set

$$M := \{v \in X : \lambda v \in G(v) \text{ for some } \lambda > 1\}$$

is bounded, then  $G$  has a fixed point.

### Main Result

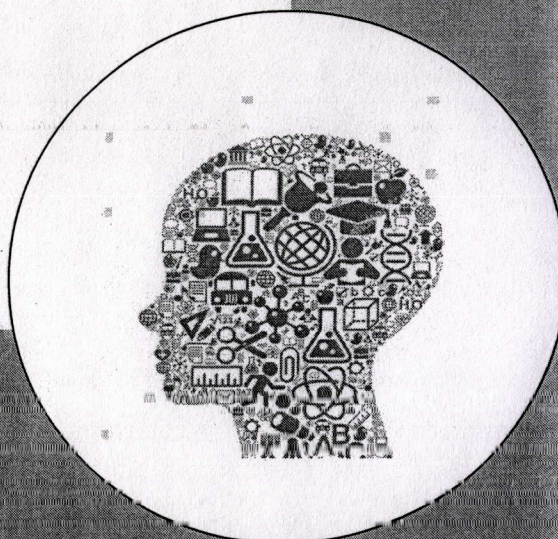
We are now in a position to state and prove our existence result for the problem (1.1)–(1.2).

**Theorem 3.1.** Suppose  $F : J \times \square \rightarrow CC(\square)$  is an  $L^1$ -Caratheodory multivalued map. In addition assume the following conditions.



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## Benefits of Yoga & Meditation during pandemic

**Dr.Umesh R. Sadegaonkar**

Shri. Siddheshwar Mahavidhyalaya Majalgaon



### Abstract:

Yoga is a cerebrum and frame exercise with 5,000-yr records in out of date Indian perspective. Various sorts of yoga merge real positions, respiratory techniques, and contemplation or loosening up in covid pandemic. In later years, it has gotten famed as a type of real exercising reliant upon addresses that enhance in addition evolved manipulate of the thoughts and frame and overhaul thriving. In covid pandemic, there are more than one unmistakable varieties of yoga and numerous controls in the preparation. This article examines the blessings of yoga & meditation to save you mental strain in the course of covid set of experiences, hypothesis, and numerous portions of yoga. In the ultra-modern world, the South Asian electricity of yoga has stretched out to all aspects of the globe. While it's far currently a popular type of movement and reflection, this has now no longer for the maximum element been the circumstance.

**Keywords:** Yoga, Meditation, psychological stress, covid pandemic.

### Introduction:

#### History:

There is no put down record of the creator of yoga. Male yoga experts are known as yogis, and female yoga specialists are called yogi is. Both rehearsed and showed yoga some time before any made record out of yoga showed up. Over the going with five centuries, yogis passed the solicitation down to their students, and various schools of yoga made as the readiness expanded its general reach and recognizable quality. The "Yoga Sutra," a 2,000-year-old arrangement on yogic point of view by the Indian sage Patanjali, is a manual on the most competent technique to ace the psyche, control the opinions, and develop fundamentally. The Yoga Sutra is the most dependable established up standard of yoga and logical the most settled substance in presence and gives the development to all undeniable level yoga. Yoga is striking for its positions and positions, yet they were not an indispensable piece of unprecedented yoga customs in India. Wellbeing was not a principal target. Subject matter experts and devotees of yogic show zeroed in rather on different practices, for example, growing strong noteworthiness utilizing breathing strategies and mental center interest. The only started to get notoriety in the West near the fruition of the nineteenth century. An effect of energy for postural yoga happened during the 1920s and 1930s, first in quite a while and later in the West. To pass on its critical message and guide gatherings, yoga regularly utilizes the symbolism of a tree with roots, a trunk, branches, fledglings, and customary things. Each "branch" of yoga tends to a substitute obsession and set of attributes.

#### Types of Yoga: -

**Hatha yoga:** This is the physical and mental branch expected to take action and brain.

**Raja yoga:** This branch incorporates contemplation and extreme adherence to a movement of disciplinary advances known as the "eight members" of yoga.

**Karma yoga:** This is a method of organization that hopes to make a future freed from skepticism and whimsicalness.

**Bhakti yoga:** This plans to set up the method of responsibility, a good strategy to channel sentiments and foster affirmation and opposition.

**Jnana yoga:** This piece of yoga is about insightfulness, the method of the scientist, and developing the brain through assessment.

**Tantra yoga:** This is the pathway of custom, administration, or summit of a relationship.

Pushing toward yoga considering a particular objective can engage an individual to pick which branch to follow.

#### Chakras:

"Chakra" truly deduces turning wheel. Yoga keeps up those chakras are focus inspirations driving vitality, musings, sentiments, and the genuine body. As indicated by yogic instructors, chakras pick the way where individuals experience reality through energetic responses, requirements or hatred's, levels of

**Dr.Umesh R. Sadegaonkar**



conviction or dread, and shockingly real accidental impacts a ton. Exactly when centrality gets vexed in a chakra, it is said to trigger physical, mental, or enthusiastic erratic traits that show in accidental impacts, for example, tension, torpidity, or defenseless absorption. Asanas are the different genuine conditions in Hatha yoga. Individuals who practice yoga use asanas to free vitality and engage an imbalanced chakra. There are seven gigantic chakras, each with their own middle interest:

**Sahasrara:**

The "thousand-spel up" or "crown" chakra addresses the condition of pure care. This chakra is organized at the crown of the head, and the disguising white or violet tends to it. Sahasrara fuses matters of inward information and real obliteration.

**Ajna:**

The "course" or "third-eye chakra" is a party point between two immense blazing streams in the body. Ajna takes a gander at to the shade's violet, indigo, or dull blue, in any case standard yoga specialists portray it as white. The ajna chakra connects with the pituitary organ, which drives improvement and movement.

**Vishuddha:**

The disguising red or blue locations the "particularly pure" or "throat" chakra. Specialists consider this chakra to be the home of talk, hearing, and handling.

**Anahata:**

The "unstruck" or "heart" chakra connects with the tones green and pink. Primary concerns of conflict including anahata unite complex opinions, sympathy, delicacy, limitless love, concordance, dismissal, and flourishing.

**Manipura:**

Yellow locations the "jewel city" or "navel" chakra. Experts accomplice this chakra with the stomach related design, correspondingly as precious power, dread, uneasiness, making feelings, and inclinations towards an independent individual.

**Svadhishthana:** Practitioners guarantee that the "one's own base" or "pelvic" chakra is the home of the conceptive organs, the genitourinary framework, and the adrenal organ.

**Yoga and Meditation:**

While there two or three differences among yoga and care reflection from the Buddhist show, these two practices are plainly synergistic and clearly tradable. Care is the capacity to keep up thought on a particular clever article (e.g., breath, mantra), with feature on getting back to important (versus negative) assessments. Care can be exhausted in a progressively standard manner by sitting in a peaceful space with eyes shut for a specific extent of time, comparatively as during a yoga class with base on breath and headway while holding and changing start with one position then onto the accompanying. Yoga care reflection desires expanded care in regards to introduce second encounters, rather than confining or trying to free the brain from messed up assessments, opinions, or sensations. Right now, reflection can enable the student to figure out some method for pulling out from evaluative or principal hypothesis by cultivating a state of mind of interest and regard for propelling responses to opinions, experiences, and sentiments lastly limiting enduring with broadened lucidity of this current reality.

Reflection is a need in our mind boggling lives, yet it doesn't come effectively for by a wide margin most. Individuals need to try it, in any case they observe it is more dangerous than they whenever envisioned. How hard could it have the choice to be?! Sitting upstanding takes muscles that that we may not utilize, and that may save some work to make. Possibly we sit at a work area for the span of the day; in any case, our back is slouched over the PC. Sitting upstanding and still may feel outstandingly wrong.

Yoga positions are an exceptional methodology to set up the body for examination. Yoga isn't restoring for the body yet in addition the cerebrum. Yoga positions were genuinely proposed to successfully set up the body to think, in any case with a mind blowing piece of the yoga accessible these days, the relationship with consideration is from time to time alluded to.

In Ananda Yoga for Higher Care, we train yoga to plan for consideration. The amount of the asanas is organized in a step by step practice to help with planning the importance into the spine, to be alluringly coordinated vertical to the cerebrum to blend and lift our appreciation.

Yogananda said that getting into and out of a position is just similarly immense as being in the real position. For instance, in Ananda Yoga, when we raise our arms, we take in. Right when we slice down our arms to our sides, we breathe in out. We can move our arms generally, in a wonderful manner in collaboration with the breath, or we can lift the arms rapidly and let them simply drop, without connecting with the breath. We can tumble down on a parlor seat, or sit perfectly effectively and control.



Precisely when we start to direct our breath and start to synchronize it with our development, we become quiet. By then, at that point, we become still hanging out there reason. By dropping down, we start to achieve more and we keep our idea right now. This additionally assists with developing our body, comparatively as care, to expect reflection. Consideration and yoga are interrelated. They are both piece of the Eight Limbs of Patanjali's Yoga Sutras. They go hand a great deal. They direction to get our little self along with our higher soul self. One can't be open without the other. We should ponder the body to forget about it, to go inside in consideration.

Where the breath streams, the psyche goes. In yoga and in consideration, we can raise our care. Yoga causes us to pass on the body to a condition of quietness by cleaning up the lively vitality we pull around, and sets us up to turn out to be completely brought down in huge focus, examination. Yoga, for instance, introducing, can help with opening our hearts and permit the vitality to stream up, to the higher chakras and higher understanding. "Be really lightening in your heart. A peaceful soul will help you in a short moment to conclude issues that may by somehow require days, weeks, or even a long time of precarious inspecting."- Expert Kriyananda.

#### **Benefits of Yoga and Meditation: –**

1. Day by day practices are an extraordinary method for freeing the pressure from your day can carry a feeling of prosperity to your life. Here are the best ten advantages of yoga.
2. **Stress Relief:** - In this pandemic Yoga can assist with decreasing the impacts of mental weight on your body. One of the advantages of yoga is that it empowers unwinding and can bring down how much cortisol in your body.
3. **Pain Relief:** - In these pandemic every day activities of yoga can assist with facilitating the throbbing painfulness of the body. Many individuals with intense illnesses have announced less agony after these day-by-day works out. Like asanas or contemplation.
4. **Better Berating:** - In this pandemic, You will figure out how to take further. More slow breaths with day-by-day activities of yoga. It will assist with expanding your lung capacity and set off the body's unwinding reaction. This can be one of the most impressive advantages of yoga.
5. **Flexibility:** - In this pandemic, you will see your degree of adaptability will increment. Which will assist with your scope of movement. In some cases in the yoga day by day works out. Individuals cannot contact their toes. The advantages of yoga will incorporate extending the muscles. Ligaments and tendons in your body to assist you with turning out to be more adaptable.
6. **Increased Strength:-** In this pandemic Yoga, presents utilize every one of the muscles in your body and assist you with expanding your solidarity level from head to toe. The advantages of yoga and every day activities will assist you with fortifying your muscles near the bones. Which increment the help of your skeletal framework also?
7. **Weight Management:** - In this pandemic, you will see the advantages of yoga start to influence your scale. Every day practices are suggested all the time. However, yoga decreases the degree of cortical in your body. This guides in weight reduction and fat consuming.
8. **Improved Circulation:** -In this pandemic Yoga will help improve your body's circulation. In turn, with daily exercises, you will see the benefits of yoga with lowered blood pressure and pulse rates.
9. **Cardiovascular Conditioning:** -In this pandemic, even the gentlest style of yoga will assist with bringing down your resting pulse and increment your general perseverance. This is one of the significant advantages of yoga to assist with working on how much oxygen taken in during the day-by-day works out.

#### **Conclusion:**

In this pandemic, every people under psychological stress to prevent stress do yoga and meditation. In this pandemic, each individual under mental pressure to forestall pressure do yoga and reflection. Commoners and sports people the most significance are sports movement wire of yoga and Reflection players and people group's execution improvement with the genuine that yoga and examination importance of life. The fundamental standard of yoga and Reflection is "Loosen up the body and psyche, deter the breath, quiet down the brain". The current yoga bunch is having the altogether persuading relaxing systems like pranayama - a breathing activity to change and control the brain, the philosophical conversations about the presence's point of view about the neutrality and truth of life and the right disposition may have given them trust for the term of standard everyday presence.

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## Preliminary Survey on timber yielding plants of Yawal-Pal wildlife sanctuary and it's adjacent area in Southern Satpuda Ranges from Jalgaon District (M.S).

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**Abstract :** The present study is based on the preliminary survey on timber yielding plants resources of Yawal-Pal wildlife sanctuary and it's adjacent area from Southern Satpuda ranges during 1991 – 1995 and again repeated the survey in 2017-2019. The results showed that 70 timber yielding plants belonging to 33 families and 53 genera. Among the different families fabaceae family is dominant with 10 species followed by Mimosaceae and Caesalpiniaceae with 9 and 6 species respectively. Timber species are used by tribals and villagers for hut, house construction and Agriculture equipment's. Now a days the demand of the timber increases for the same. Paper factory needs Bamboo and other soft wood. Forest is also cut for electrification. So measures should be adopted to prevent the massive deforestation prevailing in the area.

**Keywords -** Plants resources, Deforestation, survey, Yawal-Pal wildlife sanctuary, District Jalgaon.

### I. INTRODUCTION

Timber plays a vital role in the economic and industrial development. Timber products are eco-friendly than the other variants made from metals, plastics and cement as these are recyclable, energy efficient and reduce greenhouse gases. Timber is the one of most versatile and valuable raw material used by the man (Singh, *et.al.*, 2021). The timber yielding plants species are used by tribals and villagers for hut, house construction, agricultural equipment's, boat building, toys, Musical instruments furniture and Grinding equipments. (Vijigiri, and Sharma, 2012; Singh, 2018; Dobhal, *et.al.*, 2010).

Satpuda mountain range is major topographical features of central India. There are seven ranges of Satpuda which run more or less parallel to each other. According to karnik (1959), Satpuda starts from Mahadev hills of Chauragarh in Madhya Pradesh, extending westward to Burhanpur and Nimar, thence to Khandesh. Mountain tracks of Satpuda are situated between Vindhya ranges and Chandor hills of Sahyadri's from the Western Ghats.

### II. THE STUDY AREA

Southern Satpuda is divided into three talukas namely Chopda, Yawal and Raver. The Yawal wildlife sanctuary and Pal forest park is situated in these three talukas. This area lies between 700.41' and 7609.73' E longitudes and 210 3.42' and 210.25' N latitudes. This area is about 120 Kilometers in length having width of 45 kilometers. The average height of this area is 721 meters and it varies between 700 to 1150 meter.

The headquarter of sanctuary is at Yawal. It covers an area of 177.52 sq.kms. Height of the sanctuary varies between 700m to 1134m. Highest hillock is situated near the Gawilgad hills; in Yawal taluka (1134 m.) . The rainfall of sanctuary varies between 800-900 mm. The average maximum and minimum temperature is 430 C. and 80 C. respectively.

### III. CLIMATE

Climate of the study area is identified in three well defined seasons viz. Winter (Nov-Feb), Summer (March-May) and rainy season (June-Oct).

1. Rainfall : Average annual rainfall of area was Chopda 661.27mm. , Yawal 670.54mm. and Raver 634.63 mm. respectively. Maximum rainfall occurs during the month of August.



2. Temperature : Temperature rises rapidly after February. May is hottest month of the year. The maximum temperature rises upto 460 C. December is usually the coldest month, minimum temperature varies between 70 C. - 150C.
3. Humidity: Humidity is one of the important factor, which affects the growth of the plant species and quality of the vegetation. Relative humidity is maximum during July and August 80% to 95% and minimum during May and April (30% to 40%). Hence due to constant rainfall and humidity, we found quality timber species in Southern satpada ranges.

#### IV. MATERIAL AND METHODOLOGY

The botanical excursions were arranged to cover all the places of botanical interest and to collect most of the plants in their flowering and fruiting stages. Timber species were brought to the laboratory and identified with the help of Floras such as Cooke (1958), Hooker (1872 to 1897) and Santapau (1967). Collected specimen were compared with authentic ones in the herbarium of the Botanical survey of India, Western circle, Pune and Agharkar Research Institute, Pune. After identification of plants, specimens were pressed, poisoned and labeled. Saturated solution of mercuric chloride in ethyl alcohol was used for poisoning the specimens. Then herbarium sheets have been deposited in the herbarium Department of Botany, University of Poona, Pune 411007.

#### V. RESULT AND DISCUSSION

Timber has been a major natural resource in all civilizations across the world. The demand for timber has been traditionally met only from the forests. Large scale utilization of timber, especially after the industrialization, has reduced the natural timber stock acutely in several tropical and temperate countries. India is one of the largest timbers producing as well as importing country due to its increasing demand for both domestic and industrial utility.

In the present work Preliminary survey on timber yielding plants of Yawal-Pal wildlife Sanctuary and it's adjacent area has been carried out. Data were collected and it is observed that 70 Angiosperm timber yielding plants belong to 33 families and 53 genera. They are arranged alphabetically according to their scientific names, families and vernacular names. Previous work on the timber yielding plant was carried out by several workers like 54 timber yielding plant belonging to 54 species and 23 families were identified from Alirajpur district, Madhya Pradesh, India (Panchya, 2021) and the other researcher identified 27 timber yielding plants belonging to 25 genera and 13 families from Bhadravathi Taluka, Karnataka (Kumar and Kiran, 2016). The phytochemical work on individual plants is carried out by number of workers; qualitative investigation was carried out in *Acacia leucophloea* (Roxb.) Willd. (Wankhade, 2019).

#### VI. CONCLUSION

India is one of the largest timbers producing as well as importing country due to its increasing demand for both domestic and industrial utility. The exploration of timber yielding plants is need of the present era because of its utility. The present work provides the documentation and appropriate utilization of timber yielding plant in the study area. People of these are having the good knowledge about of the timber yielding plants, but the urbanization and industrialization may result in the loss of the several species from the area. The lesser known timbers trees with multipurpose utility need to be given more attention for improvement, popularization and marketing in the future so that pressure on few selected timber species can be reduced.

Fig. No. 1- Distribution of timber yielding taxa within family genera and species.

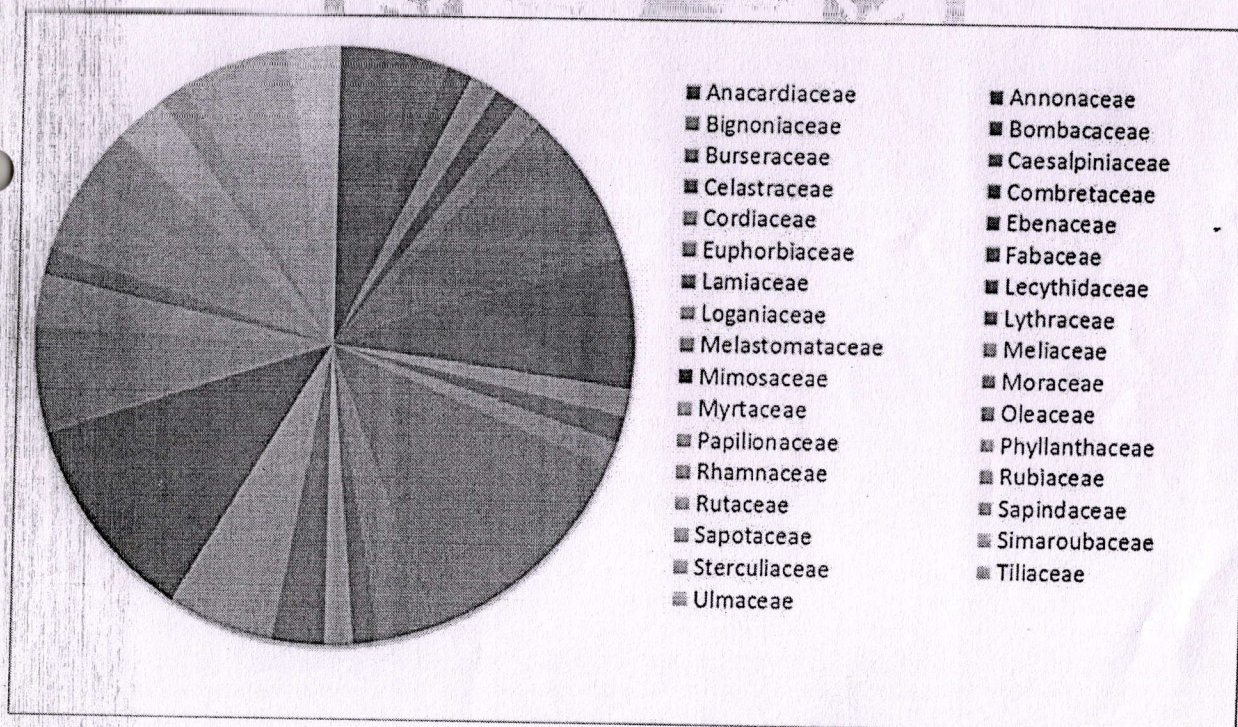




Fig. No.2- Distributin of timber yielding plants within family, genera and species

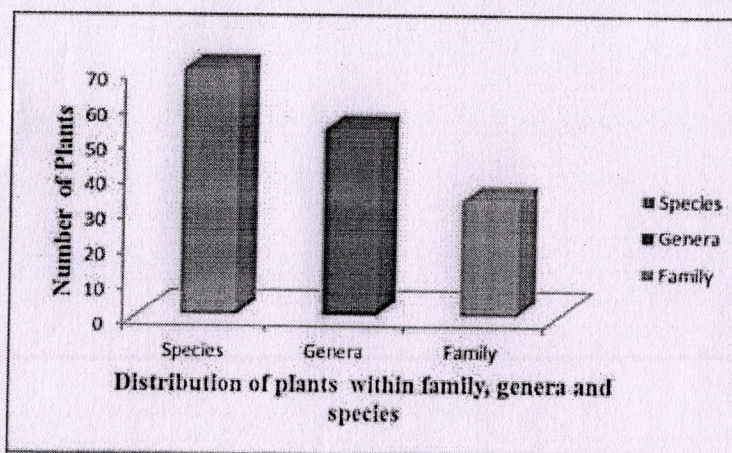


Table 1- Timber yielding plants from the study area.

Sr.No	Botanical Name	Local Neme	Family
1.	<i>Acacia leucophloea</i> (Roxb.) Willd	'Hiwar'	Mimosaceae
2.	<i>Acacia ferruginea</i> DC.	'Ghatsag', 'Pandhara khair'	Mimosaceae
3.	<i>Acacia polyacantha</i> Willd.	'Sonkhairi'	Mimosaceae
4.	<i>Acacia nilotica</i> (L.) Delile	'Babul'	Mimosaceae
5.	<i>Acacia chundra</i> (Roxb. Ex Rottl. Willd.)	'kher', 'khair'	Mimosaceae
6.	<i>Albizia procera</i> Benth	'Gurar', 'Safed-Siris'	Mimosaceae
7.	<i>Albizia lebbeck</i> (L.) Benth	'Sirisha', 'Chinchola'	Mimosaceae
8.	<i>Albezia odoratissima</i> (L.F.) Benth.	'Chichwa', 'Kalashiras'	Mimosaceae
9.	<i>Anogeissus latifolia</i> (Roxb. Ex DC) Wall ex. Guill and perr.	'Dhaura', 'Davda'	Combretaceae
10.	<i>Aegle marmelos</i> (L.) Corr.	'Bila', 'Bel'	Rutaceae
11.	<i>Azadirachta indica</i> A.Juss.	'Nimb', 'Neem'	Meliaceae
12.	<i>Ailanthus exculsa</i> Roxb.	'Varue', 'Hadu'	Simaroubaceae
13.	<i>Dridella retusa</i> (L.) A. Juss.	'Asana'	Phyllanthaceae
14.	<i>Buchanania lanzan</i> Spr.	'Char', 'Charu', 'Charoli'	Anacardiaceae
15.	<i>Buchanania axillaris</i> (Desr.) Ramamoorthy	'Char'	Anacardiaceae
16.	<i>Bombex ceiba</i> DC.	'Simal', 'Sawar'	Bombacaceae
17.	<i>Butea monosperma</i> (Lam.) Taub.	'Bhahavi', 'Palas'	Fabaceae
18.	<i>Cassia fistula</i> Linn.	'Bahava'	Caesalpinaceae
19.	<i>Careya arborea</i> Roxb.	'Kumbi', 'Kumbh'	Lecythidaceae
20.	<i>Cassine glauca</i> (Rottb.) O. ktze.	'Jamrasi', 'Aran', 'Butyakalas'	Celastraceae
21.	<i>Chloroxylon swietenia</i> DC.	'Haldu', 'Bhirra'	Meliaceae
22.	<i>Cordia macleodii</i> (Griff.) Hook.	'Dhaian'	Cordiaceae
23.	<i>Dispyros chloroxylon</i> Roxb.	'Temru'	Ebenaceae
24.	<i>Dalbergia sissoo</i> Roxb.	'Sisam', 'Sissu'	Papilionaceae
25.	<i>Dalbergia latifolia</i> Roxb.	'Bijsa', 'Shisham'	Fabaceae
26.	<i>Dalbergia paniculata</i> Roxb.	'Phassi'	Fabaceae
27.	<i>Dalbergia lanceolaria</i> L	'Shisham'	Fabaceae
28.	<i>Delonix elata</i> (L.) Gamble.	'San-sada'	Caesalpinaceae
29.	<i>Delonix regia</i> (Hook.) Raf.	'Gulmohar'	Caesalpinaceae
30.	<i>Dolichandrone falcata</i> Seem.	'Medsing'	Bignoniaceae
31.	<i>Erythrina suberosa</i> Roxb.	'Pangara'	Fabaceae
32.	<i>Erythrina stricta</i> Roxb.	'Pangara'	Fabaceae
33.	<i>Emblia officinalis</i> Gaertn.	'Awa'	Euphorbiaceae
34.	<i>Eucalyptus globulus</i> Labill.	'Nilgiri'	Myrtaceae
35.	<i>Ficus religiosa</i> L.	'Pipal'	Moraceae
36.	<i>Ficus recemosa</i> L.	'Umber'	Moraceae
37.	<i>Ficus benghalensis</i> L.	'Wad'	Moraceae
38.	<i>Ficus amplissima</i> J.E.sm.	'Pipri'	Moraceae
39.	<i>Gmelina arborea</i> Roxb.	'Shivan'	Lamiaceae
40.	<i>Garuga pinnata</i> Roxb.	'Katula', 'kakad'	Burseraceae



41.	<i>Grewia tiliaefolia</i> Vahl.	'Dhayn'	Tiliaceae
42.	<i>Haldina cordifolia</i> Hook. F.	'Hardu', 'Haldu'	Rubiaceae
43.	<i>Holoptelea integrifolia</i> (Roxb.) planch	'Papada'	Ulmaceae
44.	<i>Hardwickia binata</i> Roxb.	'Anjan'	Caesalpiniaceae
45.	<i>Lagerstroemia parviflora</i> Roxb.	'Bondara'	Lythraceae
46.	<i>Lannea coromandelica</i> Merrill.	'Moian', 'Moin'	Anacardiaceae
47.	<i>Lagerstroemia microcarpa</i> Wight	'Girvada', 'Lendia'	Lythraceae
48.	<i>Limonia acidissima</i> L.	'Kaitha', 'Kait'	Rutaceae
49.	<i>Mangifera indica</i> Linn.	'Amba'	Anacardiaceae
50.	<i>Mitragyna parvifolia</i> (Roxb) Korth	'Kallam', 'kaddam'	Rubiaceae
51.	<i>Madhuca longifolia</i> (J.Konig) J.F.Macbr	'Mahu', 'Muhu', 'Mahuwa'	Sapotaceae
52.	<i>Memecylon umbellatum</i> Burm.	'Karap'	Melastomataceae
53.	<i>Milusa tomentosa</i> J.Sinclair	'Homb', 'Hoom'	Annonaceae
54.	<i>Ougeinia oojensis</i> (Roxb.) Hochr.	'Tinsa', 'Tiwas'	Fabaceae
55.	<i>Pongamia pinnata</i> (L.) Pierre	'Kanji', 'Karanj'	Fabaceae
56.	<i>Pterocarpus marsupium</i> Roxb.	'Bia', 'Bivla', 'Bhilava'	Fabaceae
57.	<i>Syzygium cumini</i> Lam.	'Jamun', 'Jambul'	Myrtaceae
58.	<i>Schleichera oleosa</i> (Lour.) Oken.	'Kusum'	Sapindaceae
59.	<i>Sterculia urens</i> L.	'Karai', 'Dhavarukh'	Sterculiaceae
60.	<i>Soymdia febrifuga</i> (Roxb.) A.Juss.	'Rohin', 'Rohan'	Meliaceae
61.	<i>Strychnos potatorum</i> L.	'Nirmoi', 'Nirmali'	Loganiaceae
62.	<i>Schreberia swietenoides</i> Roxb.	'Mokha'	Oleaceae
63.	<i>Terminalia belirica</i> Roxb.	'Behdu', 'Beheda'	Combretaceae
64.	<i>Terminalia arjuna</i> (Roxb. Ex DC.) Wight and Arm	'Kahu', 'Kahua', 'Arjun sadada'	Combretaceae
65.	<i>Tectona gaudis</i> L.F.	'Sag', 'Sagudu'	Lamiaceae
66.	<i>Terminalia crenulata</i> Roth.	'Ain', 'Sadada'	Combretaceae
67.	<i>Trema orientalis</i> (L.) Bl.	'Gol'	Ulmaceae
68.	<i>Terminalia chebula</i> Retz.	'Harda', 'Hirda', 'Harla'	Combretaceae
69.	<i>Tamarindus indica</i> L.	'Chinch'	Caesalpiniaceae
70.	<i>Ziziphus glaberrima</i> (Sedgew.) Sant.	'Ghatboor', 'Ghoti'	Rhamnaceae

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## 21 वीं सदी के हिंदी साहित्य में महिला लेखन की भूमिका



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**‘गिलिगडु’ उपन्यास में बुजुर्गों का यथार्थ चित्रण**

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श्री सिद्धेश्वर महाविद्यालय, माजलगाव जि.बीड - ४३११३१

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साहित्य एक ऐसी जलधारा है जो की समयानुसार अपने प्रभाव को बदलती है। उसी बदलाव में अतीत, वर्तमान और भविष्य की झलक निरंतर दिखाई देता है। आज के हिंदी साहित्य की स्थिति बिल्कुल इसी तरह की है। एक और साहित्य में दलित विमर्श, स्त्री विमर्श तथा आदिवासी विमर्श ने जोर पकड़ लिया है तो वहीं दूसरी ओर अल्पसंख्यकों की समस्याओं ने भी साहित्य के माध्यम से सिर उठाया है। इक्कीसवीं सदी के साहित्य में एक ओर आरक्षण की स्थिति दिखाई देती है तो दूसरी ओर वास्तववादिता का चित्रण दृष्टिगोचर होता है। भारतीय संस्कृति एवं भारतीय साहित्य में माता-पिता को भगवान से भी ऊंचा दर्जा है लेकिन आज की युवा पीढ़ी पर पाश्चात्य संस्कृति का प्रभाव दिखाई देता है। हमारे कुटुंब पद्धति में माता-पिता बड़े बुजुर्गों को मान-सम्मान और आधार का स्थान था, लेकिन आज की स्थिति इससे बिल्कुल विपरीत दिखाई देता है, इसी बदलती स्थितियों में बुजुर्गों की स्थिति का चित्रण चित्रा मुद्गल ने बड़ी संवेदनशीलता से हमारे सम्मुख ‘गिलिगडु’ उपन्यास के माध्यम से रखा है। आज के जीवन पद्धति पर पाश्चात्य जीवन पद्धति का गहरा प्रभाव पड़ता दिखाई दे रहा है और हमारी जीवन शैली वैसे ही होती जा रही है इससे हमारे पारिवारिक स्नेह के संबंध बिखरते जा रहे हैं। एक दूसरे के प्रति जो आत्मीयता का भाव था वह आज लगभग समाप्त हो गया है। यही कारण है कि बुजुर्गों का जीवन एकाकी, व्यथापूर्ण तथा दयनीय होता जा रहा है। विवेच्य उपन्यास में दो बुजुर्गों की लया कथा है, जो रौर के राग्य बनाया गिलिते हैं और एन. रागे में अपनी संवेदनशीलता और स्मरण का प्रतिबिंब देखते हुए आत्मीयता का तरल पाकर अंतरंग बन जाते हैं।

‘बाबू जसवंत सिंह’ जो कानपुर में सेवानिवृत्त इंजीनियर है वह अपनी पत्नी और दोस्त के निधन के बाद बिल्कुल अकेले हो जाते हैं। इस अकेलेपन की बीमारी से छुटकारा पाने के लिए डॉक्टर की सलाह मानकर वे दिल्ली में अपने बेटे नरेंद्र के पास आकर रहने लगे हैं। यहां आकर उन्हें पता चलता है कि बेटे नरेंद्र के मन में उनके प्रति कोई आधार भाव नहीं है। वे सारी कटुता है जो जब-तब पिता के कठोर अनुशासन भरे अतीत का स्मरण दिलाकर उन्हें क्रूर व्यक्ति के कटघरे में खींच कर ले जाती है, परंतु उन सुविधाओं के लिए वे कृतज्ञ नहीं रहे जिन्हें जुटाने में बाबू जसवंत सिंह ने अपना शौक और जवानी गला दी। माता-पिता की महत्वकांक्षा, भोगवादी संस्कृति और कंप्यूटरजनित तकनीकी विकास में उलझी नई पीढ़ी ने जब स्वयं अपनी छोटी-छोटी जिंदगीयों में कोई मानवीय स्पर्श महसूस नहीं किया है, तो उनकी भावी पीढ़ी भला कैसे कर पाएगी? किन्हीं अमूर्त भयावह लक्ष्यों की ओर दौड़ती अभिशप्त नई पीढ़ी चित्रा मुद्गल की शब्दों में - “बुद्धि विकास की आड़ में बड़ी खूबसूरती से.... संवेदनाच्युत की जा रही है इतनी की बच्चे कभी परिवार में लौट ही न सके न कभी अपना परिवार गढ़ सके।” ऐसे बंजर और अनात्मीय वातावरण में अपनी तिरस्कृत उपस्थिति बाबू जसवंत सिंह को इस कदर भारी लगने लगती है कि वे स्वयं अपने अस्तित्व और उपयोगिता को लेकर शंकित हो उठते हैं। जैसे- “बाबू जसवंत सिंह तुमने अगर नरेंद्र की माता की भांति पकवान बनाने में दक्षता आसिल कर ली होती है निश्चित ही बहू सुनयना के लिए तुम्हारी उपयोगिता होती है। बुढ़ा ढेलुआ उसके लिए किस काम का जो खाने हगने के अलावा कुछ और नहीं कर सकता।”

बहु सुनयना के मन में अपने ससुर के प्रति कोई आत्मीयता नहीं है कुछ है तो लोग है, जो मृत सास के गहनों और ससुर की संपत्ति हड़पने की आकांक्षा जिसने उसे अपने ससुर के साथ रहने के लिए विवश किया है। उसी सुनयना ने ऐसी गुंगी स्थितियां पैदा की है, जहां संवाद के लिए कोई गुंजाइश नहीं है। आत्मकेंद्रित बच्चों को बाबू जसवंत सिंह कोई दोष देना नहीं चाहते हैं। घर में उनकी स्थिति का चित्रण लेखिका के शब्दों में - “इस घर में एक नहीं दो कुत्ते हैं एक टॉमी और दूसरा अवकाश प्राप्त सिविल इंजीनियर जसवंत सिंह। टॉमी की स्थिति निःसंदेह उसकी बनिस्बत मजबूत है उसकी इच्छा-अनिच्छा की परवाह में बिछा रहता है।”



पूरा घर। उनके लिए किसी को बीछे रहना जरूरी नहीं लगता। टॉमी अच्छी नस्ल का कुत्ता है। सोसायटी में उनके घर का रुतबा बढ़ा तो उनके चलते उनका रुतबा कलंकित हुआ।”<sup>३</sup>

जसवंत सिंह के विपरीत व्यक्तित्व रखने वाले उनके दोस्त कर्नल विष्णु नारायण स्वामी हैं। जिनका जीवन मंत्र है – “लिव लाईक शेर... अपनी तरह से। अपनी शर्तों पर।”<sup>४</sup> कर्नल यह बाबू जसवंत सिंह के दोस्त एवं हितैषी होने के बावजूद उनको सांत्वना देने के बजाय उन्हें हो आड़े आथो लेते हैं- “सच तो यह है कि दोस्त, आपको दुख ओढ़ने बिछाने की आदत हो गई है। साधारण बात प्रहार हो उठती है। दरअसल यह कुछ और नहीं है मिस्टर सिंह, बुढ़ो की शासन न कर पाने की कुंठा है। इसी कुंठा से उन्हें मुक्त कराने हेतु कर्नल स्वामी जसवंत सिंह का अच्छी तरह से ख्याल रखते हैं। उन्हें जॉगिंग के लिए जूते खरीद कर देने से लेकर अपने साथ सिनेमा और शराब पानी-पिलाने तथा उनकी हर कामना पूरी करने के लिए पीछे रहते हैं।”<sup>५</sup>

जसवंत सिंह को कर्नल स्वामी अपने परिवार के किस्से सुनाते थे, जिन्हें सुनकर ऐसा लगता है कि घर में उनके बिना पत्ता भी नहीं हिलता हो, लेकिन बारह दिनों तक बिना बताए घूमने के लिए न आने के कारण उनसे मिलने के लिए उत्कटित बाबू जसवंत सिंह है जब तेरहवें दिन उनसे मिलने उनके घर पहुंचे हैं तब वहां उनके पड़ोसी से उनके बारे में जानकर उनके पैरों तले की जमीन खिसक जाती है। कर्नल स्वामी का तो बारह दिन पहले ही सीढ़ियों से उतरते समय दिल का दौरा पड़ने से निधन हो गया था। जब जसवंत सिंह ने उनके परिवार के बारे में पूछने पर जो उन्हें सुनने को मिला, उसे उनके आंखों के आगे अंधेरा सा छा गया। कर्नल स्वामी जो कि हर समय दूसरों को प्रेरणा देने वाले उन्हीं के जीवन की इतनी बड़ी त्रासदी हो सकती है? अपने परिवार की हर-दम प्रशंसा करने वाले कर्नल स्वामी को उन्हीं के बेटे श्री नारायण ने पैसों के लालच में उन्हें पिटाई की थी और जिसे रोकने के लिए पड़ोसियों को पुलिस की मदद लेनी पड़ी। उनके जीवन पर पड़ोसी मिसेज श्रीवास्तव की टिप्पणी है, “ऐसी कसाई औलादों से आदमी निपुता भला हमें इस बात का कोई गम नहीं कि हमारी कोई औलाद नहीं।”<sup>६</sup> कर्नल स्वामी की सारी जीवन त्रासदी की दास्तान इन पंक्तियों में बयान होती है।

आज की पीढ़ी को अपने बुजुर्गों के प्रति कोई भी आत्मीयता, मान-सम्मान, प्यार और उसकी पसंद और नागरांड का कोई संबंध नहीं है। बस उन्हें इस बात की फिक्र है कि उनकी धन संपत्ति को किस तरह से हातियाले। जो भी वह उनके साथ अच्छा व्यवहार कर रहे हैं वह इसलिए कि उनकी बच्चे जमीन, पत्नी को आने कूजे में कर ले। इसी कारणवश चित्रा मुद्गल ने उपन्यास में चित्रित बुजुर्गों की स्थिति के द्वारा समाज के समक्ष उभारणवाली जटिल समस्या और संस्कृति की बिगड़ती तस्वीर को इसी समाज को दिखाई है जो आज की स्थिति में सबसे भयावह स्थिति इन बुजुर्गों की है। जो अपने ही परिवार में उनकी स्थिति एक कुत्ते से भी बदतर नजर आती है।

चित्रा मुद्गल जी ने एक साहित्यकार का उत्तरदायित्व बखूबी निभाया है जो स्थिति को समाज के सामने लाकर इस पर विचार करने पर मजबूर किया है। आज इन समस्याओं पर साहित्य में लिखा जा रहा है तो कल समाज का ध्यान इन बुजुर्गों की ओर जाएगा और इन समस्याओं के समाधान के लिए समाज तत्पर होगा। ‘गिलिगडू’ उपन्यास के माध्यम से इक्कीसवीं सदी के साहित्य की दिशा क्या है? उसका उत्तरदायित्व क्या है? आनेवाली स्थिति कैसी है? इसका चित्रण चित्रा मुद्गल ने गहनता से सोच विचार कर पूरे समाज के समक्ष रखा है।

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# NUTRITION AND PHYSICAL PERFORMANCE

**Dr. Umesh R. Sadegaonkar**

Shri. Siddheshwar Mahavidhyalaya Majalgaon

## ABSTRACT:

The awareness of nutrition plays an important role in sports performance. Many factors can affect the performance of a sports person during competition, which may be related to different domains. Nutrition, physical performance and the level of functional capacity of the human beings are interrelated. Any dietary deficiency that adversely affects the health of the individual is likely to impair his or her physical performance capacity and thus nutrition and wellbeing assumes a vital role in the field of sports. The consequence of extremely prolonged exercise is huge energy expenditure and the subsequent nutrient loss and therefore athletes must be continuously supplied with adequate nutrients, to maintain their optimum nutritional wellbeing.

**KEYWORDS:** Nutrition and wellbeing, physical performance

## INTRODUCTION:

Successful athletic performance is a combination of proper training and a sensible approach to nutrition. During the past 20 years, there have been greater developments in health and physical performance. Sports nutrition has many goals to enhance performance. First, it improves performance by improving body composition, which increases speed, quickness, mobility, and strength. Second, it will help the speed of recovery, which will in turn create more capacity for practicing and competition as the body is becoming more fit and adjusted to the coupling of the good nutrition incorporated into the workout regimen. Third, it will allow one to increase energy for both practice and competition, which will definitely help one's performance. Strategic diet will also increase immunity, allowing one to stay healthy and be able to continue and intensify practice and training. Thus, nutritional status is a critical determinant of athletic performance.

Nutrition intake is undoubtedly an important component that has an impact on physical performance of athletes both men & women. Many sports scientists agree on the fact that sports, health and invariably the nutritional status are inter related. Reports from both western countries and India have strongly supported this view that at the very basic level, good nutrition plays an important role in the maintenance of health allowing the athlete to train and compete. In countries such as India where malnutrition is of a public health dimension, poor athletic performance could be partly due to poor physique and unsatisfactory physical fitness resulting from under nourishment. Nutritional status refers to the health of an individual and has a direct bearing on their physical performance and work capacity.

Good nutrition must be a key part of training programmes if one has to succeed. The nutrients are the distinct chemical components in the food. The six major nutrients present in the food are mainly carbohydrates, protein, fats or lipids, vitamins, minerals and water. They are like team mates that work together to provide good nutrition. Just as each team member carries out different tasks during a game, each nutrient performs specific functions in your body. A lack of even one nutrient is a disadvantage to your body. Nutritional deficiencies can result in decreased performance.

## CARBOHYDRATES:

Carbohydrates are the most important source of energy. It is the most preferred fuel for sports performance. Glucose is the simplest form of carbohydrate and starch is example of complex carbohydrates. Different forms of carbohydrates, which we consume in the diet, are converted into



glucose in our body, which is then metabolized to produce energy. 1 gm of carbohydrate gives 4-Kilo calories of energy. Foods rich in carbohydrates are Cereals like rice, wheat & wheat products. (Broken wheat rava, pasta etc.) and millets like maize, bajra, jowar, oats, ragi, and roots & tubers like potatoes, sweet potatoes, carrots etc. Carbohydrates contribute 50 to 60% of total energy requirement in a day.

#### **PROTEINS:**

Primary role of proteins is bodybuilding and growth. Every organ, tissue and cells in our body is made up of proteins. Proteins help in muscle development, maintenance, and repair of all tissues. Protein requirement for normal people is 1 gm per kg ideal body wt. but for athletes it can be increased to 1.2 to 1.5 grams per kg body wt. in a day. About 60 to 80 grams of protein is sufficient for a day, which can be obtained from milk egg, meat, fish, dhal, pulses, cereals etc. but excess consumption of protein foods is not advisable as it can increase the workload on kidneys and can cause kidney damage in the later stage. It is a misconception that excess consumption of meat, milk, eggs etc. will give energy & stamina.

#### **FATS:**

Fats are concentrated source of energy. 1gm of fat will give 9-kilocalories, which is, double the amount produced by carbohydrates. For example, 2 teaspoon of butter and 1 cup of rice gives 100-kilo calories. 20 to 30% of the total energy required in a day should come from fats. It is not good to consume excess amount of fat in the diet, as it will lead to obesity and heart diseases in the later part of life. It is better to avoid lot of butter and ghee and take more of vegetable oils like sunflower oil, soya bean oil or rice bran oil.

#### **ENERGY REQUIREMENTS**

Carbohydrates, fats and proteins are known as energy yielding nutrients. But carbohydrates are the major source of energy, then fats and least from proteins. Approximately the caloric need of an athlete is around 3000 k calories per day. During heavy training and competition, the requirement may go up to 5000Kcals per day.

#### **VITAMINS AND MINERALS**

Vitamins and minerals are known as the micronutrients as they are found in less amounts in the body, but they play a major role in maintaining many important physiological functions. The main functions of micronutrients are to enable many chemical reactions to occur in the body. Foods rich in vitamins and minerals are also known as “protective foods” as it helps to build body’s resistance and immunity and helps in energy metabolism, strengthening of bones and muscles, good vision, blood formation etc. Fat soluble vitamins are Vit A, D, E and K and rich sources are green leafy vegetables, orange yellow fruits and vegetables like carrot mango papaya etc. Important food sources are citrus fruits, milk, eggs, nuts, cereals etc. Vitamin deficiency of all kinds are damaging to work performance and can impair physical work capacity, which is expected to have the most immediate effect.

Major minerals are calcium and phosphorus, which is needed for the bones and teeth, and for muscle functioning. Iron deficiency is associated with decreased work capacity, poor mental performance and reduced hemoglobin levels, which will lead to decreased oxygen carrying capacity and cause anemia. Low calcium levels can cause irregular muscle contractions, bone density loss etc. foods like milk, egg, liver, meat, ragi, oats, green leafy vegetables, dry fruits like dates etc. should be



included in the diet. Other important minerals are sodium potassium, zinc, magnesium, fluoride, iodine, copper etc. that perform specific functions in the body.

## **WATER**

Of all the nutrients water is probably, the most essential for human life. Water constitutes 60-65% of the total body weight, 70% of the muscle composition, and 90% of the blood plasma. When you exercise, your body loses water through perspiration, which can lead to dehydration. Excess loss of water can lead to serious problem for sports people. It causes cramps, vomiting delirium and lead to unconsciousness similar to sunstroke.

## **RECOMMENDED DIETARY ALLOWANCE (RDA)**

An adequate balanced diet is necessary for an effective performance. The nutritional requirements of the athlete are more than the normal persons. However, excess consumption of any nutrient more than the recommended dietary allowance (RDA) will be harmful and dangerous. Following is the RDA for sports persons

NUTRIENTS	DAILY REQUIREMENTS
Energy	3000-5000KCal
Protein	60-90gms
Fat	80-150gms
Calcium	600-800mg
Iron	20-30mg
Vitamin A	750-1000mcg
Thiamine ( B1)	2-3mg
Riboflavin ( B2)	2-3.2mg
Niacin ( B3)	26-36mg
Ascorbic acid (Vit C)	50-80mg

## **DIETARY GUIDELINES FOR SPORTS PERSONS :**

Follow a balanced diet and eat all types of food in moderation

- Never skip breakfast as it the most important meal of the day
- It is better to eat 3- 5 meals a day rather than eating three heavy meals
- Have milk at least 2-3 glasses per day.
- Have plenty of fruits like papaya, guava, citrus fruits, watermelon etc and fruit juices.
- Have sprouted pulses (chana or moong) and salads at least a bowl every day.
- Eat whole cereals like daliya (broken wheat upma) wheat and ragi porridge & Oats.
- Eat dry fruits like dates raisins and nuts like groundnuts almonds etc
- Restrict no vegetarian foods 2-3 times a week and reduce excess consumption of red meat.
- Have plenty of green leafy vegetables, carrots, beetroot and other vegetables.
- Avoid soft drinks, alcohol and too much of coffee, tea, fatty foods and other junk foods and too many sweets. Have only 1-2 eggs per day.
- Never exercise immediately after a meal, or else it can lead to nausea, vomiting, distension and cramping

## **CONCLUSION:**

It is concluded that the nutrients are very important for sports performance in order to improve their performance. A well balanced diet and effective training and coaching will be the



winning combination and will help the athlete to build up strength and stamina. Hence systematized modification of diet with steady monitoring of the deficiencies if any, by a sport dietician, linked with skilled training programme and effective nutrition education can definitely lead to better performance.

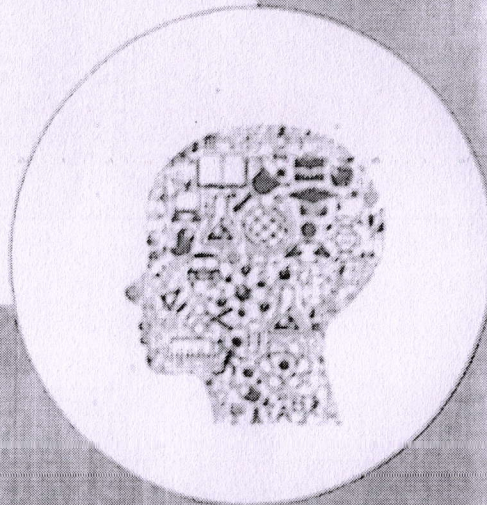
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## Benefits of Yoga & Meditation during pandemic

**Dr. Umesh R. Sadegaonkar**

Shri. Siddheshwar Mahavidhyalaya Majalgaon

### Abstract:

Yoga is a cerebrum and frame exercise with 5,000-yr records in out of date Indian perspective. Various sorts of yoga merge real positions, respiratory techniques, and contemplation or loosening up in covid pandemic. In later years, it has gotten famed as a type of real exercising reliant upon addresses that enhance in addition evolved manipulate of the thoughts and frame and overhaul thriving. In covid pandemic, there are more than one unmistakable varieties of yoga and numerous controls in the preparation. This article examines the blessings of yoga & meditation to save you mental strain in the course of covid set of experiences, hypothesis, and numerous portions of yoga. In the ultra-modern world, the South Asian electricity of yoga has stretched out to all aspects of the globe. While it's far currently a popular type of movement and reflection, this has now no longer for the maximum element been the circumstance.

**Keywords:** Yoga, Meditation, psychological stress, covid pandemic.

### Introduction:

#### History:

There is no put down record of the creator of yoga. Male yoga experts are known as yogis, and female yoga specialists are called yogi is. Both rehearsed and showed yoga some time before any made record out of yoga showed up. Over the going with five centuries, yogis passed the solicitation down to their students, and various schools of yoga made as the readiness expanded its general reach and recognizable quality. The "Yoga Sutra," a 2,000-year-old arrangement on yogic point of view by the Indian sage Patanjali, is a manual on the most competent technique to ace the psyche, control the opinions, and develop fundamentally. The Yoga Sutra is the most dependable established up standard of yoga and logical the most settled substance in presence and gives the development to all undeniable level yoga. Yoga is striking for its positions and positions, yet they were not an indispensable piece of unprecedented yoga customs in India. Wellbeing was not a principal target. Subject matter experts and devotees of yogic show zeroed in rather on different practices, for example, growing strong noteworthiness utilizing breathing strategies and mental center interest. The only started to get notoriety in the West near the fruition of the nineteenth century. An effect of energy for postural yoga happened during the 1920s and 1930s, first in quite a while and later in the West. To pass on its critical message and guide gatherings, yoga regularly utilizes the symbolism of a tree with roots, a trunk, branches, fledglings, and customary things. Each "branch" of yoga tends to a substitute obsession and set of attributes.

#### Types of Yoga: -

**Hatha yoga:** This is the physical and mental branch expected to take action and brain.

**Raja yoga:** This branch incorporates contemplation and extreme adherence to a movement of disciplinary advances known as the "eight members" of yoga.

**Karma yoga:** This is a method of organization that hopes to make a future freed from skepticism and whimsicalness.

**Bhakti yoga:** This plans to set up the method of responsibility, a good strategy to channel sentiments and foster affirmation and opposition.

**Jnana yoga:** This piece of yoga is about insightfulness, the method of the scientist, and developing the brain through assessment.

**Tantra yoga:** This is the pathway of custom, administration, or summit of a relationship.

Pushing toward yoga considering a particular objective can engage an individual to pick which branch to follow.

#### Chakras:

"Chakra" truly deduces turning wheel. Yoga keeps up those chakras are focus inspirations driving vitality, musings, sentiments, and the genuine body. As indicated by yogic instructors, chakras pick the way where individuals experience reality through energetic responses, requirements or hatred's, levels of

**Dr. Umesh R. Sadegaonkar**



conviction or dread, and shockingly real accidental impacts a ton. Exactly when centrality gets vexed in a chakra, it is said to trigger physical, mental, or enthusiastic erratic traits that show in accidental impacts, for example, tension, torpidity, or defenseless absorption. Asanas are the different genuine conditions in Hatha yoga. Individuals who practice yoga use asanas to free vitality and engage an imbalanced chakra. There are seven gigantic chakras, each with their own middle interest:

**Sahasrara:**

The "thousand-spel up" or "crown" chakra addresses the condition of pure care. This chakra is organized at the crown of the head, and the disguising white or violet tends to it. Sahasrara fuses matters of inward information and real obliteration.

**Ajna:**

The "course" or "third-eye chakra" is a party point between two immense blazing streams in the body. Ajna takes a gander at to the shade's violet, indigo, or dull blue, in any case standard yoga specialists portray it as white. The ajna chakra connects with the pituitary organ, which drives improvement and movement.

**Vishuddha:**

The disguising red or blue locations the "particularly pure" or "throat" chakra. Specialists consider this chakra to be the home of talk, hearing, and handling.

**Anahata:**

The "unstruck" or "heart" chakra connects with the tones green and pink. Primary concerns of conflict including anahata unite complex opinions, sympathy, delicacy, limitless love, concordance, dismissal, and flourishing.

**Manipura:**

Yellow locations the "jewel city" or "navel" chakra. Experts accomplice this chakra with the stomach related design, correspondingly as precious power, dread, uneasiness, making feelings, and inclinations towards an independent individual.

**Svadhishthana:** Practitioners guarantee that the "one's own base" or "pelvic" chakra is the home of the conceptive organs, the genitourinary framework, and the adrenal organ.

**Yoga and Meditation:**

While there two or three differences among yoga and care reflection from the Buddhist show, these two practices are plainly synergistic and clearly tradable. Care is the capacity to keep up thought on a particular clever article (e.g., breath, mantra), with feature on getting back to important (versus negative) assessments. Care can be exhausted in a progressively standard manner by sitting in a peaceful space with eyes shut for a specific extent of time, comparatively as during a yoga class with base on breath and headway while holding and changing start with one position then onto the accompanying Yoga care. ~~Reflection desires expanded care in regards to~~ introduce second encounters, rather than continuing or trying to free the brain from messed up assessments, opinions, or sensations. Right now, reflection can enable the student to figure out some method for pulling out from evaluative or principal hypothesis by cultivating a state of mind of interest and regard for propelling responses to opinions, experiences, and sentiments lastly limiting enduring with broadened lucidity of this current reality.

Reflection is a need in our mind boggling lives, yet it doesn't come effectively for by a wide margin most. Individuals need to try it, in any case they observe it is more dangerous than they whenever envisioned. How hard could it have the choice to be?! Sitting upstanding takes muscles that that we may not utilize, and that may save some work to make. Possibly we sit at a work area for the span of the day; in any case, our back is slouched over the PC. Sitting upstanding and still may feel outstandingly wrong.

Yoga positions are an exceptional methodology to set up the body for examination. Yoga isn't restoring for the body yet in addition the cerebrum. Yoga positions were genuinely proposed to successfully set up the body to think, in any case with a mind blowing piece of the yoga accessible these days, the relationship with consideration is from time to time alluded to.

In Ananda Yoga for Higher Care, we train yoga to plan for consideration. The amount of the asanas is organized in a step by step practice to help with planning the importance into the spine, to be alluringly coordinated vertical to the cerebrum to blend and lift our appreciation.

Yogananda said that getting into and out of a position is just similarly immense as being in the real position. For instance, in Ananda Yoga, when we raise our arms, we take in. Right when we slice down our arms to our sides, we breathe in out. We can move our arms generally, in a wonderful manner in collaboration with the breath, or we can lift the arms rapidly and let them simply drop, without connecting with the breath. We can tumble down on a parlor seat, or sit perfectly effectively and control.



Precisely when we start to direct our breath and start to synchronize it with our development, we become quiet. By then, at that point, we become still hanging out there reason. By dropping down, we start to achieve more and we keep our idea right now. This additionally assists with developing our body, comparatively as care, to expect reflection. Consideration and yoga are interrelated. They are both piece of the Eight Limbs of Patanjali's Yoga Sutras. They go hand a great deal. They direction to get our little self along with our higher soul self. One can't be open without the other. We should ponder the body to forget about it, to go inside in consideration.

Where the breath streams, the psyche goes. In yoga and in consideration, we can raise our care. Yoga causes us to pass on the body to a condition of quietness by cleaning up the lively vitality we pull around, and sets us up to turn out to be completely brought down in huge focus, examination. Yoga, for instance, introducing, can help with opening our hearts and permit the vitality to stream up, to the higher chakras and higher understanding. "Be really lightening in your heart. A peaceful soul will help you in a short moment to conclude issues that may by somehow require days, weeks, or even a long time of precarious inspecting."- Expert Kriyananda.

#### Benefits of Yoga and Meditation: -

1. Day by day practices are an extraordinary method for freeing the pressure from your day can carry a feeling of prosperity to your life. Here are the best ten advantages of yoga.
2. **Stress Relief:** - In this pandemic Yoga can assist with decreasing the impacts of mental weight on your body. One of the advantages of yoga is that it empowers unwinding and can bring down how much cortisol in your body.
3. **Pain Relief:** - In these pandemic every day activities of yoga can assist with facilitating the throbbing painfulness of the body. Many individuals with intense illnesses have announced less agony after these day-by-day works out. Like asanas or contemplation.
4. **Better Berating:** - In this pandemic, You will figure out how to take further. More slow breaths with day-by-day activities of yoga. It will assist with expanding your lung capacity and set off the body's unwinding reaction. This can be one of the most impressive advantages of yoga.
5. **Flexibility:** - In this pandemic, you will see your degree of adaptability will increment. Which will assist with your scope of movement. In some cases in the yoga day by day works out. Individuals cannot contact their toes. The advantages of yoga will incorporate extending the muscles. Ligaments and tendons in your body to assist you with turning out to be more adaptable.
6. **Increased Strength:** - In this pandemic Yoga, presents utilize every one of the muscles in your body and assist you with expanding your solidarity level from head to toe. The advantages of yoga and every day activities will assist you with fortifying your muscles near the bones. Which increment the help of your skeletal framework also?
7. **Weight Management:** - In this pandemic, you will see the advantages of yoga start to influence your scale. Every day practices are suggested all the time. However, yoga decreases the degree of cortical in your body. This guides in weight reduction and fat consuming.
8. **Improved Circulation:** -In this pandemic Yoga will help improve your body's circulation. In turn, with daily exercises, you will see the benefits of yoga with lowered blood pressure and pulse rates.
9. **Cardiovascular Conditioning:** -In this pandemic, even the gentlest style of yoga will assist with bringing down your resting pulse and increment your general perseverance. This is one of the significant advantages of yoga to assist with working on how much oxygen taken in during the day-by-day works out.

#### Conclusion:

In this pandemic, every people under psychological stress to prevent stress do yoga and meditation. In this pandemic, each individual under mental pressure to forestall pressure do yoga and reflection. Commoners and sports people the most significance are sports movement wire of yoga and Reflection players and people group's execution improvement with the genuine that yoga and examination importance of life. The fundamental standard of yoga and Reflection is "Loosen up the body and psyche, deter the breath, quiet down the brain". The current yoga bunch is having the altogether persuading relaxing systems like pranayama - a breathing activity to change and control the brain, the philosophical conversations about the presence's point of view about the neutrality and truth of life and the right disposition may have given them trust for the term of standard everyday presence.

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