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# Financial Inclusion and its Impact in India: An Empirical Analysis

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## Abstract

Financial inclusion is one of the powerful scheme on emerging concept develop the banking habit for improving financial service through unbanked area. Financial inclusion is affordable cost reduce minimum formalities to open no frill account independently occupying customer. Banking sector contribute unique service of financial inclusion reach for unaware customer sharing innovate technology through financial transaction. Financial inclusion are mainly through service to self help group women getting financial assistance, government subsidy on agriculture loan and receiving pension fund scheme in banking sector. Financial inclusion is sustainable growth of banking technology. Financial inclusion is a wider concept; bankers do not collect cost of expenditure to open account under financial inclusion scheme. The present research article is based on primary data collected using interview schedule technique from 150 respondents staying in Vada of Palghar District, Maharashtra.

**Keywords:** Financial Inclusion, Banking Sector, Financial Literacy

## Introduction

Financial inclusion is delivery of financial service to promote banking activities by sharing the financial product through banking institutions. Financial inclusion is primary role support on weaker section the people; they have access to financial products like saving, insurance and credit among customer. Financial inclusion is mainstream open no frills account without cost of expenditure his bank's full support and co-ordination. Rural customer not having access to banking can avail the facility. Financial inclusion is policy implementation to assist marginalized people; saving deposits in bank, better financial assistance and inculcating banking habits. Financial inclusion could be for individual or an business man can have access financial service; credit facilities are available without any cost of expenditure with minimum formalities to open account in unbaked area.

Financial inclusion aims at activities not only receiving

credit facilities but also to enjoy multiphase economic benefit. It is focused on weaker section of the people; promotes the financial service opening saving account for purpose of financial transaction to reach unreached population as yet. Reserve bank of India finalized a special committee to determine financial inclusion scheme. RBI introduced opening of bank account at no cost of expenditure and including number of financial products through banking institutions. Financial inclusion scheme focused on social welfare activities based on economically weaker section of population freely operating banking function in unreached areas. It lays greater emphasis on effective credit delivery mechanism for enhancing priority sector of micro finance support self help group women, government subsidy of farmers, financial assistance and contribute LPG subsidy to weaker section of the people. It is focused on developing policies and promoting banking technology sharing on vulnerable group of people access

digitalized cash transactions.

Financial inclusion is comprehensively strategy development of banking polices providing digitalized financial transactions to accelerate unbanked villages. Banking committee reviewed to identify banking service on electronic device payment of cash transfer through digitalized model. Financial inclusion is survey based on ECD/INFE methodology financial literacy is measured across three components viz. financial knowledge, attitude, and behavior of customer. Digitalized financial transaction is gaining more valuable service of illiteracy people to explore financial service in rural area. Banking institutions create awareness programme of financial inclusion scheme; people are benefited for credit delivery through digital transaction in urban area.

### Objectives

1. To assess financial inclusion of no frill account holder are benefited banking technology through unbanked customer
2. To measure role of financial inclusion and its impact on banking institutions among unaware customer in rural area.
3. To examine factor of financial inclusion on no frill account holders for lengthy procedure of banking formalities.

### Methodology & Analysis of Data

The present research article is based on primary data collected using interview schedule technique. Vada is the area selected in Palghar District in Maharashtra. Vada has three banks. 50 customers were considered in three banks each. Total number of respondents (T.N.R) were 150. That is total 150 customers were considered for the interview.

**Table-1 - Profile of the Respondents**

Profile	Variables	Total respondents	percentage	Grand Total				
				T.N.R	%			
Age (year)	25-30	35	23.33	150	100			
	31-35	55	36.66					
	36-40	24	16					
	41-45	36	24					
Education	Illiterate	22	14.67	150	100			
	Primary	36	24					
	Middle class	15	10					
	High school	27	18					
	Graduation	24	16					
Gender	Post graduation and Above	26	17.34	150	100			
	Male	84	56					
	Female	66	44					
	Marital status	Married	54			36	150	100
		Unmarried	72			48		
Widow		16	10.67					
	Divorce	8	5.33					

Occupation	Job	38	25.33	150	100
	Own business	55	36.67		
	Farmer	43	28.67		
	Land less labour	14	9.33		
Annual Income	Below-Rs.25000	72	48	150	100
	Rs.26000-Rs.36000	40	26.67		
	RS.37000-RS.47000	38	25.33		
Type of family	Nuclear	78	52	150	100
	Joint	52	48		
Family Members	Below-4	74	49.33	150	100
	05-Jul	64	42.67		
	8 and above	12	8		
Bank	Yes	66	44	150	100
	No	84	56		
Account Holders	Yes	98	65.33	150	100
	No	52	34.67		

Sources: Primary Data-2019

**Table-2 - Function of No-Frill Account**

Function	Particulars	Total	Percentage	Grant Total *	
				T. N.R	%
				150	100
Open No frill account	Yes	72	48	150	100
	No	78	52		
Source of Information	Banker	38	25.33		
	Friends	34	22.67		
	Relatives	30	20		
	Colleagues	22	14.67		
	NGO	1	0.67		
	Panchayat level federation	17	11.33		
	Others	8	5.33		
Purpose of Account	LPG	8	5.33	150	100
	MGNREGS	22	14.67		
	SHG	6	4		
	Government subsidy	33	22		
Bank wise Account	Farmer loan	45	30		
	Salary	32	21.33		
	Pension fund	4	2.67		
	Public sector	28	18.67	150	100
	Private sector	58	38.67		
	Co-operative bank	42	28		
	Regional rural bank	22	14.67		
Account Holders	One	68	45.33	150	100
	Two	58	38.67		

Types of Account	Three	24	16		
	Saving	85	56.67	150	100
	Current	44	29.33		
Visited Bank	Fixed deposit	16	10.67		
	Recurring deposit	5	3.33		
	One	54	36	150	100
	Two	67	44.67		
	Three	21	14		
Benefits	Four	8	5.33		
	Loan	26	17.33	150	100
	Locker facility	38	25.33		
	Credit card	26	17.33		
	Debit card	28	18.67		
	Mortgage	17	11.33		
	Deposit and withdraw Cash	15	10		

Sources: Primary Data 2019

The primary data were collected during the months from March 2019 to June 2019.

As is clear from the Table-1 over 55% of the respondents (about 60 %) are aged 25-35 years. About 15 % of the respondents are illiterate and 33 % are Graduates and post graduates.

It is found that about 25 % of the respondents are employed, 37 % are doing own business, 29 % farmers and other 9 % agricultural labourers. As many as 48 % of the respondents stating their annual income to be Rs.25000, and less indicates that the study area is predominantly economically weak. 27 % stated to be earning an annual income of Rs.26, 000-36,000 indicates a moderately better economic standard. To the query of bank' presence in the village 44 % of the respondents answered an affirmative.

Of the 150 respondents, 48% stated to have opened no frill account. As many as 39 % of the respondents were found to have opened account in private sector banks, followed by Co-operative Banks (28 %), Public Sector Banks (19%) and Regional Rural Banks (14 %). An analysis of type of account opened reveals that over 55 % (57 %) have opened Saving account while 29 % have opened current account. Few have fixed/recurring deposits.

45 % of the respondents were found to have one account, 39 % stated to have hold two accounts and 16 % stated to have three accounts As regard purpose of opening of an account, about 21% of the respondents stated to have opened account to deposit their salary while 22% stated to have opened to facilitate Government to credit subsidy amount to their bank accounts. As many as 30% stated to

have opened for farm loan purposes. Other purposes include crediting MGNRES remuneration (153), LPG subsidy (52), SHG (42) and Pension Fund (about (32).

An analysis of benefit of holding bank account revealed the perceived benefit of the respondents to be availing the locker facility (25%), availing loan (17%), credit card facility (17%), debit card facility (19%), mortgage facility (11%) and cash transaction (10%) - that is deposit of withdrawal of cash.

Table-3 presents the factors considered for financial inclusion.

Factor	VHL	HL	NO	IX	LL	Total
Poor communication network	37(24.6)	48(32)	32(21.3)	18(12)	15(10)	150(100)
Lengthy procedures of banking services	44(29.3)	32(21.3)	37(24.6)	15(10)	22(14.6)	150(100)
Awareness on information technology	48(32)	55(36.6)	34(22.6)	8(5.3)	5(3.3)	150(100)
Lacking of financial service	32(21.3)	44(29.3)	37(24.6)	19(12.6)	18(12)	150(100)
No regularity in functioning	55(36.6)	46(30.6)	15(10)	14(9.3)	20(13.3)	150(100)
Lacking of CRM	48(32)	55(36.6)	32(21.3)	10(6.6)	5(3.3)	150(100)
Inadequate of ATM services	44(29.3)	37(24.6)	18(12)	15(10)	36(24)	150(100)
Delay on Pension payments	55(36.6)	34(22.6)	27(18)	20(13.3)	14(9.3)	150(100)
Insufficient of On-line service	32(21.3)	48(32)	19(12.6)	8(5.3)	43(28.6)	150(100)
Service quality of Safe lockers facilities	37(24.6)	69(46)	20(13.3)	10(6.6)	* 14(9.3)	150(100)

Sources: Primary data. Notes: VHL- Very High level, HL- High level, LL- Least level

It is inferred from Table-3 that poor communication network (32%) lengthy procedures! 36%) irregular functioning (31%), Poor CRM (37%) and indifferent online services are functioning of the bank. Financial inclusion is concept open no-frill account in banking sector framing guideline for the purpose of service to banking and financial service. Banking institutions fully pledged is primary motive of service sector is promoting unbanked areas.

The Main Suggestions for Better Functioning are as follows:

1. Rural customers lack awareness of information technology such as on-line banking, ATM, direct payment of financial transaction through net banking activities. Customers' reach of banking technology regarding electronic device payments and receipts sharing communication networks is lacking. Hence efforts should be made to create awareness through campaign, public addressing etc.
2. CRM is sustainable development of banking function all aspect of social growth for promoting financial and non-financial service provider in unreachd

- customers. Customer relationship management should lead to increasing financial service and better inclusion.
- Private sector, co-operative bank are not given important for financial service especially financial inclusion of no frill account holder. Private sector bank follows lengthy procedures to open bank account given number of instruction and submitted documents after opening bank account. Reserve bank of India must be give new regulations to avoid lengthy formalities to open no frill account in private bank.
  - Banking institutions must be creating financial inclusion of service quality on banking service by conducting special programme for customers.
  - Rural customer are not aware of the benefits of bank and there is no awareness of banking financial transactions validity. Banking institutions must recruit rural youth as business support agents who can guide villagers in opening accounts in banks.

#### Conclusion

Financial inclusion is one of the wonderful schemes for opening no frill account in unbaked area. Financial inclusion service developments of banking technology however, reach customer bank account independently operating for financial services between bankers and customer. Customers getting government subsidy utilizing numbers of financial scheme are available in banking sector. Financial inclusion is liberalize financial service of unaware customer promote socioeconomic growth in our Indian economy. Financial inclusion considering customer KYC tool sharing financial as well as banking technology in unbanked area, would help in better inclusion of weaker section. Banking institutions must be promoting financial inclusion and ensure economic benefit for weaker section through user-friendly procedures and approaches. Employing educated unemployed youth in villages would help the banks in promoting banking success to rural areas as also providing employment opportunities to unemployed youth.

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## NON FICTIONAL AND SCARED WAYS TO MANAGE LIFE SKILLS

(Laid down 1450 years ago by untutored Prophet)

Dr Ashfaq Ahmad Khan

### Abstract

Life skills are abilities for adaptive and positive behavior that enable humans to deal effectively with the demands and challenges of life. This concept is also termed as psychosocial competency. What the 21st century is expecting and inculcating from mankind. In this materialistic world, life skills are associated with promotional activities; it may be promotion of commodities, businesses and ideas. It's very objective is customary and professional in approach. An attempt has been made to compile some imperative, contemporary, empirical and fool proof life skills laid down by the Prophet Mohammad (SAW) some 1450 years ago. Be it Social, Cultural, Economical or Religious provided standards to mankind. Above all the Almighty gave them a certificate of success and made them a benchmark for the rest of mankind. From tribes they became Companions of the Prophet Mohammad (SAW) Therefore an effort has been made to compile those lost, unconventional, sacred and divine skills followed by earlier Muslims. May Allah make it a source of inspiration for all us. For example, the following are few teachings of Prophet Mohammad (SAW). Ayesah Radiyallahu 'anha narrated that Prophet Mohammad (SAW) ordered us to treat people according to their status. (Sahih Muslim). Jabir ibne-'Abdullah Radiyallahu 'anhu narrated that Prophet Mohammad (SAW) prayed May Allah confer mercy upon a man who is kindly, when selling, when buying and when demanding his balance. (Bukhari). Abu Hurairah Radhiyallahu 'anhu narrates that Prophet Mohammad(SAW) said: A Believer's soul is attached (preventing his entry to Paradise) to his debt till it is paid. (Tirmidhi)

### Key words:

Life skills, Prophet Mohammad, Sahaba-(Companion), Hadith-(Saying of Prophet SAW), Quran, Islam, Sallalaha ahiwa sallam(SAW)-(Peace be upon him), Radiyallahu 'anhu (RA) May the Almighty be pleased with him.



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### Introduction

"The term 'Life Skills' refers to the skills you need to make the most out of life."

Life skills are abilities for adaptive and positive behavior that enable humans to deal effectively with the demands and challenges of life. This concept is also termed as psychosocial competency. The subject varies greatly depending on social norms and community expectations but skills that function for well-being and aid individuals to develop into active and productive members of their communities are considered as life skills.

The World Health Organization in 1999 identified the following core cross-cultural areas of life skills:

- Decision-making and problem-solving;
- Creative thinking and critical thinking;
- Communication and interpersonal skills;
- Self-awareness and empathy;





32. Abdullah ibne-'Umar Radiyallahu 'anhuma narrates that Prophet Mohammad ﷺ (SAW) said: He who raises weapons at us, is not from us. (Muslim)
33. Yazid Radiallahu 'anhu narrated that Prophet Mohammad ﷺ (SAW) said: Undoubtedly none of you should take the belongings of his brother, neither in amusement nor seriously. (Abu Dawud)
34. Abdullah ibne-Mas'ud Radiyallahu 'anhu narrated that Prophet Mohammad ﷺ (SAW) said: It is not befitting for a believer to curse others. (Tirmidhi)
35. Abu Darda' Radiyallahu 'anhu narrated that Prophet Mohammad ﷺ (SAW) said: He who Mentions a fault in a person, which is not present in him so as to defame him, Allah will detain him in Hell-fire till he proves what he said. (Tabarani, Majma Uz-Zawaid)
36. Abu Hurairah Radhiyallahu 'anhu narrates that Prophet Mohammad ﷺ (SAW) said: There are three signs of a hypocrite: When He Speaks, he lies; when he promises, he breaks it; when he is entrusted, he violated the trust. (Muslim)
37. Imran ibne-Husain Radiyallahu 'anhuma narrated that Prophet Mohammad ﷺ (SAW) said: Whoever plunders is not from us. (Tirmidhi)
38. Humaid ibne-Abdur Rahman narrates from his mother Radiyallahu 'anha that Prophet Mohammad ﷺ (SAW) said: He who has spoken untruthfully to strike a reconciliation between two people has not lied. (Abu Dawud)
39. Abu Hurairah Radiyallahu 'anhu narrates that Prophet Mohammad ﷺ (SAW) said: He is not from us who instigates a woman against her husband, or a slave against his master. (Abu Dawood)
40. Urs ibne-'Umairah Al Kindi Radiyallahu 'anhu narrated that Prophet Mohammad ﷺ (SAW) said: When a sin is committed on the earth; he who sees it and disapproves it, will be like the one who wasn't present. And the one who wasn't present when the sin was committed but approves of it, will like the one who was present there. (Abu Dawud)

### Conclusion

May The Almighty shower his bounties on the companions who recorded, memorized and saved every aspect of beloved Prophet Mohammad ﷺ (SAW) for the guidance of mankind in both the world. These are few selected teachings of the Prophet. While going through this we can understand their relevance in today's world for peaceful life be it personal, social, economical, spiritual or formal engagement. An effort was made to compile those lost, unconventional, sacred and divine skills followed by earlier followers of Islam. May the almighty Allah (God) make it a source of inspiration for all us.

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MARINE LIFE DISTURBANCE DUE TO ABANDONED GEARS

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ABSTRACT

The present study describes the problems created by fisherman's activities and their effects on aquatic life disturbance. Visit to various beaches has proven that fishermen usually throw their derelict nets and gears in marine waters. It not only leads to pollution of the marine environment but also disturbs aquatic life. Sharp tools of fishery injure many aquatic animals. Derelict nets thrown by fishermen, trap crabs and other aquatic animals. Such animals lose their body parts or even die. Derelict nets also intertwine mangroove trees and sometimes root out complete plant due to pressure. Heavy gears get settled to the bottom and disturb the beneath aquatic system.

Keywords: Fisherman, aquatic life disturbance, derelict gears, Marine pollution.

INTRODUCTION

Derelict fishing gear is accidentally lost or intentionally discarded or abandoned. These include fishing lines, nets, pots, traps, or other gear associated with commercial or recreational fishing. (1) It is observed that most of the time fishermen dump such derelict fishing gears into the water bodies. Review on various research has manifested that fishing gear is a major component of the marine debris problem worldwide and has been identified as one of the most biologically threatening types of marine debris. (2) Derelict gear damages the marine ecosystem in different ways, directly and indirectly. (1) Approximately 10% of marine debris is fishing gear. (3) Some sharp fishing gears injure marine animals, amputate their body parts and sometimes even kill them. Many of these types of equipment are made of synthetic materials (1). Plastic in the seas is a dramatically increasing problem and has been described as a serious pollution aspect that also includes nylon debris coming from either discarded or lost fishing gear. (4) The root cause of the issue is the increased use of plastic and nylon fishing gear that when left in the marine environment persists for decades. (3) Fishing gears made of persistent synthetic material, can impact marine fauna such as sea birds, turtles, seals or cetaceans through entanglement or ingestion. These nets entangle marine animals and plants in them. Entanglement is generally considered far more likely a cause of mortality than ingestion. The high accumulation potential suggests that microplastics could be a potential source of toxic chemicals in the marine environment. (5) Some of the most affected animals include cetaceans, pinnipeds, seabirds and marine turtles and certainly fish. (6)



A specimen of *Caretta caretta* found on 13 September 2004 in Terceira Island, Azores. With a piece of nylon long line that caused a necrotic process. (7)



A specimen of *Caretta caretta* found on 2 April 2008 in Terceira Island, Azores, entangled in a bowl of plastic lines and with its left forelimb already amputated and cicatrized. Photos by JPB.(7)

Derelict net has completely derooted an aquatic plant.



Plastic has covered most of the branches of Mangroove plant.



Decorator worm has taken plastic on the body instead of the shell for camouflage.

#### **DISCUSSION:**

Derelict fishing gear is not only disturbing the marine ecosystem but also it is interfering with the lives of marine organisms. It can severely affect marine life if any action against it is not taken. Marine capture can be affected and sunken gears disrupt benthos which is responsible for nutrient up whelming. Plastic materials break down and convert into microplastic it may become part of the organic food chain and can cause biomagnifications. Serious injury due to derelict gears can reduce the number of marine organisms. Not only has this plastic coating to photosynthetic organisms affected primary producers of the food chain.

#### **CONCLUSIONS:**

Cleaning of beaches must be taken into action. There must be some strict law against throwing derelict gears or any waste product into water bodies. Fishermen must be educated, on how their carelessness can affect the fish count. Government must take waste derelict gears in their custody for recycling.

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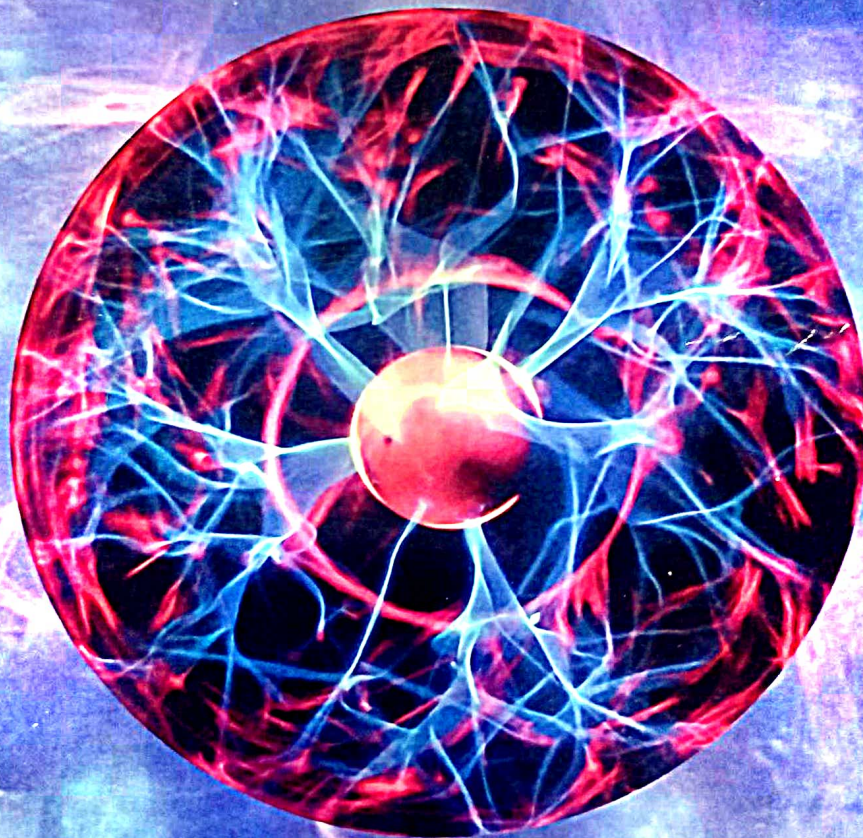


Rizvi Education Society's  
**RIZVI COLLEGE**  
OF ARTS, SCIENCE & COMMERCE



# **International Journal of Research**

**A Blind Peer Reviewed Biannual Journal  
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**Subject :**  
**MULTI DISCIPLINARY**

**EDITOR-IN-CHIEF**  
**Dr. (Mrs.) Anjum Ara M. K. Ahmad**

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## Emotional Intelligence Study on Adolescent Students

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### Abstract

The study has been conducted on a sample of 40 adolescent students selected from SSC board English medium school Khar, Mumbai. A standardized of Emotional Intelligence Scale, constructed by Anukool Hyde, Sanjyot Pethe and Upinder Dhar, was used which contains 34 items for measuring different aspect of emotional intelligence. The respondent were required to indicate their view on five point scale i.e. Strongly Agree, Agree, Uncertain, Disagree and Strongly Disagree. On the given range High, Normal and Low emotional intelligence is calculated on the basis of their areas. The findings show that most of the adolescent students are having high levels of Emotional intelligence, very few were normal, and no adolescent students were found to be low Emotional intelligence.

**Keywords :** Emotional intelligence, Self-awareness, Empathy, Motivation, Self-development

### Introduction

Although a person's feelings cannot be observed directly by others but they can be inferred from his overt behavior and verbal report of his introspection, as one can doubt the reality of emotions as conscious experience. To product an emotion, a stimulus situation must be related employee feels the presence of a threatening situation, he may handle the situation and may see it as a challenging opportunity to prove himself or experience fear or dread. Thus, our appraisal of situation and subsequent emotions are strongly influenced by our own estimate of capabilities. The emotions aroused depend not so much on the events themselves, as on how they are appraised.

### Need of the Study

Our education has always emphasized on academic results, but is that all we need to get success in our life? Why are students performing very well in schools and called as best

students not able to handle the college / peer pressure, is this something which can't be handled or these students have never been taught about this. Emotions do affect how and what we learn. Being more aware of our emotions and reaction to it will help us manage the stress. Once we learn to understand our emotions we will be able to communicate better.

### Areas of Emotional Intelligence

**Self-Awareness:** Identify your emotions; ask "How am I feeling today". Put a name to that emotion. Take a identifying what thought led to this emotion will help us to understand the reason for the way we feel.

**Empathy:** Start observing others emotions, respond to others in a way that you would want someone to respond to you. Try to put yourself in other shoes and understand their perspective being empathetic will help you handle the situations well.

the sample and the scope of the study were limited; however, the purpose was to gain a greater understanding of the phenomenon under investigation. Future research can be around the following:

- Further research should be conducted among the not just the students but also among the teachers in order to check the emotional intelligence.
- Research study should have conducted with regard to Teachers Development Programmed and Co-operative Learning.
- Research should also be conducted on assessing the relationship between leadership and emotional intelligence
- Research should be conducted in studying in detail the most relevant jobs in which EQ competencies make up the critical elements for effective performance.

#### **Conclusion**

Thus, we can conclude that most of the students are having high levels of Emotional intelligence such as Self-

awareness, Empathy, Motivation, Self-development, Managing relations, Value-orientation, Emotional Stability, Commitment and Altruistic. In no adolescents were low on the above factors of emotional intelligence.

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## A Study on Impact of Empowerment on Woman Entrepreneurs in India

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### **Abstract**

*A powerless needs and struggles for power so that one can become so empowered that one can enjoy the upper strata status. Similarly, same fundamental can be applied in entrepreneurship where one upgrades oneself from being employee to employer.*

*We can clearly see that there is an up gradation from powerless to empower or from job seeker to job giver. I.e. an entrepreneur. This differentiation between the two I.e. (i) empowerment and (ii) entrepreneur can be seen across the globe with different intensity. This differentiation is amongst various religion, culture, race and religion.*

*But one thing is common amongst above demographical component is power differentiation between male and female, which also creates base for differential rate of entrepreneurship between males and females. LGBTQ community is also our societal part but they are still in a phase of recognition. Thus to rule out this difference, need for woman empowerment for woman entrepreneurship is required.*

*Empowerment is nothing but, a process of becoming stronger and more confident especially in controlling one's life and clamming one's rights. Whereas, woman entrepreneurship is a process in which woman initiates a business, gathers all resources, undertakes risks, faces challenges and provides employment to others and manages the business. But, due to family and societal pressure gender discrimination and stereotypical patriarchal society she is suppressed and unable to display her knowledge, skills and abilities. Thus, to showcase her talents and abilities empowerment is required.*

*With the help of descriptive research, we will examine various eminent woman entrepreneurs' struggles and problems they faced. Find out the results of how they overcame the challenges by making use of the available situational opportunities and made their essential contribution to achieve the goal of 5 trillion economies.*

**Keywords:** *woman entrepreneurs, empowerment, challenges, opportunities*

### **Introduction**

Women are an important section of the society, hence empowering woman to be an entrepreneur is essential for the socio-economic and political progress of India as 1/3<sup>rd</sup> of the budding entrepreneurs in India are woman which contribute to a major share in achieving India's 5 trillion economy. Due to male dominance it is nearly impossible for them to reach their goal. Thus, to remove the gender biasness and to create neutrality between men and woman giving power to woman is the need of the hour to treat them in level with men. For woman to achieve their vision and have faith in it, determination, believe in one's ideas, skills and abilities are required and this is possible only when woman are being empowered. Woman entrepreneurs face

various hurdles and barriers which are pulling them back in achieving their dream.

### **Review of Literature**

This literature states the areas where woman empowerment relevant issues have already being articulated.

**Dufflo E. (2011)** states the weak relationship between Empowerment and *Development*. It further states that to improve the prevailing condition and better the situation it is essential to be self-sustaining and continuous policy development is essential to bring about gender neutrality and treat men and woman equally.

**H. Subrahmanyam (2011)** states *education* is an essential part in woman empowerment; it gives woman the knowledge and creates awareness amongst them. A brief

comparison was made between the past and present rate of education, which significantly showed a drastic improvement in the enrollment rate of girls in the field of education in urban rural areas.

**Venkata Ravi and Venkatraman (2005)** focused on empowerment of woman entrepreneurs through SHG helped woman to maintain work life balance and to control both family matters and career.

**Nayyar et al (2007)** focused on the *qualities and skills* essential for woman to be successful entrepreneurs. Further studied the work life balance is essential to maintain both career and personal life.

**Mathew and Panchanatham (2011)** focused on the role conflict, quality of health, problems in time management, no social support are major hindrances and obstacles of woman on the part of becoming successful entrepreneurs and how the overcome the hurdles are discussed.

#### **Objectives of the Study**

1. To identify the challenges and obstacles in the path of woman entrepreneurs.
2. To know the implication of various government schemes for woman empowerment.
3. To know the importance of woman empowerment for woman entrepreneurs
4. To identify the path through which woman becomes a major contributor towards achieving the 5 trillion economic growth.

#### **Research Methodology**

The type of research used is descriptive research. 10 woman entrepreneurs are studied across various sectors their challenges and obstacles in the way of becoming entrepreneurs are analyzed.

Data is sourced through secondary data which includes journals, research papers and management books. The objective of the study is to analyze the obstacles faced by woman entrepreneurs and provide a solution for the by studying the implication of various government schemes.

#### **Problems Faced By Woman Entrepreneurs**

After analyzing the few woman entrepreneurs, the following were the major obstacle which caused a major hurdle in the path of entrepreneurship

##### **1. Funding**

Initial investment, raising capital and getting loans from the banks is always difficult for woman in comparison to man. The major reason being the credit worthiness of a woman, this is due to the perception that woman's leave the business anytime.

##### **Solution**

The problem of funding arises as there is always a trust issue

with woman entrepreneurs because their skills are doubted and knowledge of the business is suspected. Hence, to eradicate these issues as a mean of obstacle in the path of woman entrepreneur's government of India has come up with the following schemes to help budding woman entrepreneurs overcome the challenges of funding.

- a. Mudra Yojna Scheme
- b. TREAD (Trade Related Entrepreneurship Assistance)
- c. Mahila Udyam Nidhi Scheme
- d. Annapura Scheme
- e. Stree Shakti Package for Woman Entrepreneur

##### **2. Societal Pressure**

In Indian Society males are always given an upper hand and considered superior over woman, thus males do not encourage females to be entrepreneurs and more successful over them due to ego issues. Due to this pattern, many restriction are made on woman which are created by the society. Woman earning money had become a societal stigma There is no family support, woman are expected to spend more time with the family, there is role conflict which she is supposed to address.

##### **Solution**

The Government of India has made many provisions for woman entrepreneurs to build their trust and self-confidence and be in equal power with men. Few initiatives by the Government to support woman entrepreneurs in both rural and urban areas.

- a. Mahila Shakti Kendra-Rural Woman empowerment
- b. Pradhan Mantri Matritva Vandana Yojna- For mothers.
- c. Priyadarshini-Self Help Group
- d. Rajiv Gandhi scheme-for Adolescence girls
- e. Sunkanya Samridhni Yojna-Saving Schemes for girls.

##### **3. Patriarchal Society**

Patriarchy imposes masculinity and feminists character stereotypes in the society which creates inequalities of power between men and women. Woman are considered as Paraya Dhan (liability) thus, denied rights, treated unfairly, and unequally which eventually gives rise to dowry system which is illegal in India yet still in practice.

##### **Solution**

To curb patriarchy system and to promote gender equality government of India has made some provisions:

- a. The Dowry prohibition Act, 1961
- b. The Maternity Benefit Act, 1961
- c. The Pregnancy Act, 1971
- d. The Equal Remuneration Act, 1976
- e. National Commission for Woman Act, 1990

##### **4. New Ideas non- acceptance**

Entrepreneurs are the one who believe in their vision and take risks. The myth in society that woman entrepreneurs

lack the ability, skills and knowledge of the business and hence, their ideas are not accepted by the society versus men who face less struggle in comparison to woman.

#### **Solution**

To bring the paradigm shift and help woman entrepreneurs ease their struggles. The following Government and non-governmental Schemes aided the process of removing obstacles in the way of woman entrepreneurs.

#### **Governmental schemes**

- Credit guarantee schemes new and existing MSME's
- Stand Up India (manufacturing, trading and services)
- Sustainable Finance Scheme
- Bank Credit Facilitation Scheme

#### **Non-governmental schemes**

- Saha fund (woman focused venture capital accepted by SEBI)
- Woman Entrepreneurs in India (to connect woman with abilities and skills)
- SonderConnect (is an organization dedicated to discovering, empowering and promote female Founders Globally)
- Womentum (is a pay it forward nonprofit crowd funding international platform for woman entrepreneurs in developing countries)

#### **5. Work life balance**

Married or unmarried, each have to face struggles in their own way. Unmarried woman

Encounter difficulty at workplace, have to face discrimination, mental harassment, job security issues and indecent behavior of the boss. On the other hand apart from facing the above issues a married woman also has to face additional problems of behavior of her husband and in-laws, problems of social relations, quarrels in family and taking care of children.

#### **Solution**

A woman has to find her own way out to maintain relationship at work and give time to the family. The following solutions can help her strike a proper work life balance.

- Flexible working hours
- Home based business
- Outsource task
- Following a consistent work schedule
- Network with professional associates
- Building support system by nurturing relationships

#### **6. Training**

Training is required to gain knowledge and abilities essential to fulfill the specific requirement of a skill related to a particular business. Woman entrepreneurs to start a business need to have the skills and expertise. Thus skills

can be gained when efforts are made to develop those skills. Development of the skills is possible only when the required and the relevant training is provided.

#### **Solution**

The government of India to encourage woman in rural and urban areas to be self-dependent and encourage the idea of entrepreneurship has laid down various programs and schemes to help woman build confidence.

- Skill India Mission, a mega drive initiated by the ministry of skill development and entrepreneurship through skill training
- Pradhan Mantri Kaushal Vikas Yojna (short term skill training program)
- National Skill Development Corporation (fee based training via wide networks)

#### **7. Illiteracy**

Illiteracy should be equated with ignorance because it brings about lack of awareness. Literacy does not only confide to academics, it is equated to continuous learning which brings about up gradation in knowledge and technology leading to improvement in all spheres. Thus, it is necessary for woman to be educated so that she is aware about the latest trends and copes up with the competition by making the optimum use of her knowledge which she obtained from being educated, because information cannot be converted into knowledge without education.

#### **Solution**

Education is the fundamental right of every citizen of India. Education develops personality and attitude and improves one's knowledge and skills. "If you educate a woman, you educate a family, if you educate a girl, you educate the future" -Queen Rania of Jordan. Realizing the importance of education for woman, Government schemes such as

- Sakshar Bharat Mission for female literacy.
- Kasturba Balika Vidyalaya (establishment of Residential upper primary Schools for girls)
- National Program for Education of Girls at Primary level
- Rastriya Madyamik Shiksha Abhiyan (hostel facilities for secondary education)

#### **8. Safety and Security for woman**

Women's safety is forever at stake Due to the increasing crime rates of domestic violence, dowry, acid attack, rapes, and sexual harassment it discourages other women's to even think before moving out of the house.

#### **Solutions**

- Nirbhaya Fund (safety and security of Woman)
- MHA has launched an online analytical tool for police on 19<sup>th</sup> February, 2019 called "investigation tracking system for sexual offences"

c. Emergency response Support System, which provides a single emergency number (112)

### 9. Glass Ceiling

Glass ceiling is an unacknowledged barrier to advancement in a profession, especially affecting women. Women are deliberately not allowed to move up the hierarchy after a certain point. Even if the woman is fully capable and has she required abilities men would be given preference over women. Thus, to prove her capabilities and talent and the urge to move up the career ladder she has to opt for becoming entrepreneurs.

#### Solution

Equality is the fundamental right the Indian constitution, Preamble and Directive principle focuses to treat men and women equally and to avoid discrimination between men and women To break the ceiling and encourage more women to showcase their talents and prove their worth in the society and to bring both men and women at power. Government schemes such as:

- National commission for woman act of parliament 1990 to safeguard the rights and legal entitlements
- 73<sup>rd</sup> and 74<sup>th</sup> amendment reservation of seats in local bodies' panchayats and municipalities for woman
- Human rights instruments committing to secure equal rights of woman, eliminating all forms of discrimination against woman (CEDAW) in 1993

### 10. Lack of Unity amongst oppressed woman

Women's usually do not bring their problem in open because of the fear of the society. There are many women's who face problems related to sexual harassment, dowry and rape cases. Due to this they face mental torture, depression and even commit suicide. The #METOO movement, was one of the social media movement which actually brought to notice the magnitude of sexual harassment and sexual assault cases in open.

#### Solution

Unity gives strengths to fight against evil doing, when women get united and stand together, this will help them fight against the wrong doing. There are many NGO's and organization which help woman fight against oppression. Some of the NGO's are mentioned below.

- Majlis Manch: Through their program 'Rahat', Majlis Manch's legal center provides socio-legal support to victims of domestic violence and sexual abuse.
- Meer Foundation: a non-profit organization in India, focuses on the rehabilitation of Acid Attack survivors under the work for Women Empowerment
- Jan Sahas Social Development: runs a programme to help rape survivors and their family.

Sr. No.	Entrepreneur	Marital Status	Education	Field	Struggles	Overcome
1	Smita Bhandarkar (Founder of Puro Shakti)	Married	B.Sc. Chemistry, Mass Communication	Pharma	Creative Aspirations, Societal Pressure, Lack of family support, unavailability of raw material, shortage of working capital	Self-reliance, Support from husband and brother
2	AAB Datta (Founder of Mestropedia)	Married	Supporting Graduate,	Healthcare	Work was criticized as women health issues are considered as taboo, societal pressure, creating awareness around the issues	Provided information, clear vision to educate the girl child, communication skills, back to create awareness.
3	Neelima Ladia (Founder of VLCC)	Married	Medical Engineer	Healthcare	Due to the unusual concept, business idea was criticized, medical faculty criticized, No capital	With life insurance, support from husband, Motivation to keep the business fit and healthy
4	Aashita Anar (Founder of Social Resilience Law Compliance Advisors)	Unmarried	Lawyer	Legal	No Self their internal Confidence sometimes,	#METOO movement helped her with the cause, Support from community and self-belief
5	Rhea Meghade (Founder of Bawen Limited)	Married	B.Sc Zoology, Post-graduation from Maharashtra University	Pharma	Lack of funds, health did not provide loan due to new concept, Lack of technology	Detail IPO, Global recognition for getting investment, Self-Motivation
6	Thelma Chandel (Founder of Ladies Women Travel)	Married	B.A. in Arts, Courses in Management at Noida Institute of Management	Travel	Male dominance, People discouraged her because of the perception that holding a job is not a woman business	Company, International, father's support, Skills, Know many languages
7	Sita Sengupta (Founder of Akaji Tailors)	Unmarried	Arts and Crafts, Noida Institute of Design	Arts	Family pressure to start a job, Lack of capital, Failure of business	Father's support, capital from her Zer T.V. channel, motivated her to do better
8	Kalpana Bhat (Founder of Kalpana's Kitchen)	Married	A. Arts, Schooling	Food	Menial at the age of 13 and divorced, Societal norms, Lack of education, Lack of capital	Support from her Mother, Photo Release of the TV show, Support from her father and uncle
9	AAB Anand (Founder of Sahib)	Unmarried	Graduate from Thapar University, MBA from Chicago	Education	Education's deep technology platform necessary to build was a challenge, Getting investors, shareholders and employees was a challenge	Wanted to be strong to educate India, Detail investment by Kalpana capital and Lightbox, Mumbai Anand's (MCA) bought 75% stake in Sahib
10	Rina Lakshmi (Founder of Dapp)	Married	Diploma Graduate in cooking, 2 Part time courses (Certificate and teacher certificate)	Food	Failure in college, lack of investment, competition	Acceptance of failure, Detailed positive research and strong market to succeed drove her vision, financial support from mother

### CONCLUSION

The study concludes that empowerment is crucial to accelerate woman entrepreneurship. Women are venturing in all sectors of enterprises, thus woman entrepreneurs are considered to be the most important economic agents for economic development of the country. Empowerment gives women the right to participate in society and economy in par with men.

We need to empower every oppressed so that they can be participant of our 5 trillion economy. On the basis of gender women are the most oppressed they can be uplifted and can become a major contributor for our country's growth. If the leader is chosen from the oppressed she will be the best

leader, because she has faced all the difficulties and then overcome it.

On the basis of above argument we can conclude that women entrepreneurship is the only way through which major population of the society i.e. Women can get employment and become a workforce that can force down the evil of poverty and pull up the economy of our country.

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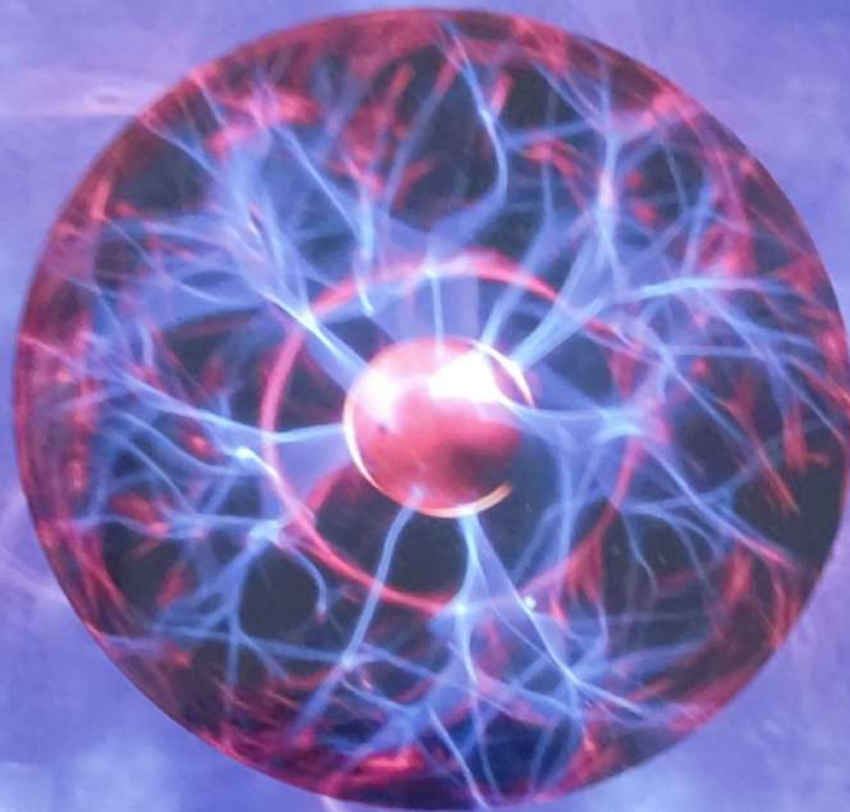


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## Study on Social Maturity Level of Junior College Students and its Impact

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### Abstract

The study has been conducted on a sample of 80 junior college students selected from Rizvi college of Arts, Science and Commerce, Bandra, Mumbai. A standardized tool of Social Maturity Scale, constructed by Nalini Rao was used which contains 90 items for measuring different aspect of Social maturity. The respondents were required to indicate their view on four point scale i.e. Strongly Agree, Agree, Disagree and Strongly Disagree. The findings shows that the social maturity score of F.Y.J.C students is more than S.Y.J.C students. The level of social maturity of male students is little higher than female students. The level of social maturity of Marathi medium students is highest. The level of social maturity of Hindi medium school students is lowest.

Social maturity involves learning to properly relate to acquaintances, family, neighbors, friends, and relationships; involves understanding how to honor and respect those in authority. It means knowing what to do and striving for it to reach the desired level of acceptable social behavior. Social maturity is a long process to be socially mature. It is process of proper attitude or behavior of an individual which is essential for functioning effectively in the society.

**Keywords:** Social Maturity, Personal Adequacy, Interpersonal Adequacy, Social Adequacy.

### Introduction

Social maturity involves learning to properly relate to acquaintances, family, neighbors, friends, and relationships. It involves understanding how to honor and respect those in authority. It means knowing what to do and striving for it to reach the desired level of acceptable social behavior. Social maturity is a long process to be socially mature. It is process of proper attitude or behavior of an individual which is essential for functioning effectively in the society.

#### The Nature of Social Maturity

The maturity of a student is influenced by various social factors as under:

(i) **Concept of dependence:** Independence: An individual is required to modify his behavior in terms of asserting his

independence and seeking aid or relief in the socio cultural context.

(ii) **Self Control:** Self-control as a part of social maturity is necessary for decision making and facing the consequences. Acquiring self-control is partly maturational and partly learnt behavior. The student studying in a secondary school understands that society does not expect him to regress to childhood behavior at this age so he attempts at coming up to the expectations of the society and this he achieves by controlling his behavior.

(iii) **Stress:** Everybody has to overcome stress. Every time there comes stress situation. A mature individual mobilizes the available resources and utilize them to the best of his ability to overcome the stress.

(iv) **Social maturation:** Socially mature are aware of their

**Interpretation:** The mean of Social Maturity of students who completed their schooling from English medium is 239.1111, students who completed their schooling from Marathi medium is 249.25, students who completed their schooling from Urdu medium is 228.3846 and students who completed their schooling from Hindi medium is 236.

**Discussion:** The level of social maturity of Marathi medium is highest. The level of social maturity of Hindi medium school is lowest. This may be because Marathi medium students make more friends and participate in activities.

### Major Findings and Discussion

After processing the data, obtaining and interpreting the results, the findings have been discussed below. These findings can be generalized to the extent of representativeness of the sample and methodology employed in the study.

It is devoted to focusing the findings, conclusions, discussion of results of this study and for indicating their implications and suggestions for further studies or research.

- The social maturity score of F.Y.J.C students is more than S.Y.J.C students. This may be because S.Y.J.C students are more involved in studies other than social activities of the college.
- The level of social maturity of males is little higher than females. This may be because males are often socially involved. Females are less involved with others.
- The level of social maturity of Marathi medium is highest. The level of social maturity of Hindi medium school is lowest. This may be because Marathi medium students make more friends and participate in activities.

### Educational Implications

Social Maturity among adolescents in the age group of 17-18 plays a very important role in their life. Though the present study was restricted to only a number of 80 students of Mumbai, its findings have important educational implications for parents, teachers, counselors, administrators etc. Parents at home and teachers at school always play a major role in influencing and developing social maturity. They may channelize an adolescent's energy into constructive dimension. By encouraging students to work to the best of their ability and by being genuinely interested in their progress, teachers can enhance the self-esteem of students, regardless of their talent. Parents can do the same and by encouraging their children to participate in extracurricular activities that match their talent, further promote self-esteem. The teacher should

engage class in a good debate. Students should learn in group discussions. Students should be involved in activities that enhance the ability to think with maturity. The present study has given a clear picture of the current situation to help and identify the factors responsible for creating problems in the life of adolescents and how they can be helped.

### Summary And Conclusion

The ultimate aim of effective social development is the attainment of social maturity. A social mature adult shows a few important characteristics. He is able to adapt himself successfully to his fellowmen and to adapt his fellowmen to himself. It includes such behavioral forms as group compatibility, kindness and sympathy, fair play emotional adjustability, courtesy and politeness, dependability, self-confidence, co-operation, leadership and cheerfulness.

A socially mature individual should be able to make judgments, decisions and take proper action in face of problems and critical issues. He should be able to participate in cooperative activities without conflict with others. He is capable of taking responsibility for his own actions, and of making and keeping a large number of friends. He has a well-balanced and objective estimate of himself and can take on himself different roles in accordance with the demand of different situations. He identifies with the interests of the group and puts the group benefits before his selfish gains.

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**EDITOR-IN-CHIEF**  
**Dr. (Mrs.) Anjum Ara M. K. Ahmad**



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## A Study on Impact of Empowerment on Woman Entrepreneurs in India

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### Abstract

*A powerless needs and struggles for power so that one can become so empowered that one can enjoy the upper strata status. Similarly, same fundamental can be applied in entrepreneurship where one upgrades oneself from being employee to employer.*

*We can clearly see that there is an up gradation from powerless to empower or from job seeker to job giver. I.e. an entrepreneur. This differentiation between the two I.e. (i) empowerment and (ii) entrepreneur can be seen across the globe with different intensity. This differentiation is amongst various religion, culture, race and religion.*

*But one thing is common amongst above demographical component is power differentiation between male and female, which also creates base for differential rate of entrepreneurship between males and females. LGBTQ community is also our societal part but they are still in a phase of recognition. Thus to rule out this difference, need for woman empowerment for woman entrepreneurship is required.*

*Empowerment is nothing but, a process of becoming stronger and more confident especially in controlling one's life and clamming one's rights. Whereas, woman entrepreneurship is a process in which woman initiates a business, gathers all resources, undertakes risks, faces challenges and provides employment to others and manages the business. But, due to family and societal pressure gender discrimination and stereotypical patriarchal society she is suppressed and unable to display her knowledge, skills and abilities. Thus, to showcase her talents and abilities empowerment is required.*

*With the help of descriptive research, we will examine various eminent woman entrepreneurs' struggles and problems they faced. Find out the results of how they overcame the challenges by making use of the available situational opportunities and made their essential contribution to achieve the goal of 5 trillion economies.*

**Keywords:** woman entrepreneurs, empowerment, challenges, opportunities

### Introduction

Women are an important section of the society, hence empowering woman to be an entrepreneur is essential for the socio-economic and political progress of India as 1/3<sup>rd</sup> of the budding entrepreneurs in India are woman which contribute to a major share in achieving India's 5 trillion economy. Due to male dominance it is nearly impossible for them to reach their goal. Thus, to remove the gender biasness and to create neutrality between men and woman giving power to woman is the need of the hour to treat them in level with men. For woman to achieve their vision and have faith in it, determination, believe in one's ideas, skills and abilities are required and this is possible only when woman are being empowered. Woman entrepreneurs face

various hurdles and barriers which are pulling them back in achieving their dream.

### Review of Literature

This literature states the areas where woman empowerment relevant issues have already being articulated.

**Dufflo E. (2011)** states the weak relationship between Empowerment and *Development*. It further states that to improve the prevailing condition and better the situation it is essential to be self-sustaining and continuous policy development is essential to bring about gender neutrality and treat men and woman equally.

**H. Subrahmanyam (2011)** states *education* is an essential part in woman empowerment; it gives woman the knowledge and creates awareness amongst them. A brief

comparison was made between the past and present rate of education, which significantly showed a drastic improvement in the enrollment rate of girls in the field of education in urban rural areas.

**Venkata Ravi and Venkatraman (2005)** focused on empowerment of woman entrepreneurs through SHG helped woman to maintain work life balance and to control both family matters and career.

**Nayyar et al (2007)** focused on the *qualities and skills* essential for woman to be successful entrepreneurs. Further studied the work life balance is essential to maintain both career and personal life.

**Mathew and Panchanatham (2011)** focused on the role conflict, quality of health, problems in time management, no social support are major hindrances and obstacles of woman on the part of becoming successful entrepreneurs and how the overcome the hurdles are discussed.

#### **Objectives of the Study**

1. To identify the challenges and obstacles in the path of woman entrepreneurs.
2. To know the implication of various government schemes for woman empowerment.
3. To know the importance of woman empowerment for woman entrepreneurs
4. To identify the path through which woman becomes a major contributor towards achieving the 5 trillion economic growth.

#### **Research Methodology**

The type of research used is descriptive research. 10 woman entrepreneurs are studied across various sectors their challenges and obstacles in the way of becoming entrepreneurs are analyzed.

Data is sourced through secondary data which includes journals, research papers and management books. The objective of the study is to analyze the obstacles faced by woman entrepreneurs and provide a solution for the by studying the implication of various government schemes.

#### **Problems Faced By Woman Entrepreneurs**

After analyzing the few woman entrepreneurs, the following were the major obstacle which caused a major hurdle in the path of entrepreneurship

##### **1. Funding**

Initial investment, raising capital and getting loans from the banks is always difficult for woman in comparison to man. The major reason being the credit worthiness of a woman, this is due to the perception that woman's leave the business anytime.

##### **Solution**

The problem of funding arises as there is always a trust issue

with woman entrepreneurs because their skills are doubted and knowledge of the business is suspected. Hence, to eradicate these issues as a mean of obstacle in the path of woman entrepreneur's government of India has come up with the following schemes to help budding woman entrepreneurs overcome the challenges of funding.

- a. Mudra Yojna Scheme
- b. TREAD (Trade Related Entrepreneurship Assistance)
- c. Mahila Udyam Nidhi Scheme
- d. Annapura Scheme
- e. Stree Shakti Package for Woman Entrepreneur

##### **2. Societal Pressure**

In Indian Society males are always given an upper hand and considered superior over woman, thus males do not encourage females to be entrepreneurs and more successful over them due to ego issues. Due to this pattern, many restriction are made on woman which are created by the society. Woman earning money had become a societal stigma. There is no family support, woman are expected to spend more time with the family, there is role conflict which she is supposed to address.

##### **Solution**

The Government of India has made many provisions for woman entrepreneurs to build their trust and self-confidence and be in equal power with men. Few initiatives by the Government to support woman entrepreneurs in both rural and urban areas.

- a. Mahila Shakti Kendra-Rural Woman empowerment
- b. Pradhan Mantri Matritva Vandana Yojna- For mothers.
- c. Priyadarshini-Self Help Group
- d. Rajiv Gandhi scheme-for Adolescence girls
- e. Sunkanya Samridhni Yojna-Saving Schemes for girls.

##### **3. Patriarchal Society**

Patriarchy imposes masculinity and feminists character stereotypes in the society which creates inequalities of power between men and women. Woman are considered as Paraya Dhan (liability) thus, denied rights, treated unfairly, and unequally which eventually gives rise to dowry system which is illegal in India yet still in practice.

##### **Solution**

To curb patriarchy system and to promote gender equality government of India has made some provisions:

- a. The Dowry prohibition Act, 1961
- b. The Maternity Benefit Act, 1961
- c. The Pregnancy Act, 1971
- d. The Equal Remuneration Act, 1976
- e. National Commission for Woman Act, 1990

##### **4. New Ideas non- acceptance**

Entrepreneurs are the one who believe in their vision and take risks. The myth in society that woman entrepreneurs

lack the ability, skills and knowledge of the business and hence, their ideas are not accepted by the society versus men who face less struggle in comparison to woman.

#### **Solution**

To bring the paradigm shift and help woman entrepreneurs ease their struggles. The following Government and non-governmental Schemes aided the process of removing obstacles in the way of woman entrepreneurs.

#### **Governmental schemes**

- a. Credit guarantee schemes new and existing MSME's
- b. Stand Up India (manufacturing, trading and services)
- c. Sustainable Finance Scheme
- d. Bank Credit Facilitation Scheme

#### **Non-governmental schemes**

- a. Saha fund (woman focused venture capital accepted by SEBI)
- b. Woman Entrepreneurs in India (to connect woman with abilities and skills)
- c. SonderConnect (is an organization dedicated to discovering, empowering and promote female Founders Globally)
- d. Womentum (is a pay it forward nonprofit crowd funding international platform for woman entrepreneurs in developing countries)

#### **5. Work life balance**

Married or unmarried, each have to face struggles in their own way. Unmarried woman

Encounter difficulty at workplace, have to face discrimination, mental harassment, job security issues and indecent behavior of the boss. On the other hand apart from facing the above issues a married woman also has to face additional problems of behavior of her husband and in-laws, problems of social relations, quarrels in family and taking care of children.

#### **Solution**

A woman has to find her own way out to maintain relationship at work and give time to the family. The following solutions can help her strike a proper work life balance.

- a. Flexible working hours
- b. Home based business
- c. Outsource task
- d. Following a consistent work schedule
- e. Network with professional associates
- f. Building support system by nurturing relationships

#### **6. Training**

Training is required to gain knowledge and abilities essential to fulfill the specific requirement of a skill related to a particular business. Woman entrepreneurs to start a business need to have the skills and expertise. Thus skills

can be gained when efforts are made to develop those skills. Development of the skills is possible only when the required and the relevant training is provided.

#### **Solution**

The government of India to encourage woman in rural and urban areas to be self-dependent and encourage the idea of entrepreneurship has laid down various programs and schemes to help woman build confidence.

- a. Skill India Mission, a mega drive initiated by the ministry of skill development and entrepreneurship through skill training
- b. Pradhan Mantri Kaushal Vikas Yojna (short term skill training program)
- c. National Skill Development Corporation (fee based training via wide networks)

#### **7. Illiteracy**

Illiteracy should be equated with ignorance because it brings about lack of awareness. Literacy does not only confide to academics, it is equated to continuous learning which brings about up gradation in knowledge and technology leading to improvement in all spheres. Thus, it is necessary for woman to be educated so that she is aware about the latest trends and copes up with the competition by making the optimum use of her knowledge which she obtained from being educated, because information cannot be converted into knowledge without education.

#### **Solution**

Education is the fundamental right of every citizen of India. Education develops personality and attitude and improves one's knowledge and skills. "If you educate a woman, you educate a family, if you educate a girl, you educate the future" -Queen Rania of Jordan. Realizing the importance of education for woman, Government schemes such as

- a. Sakshar Bharat Mission for female literacy.
- b. Kasturba Balika Vidyalaya (establishment of Residential upper primary Schools for girls)
- c. National Program for Education of Girls at Primary level
- d. Rastriya Madyamik Shiksha Abhiyan (hostel facilities for secondary education)

#### **8. Safety and Security for woman**

Women's safety is forever at stake Due to the increasing crime rates of domestic violence, dowry, acid attack, rapes, and sexual harassment it discourages other women's to even think before moving out of the house.

#### **Solutions**

- a. Nirbhaya Fund (safety and security of Woman)
- b. MHA has launched an online analytical tool for police on 19<sup>th</sup> February, 2019 called "investigation tracking system for sexual offences"

c. Emergency response Support System, which provides a single emergency number (112)

### 9. Glass Ceiling

Glass ceiling is an unacknowledged barrier to advancement in a profession, especially affecting women. Women are deliberately not allowed to move up the hierarchy after a certain point. Even if the woman is fully capable and has she required abilities men would be given preference over women. Thus, to prove her capabilities and talent and the urge to move up the career ladder she has to opt for becoming entrepreneurs.

#### Solution

Equality is the fundamental right the Indian constitution, Preamble and Directive principle focuses to treat men and women equally and to avoid discrimination between men and women To break the ceiling and encourage more women to showcase their talents and prove their worth in the society and to bring both men and women at power. Government schemes such as:

- National commission for woman act of parliament 1990 to safeguard the rights and legal entitlements
- 73<sup>rd</sup> and 74<sup>th</sup> amendment reservation of seats in local bodies' panchayats and municipalities for woman
- Human rights instruments committing to secure equal rights of woman, eliminating all forms of discrimination against woman (CEDAW) in 1993

### 10. Lack of Unity amongst oppressed woman

Women's usually do not bring their problem in open because of the fear of the society. There are many women's who face problems related to sexual harassment, dowry and rape cases. Due to this they face mental torture, depression and even commit suicide. The #METOO movement, was one of the social media movement which actually brought to notice the magnitude of sexual harassment and sexual assault cases in open.

#### Solution

Unity gives strengths to fight against evil doing, when women get united and stand together, this will help them fight against the wrong doing. There are many NGO's and organization which help woman fight against oppression. Some of the NGO's are mentioned below.

- Majlis Manch: Through their program 'Rahat', Majlis Manch's legal center provides socio-legal support to victims of domestic violence and sexual abuse.
- Meer Foundation: a non-profit organization in India, focuses on the rehabilitation of Acid Attack survivors under the work for Women Empowerment
- Jan Sahas Social Development: runs a programme to help rape survivors and their family.

Sr. No	Entrepreneur	Marital Status	Education	Field	Struggles	Overcome
1	Smita Bhandarkar (Founder of Puro Shakti)	Married	B.Sc. Chemistry, Mass Communication	Pharma	Creative Aspirations, Societal Pressure, Lack of family support, unavailability of raw material, shortage of working capital	Self-reliance, Support from husband and brother
2	AAB Ghose (Founder of Mestropedia)	Married	Supporting Graduate,	Healthcare	Work was criticized as women health issues are considered as taboo, societal pressure, creating awareness around the issues	Provided information, clear vision to educate the girl child, communication skills, back to create awareness.
3	Neelima Lohar (Founder of VLCC)	Married	Medical Engineer	Healthcare	Due to the unusual concept, business idea was criticized, medical faculty criticized, No capital	With life insurance, support from husband, Motivation to keep the business fit and healthy
4	Aashita Anar (Founder of Social Resilience Law Compliance Advisors)	Unmarried	Lawyer	Legal	No Self their internal Confidence sometimes,	#METOO movement helped her with the cause, Support from community and self-belief
5	Rhea Mopande Shah (Chairwoman of Bawaas Limited)	Married	B.Sc Zoology, Post-graduation from Maharashtra State Milk Producers University	Pharma	Lack of funds, health did not provide loan due to new concept, Lack of technology	Detail IPO, Global recognition for getting investment, Self-Motivation
6	Thelma Chandel (Founder of Ladies Women Travel)	Married	B.A. in Arts, Courses in Management at Noida Institute of Management	Travel	Male dominance, People discouraged her because of the perception that holding a job is not a woman business	Company, International, father's support, Skills, Know many languages
7	Sita Sengupta (Founder of Akaji Tailors)	Unmarried	Arts and Crafts (MA) holder in paper sculpture in cooperation	Arts	Family pressure to start a work, Lack of capital, Failure of business	Father's support, capital from Dr. T. V. Pillay, motivation her to do better
8	Kalpana Bora (Owner of a restaurant (Chairwoman of Karmah concept)	Married	A. Arts Schooling	Food	Menial at the age of 13 and divorced, Societal norms, Lack of education, Lack of capital	Support from Mother, Niece, Support from her father and uncle
9	AAB Avasthi (Founder of Sahibni)	Unmarried	Graduate from Thapar University, MBA from Chicago	Education	Education's deep technology platform necessary to build was a challenge, Getting investors, shareholders and employees was a challenge	Wanted to be strong to educate India, Detail investment by Kalpana capital and Lightbulb, Mahesh Avasthi's (DIL) bought 75% stake in Sahibni
10	Shiva Laksh (Founder of Dapphi)	Married	Diploma Graduate in cooking, 2 Part time courses (Certificate and teacher certificate)	Food	Failure in college, lack of investment, competition	Acceptance of failure, Detailed positive research and strong resolve to succeed drove her vision, financial support from mother

### CONCLUSION

The study concludes that empowerment is crucial to accelerate woman entrepreneurship. Women are venturing in all sectors of enterprises, thus woman entrepreneurs are considered to be the most important economic agents for economic development of the country. Empowerment gives women the right to participate in society and economy in par with men.

We need to empower every oppressed so that they can be participant of our 5 trillion economy. On the basis of gender women are the most oppressed they can be uplifted and can become a major contributor for our country's growth. If the leader is chosen from the oppressed she will be the best

leader, because she has faced all the difficulties and then overcome it.

On the basis of above argument we can conclude that women entrepreneurship is the only way through which major population of the society i.e. Women can get employment and become a workforce that can force down the evil of poverty and pull up the economy of our country.

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## Effect of chromium on basic growth factors of *Pennisetum glaucum* L.

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**Abstract:** One of the main concerns of agricultural production is heavy metal pollutants. The industrialization has resulted in the heavy metal contamination of agricultural soil and ecosystems. Metals are a natural component of the earth, it is when their concentration increases from natural levels, ecological deterioration occurs. In the present study, transplant experiments were conducted to evaluate the effect of chromium-contaminated soil in *Pennisetum glaucum* L. The seeds growing in petridishes were exposed to chromium, in increasing concentrations of 1, 3, 5, 10, 50, 100, 200, 300, 500 ppm. Each treatment was replicated in a randomized design and observed over a period of 7 days. The seedlings were studied for their response based on germination rate, seed vigour index, length of the radicle, length of plumule, and fresh weight against seeds germinated using distilled water as a control. Five different chromium concentrations i.e., 5, 10, 50, 100 & 200 ppm, were applied to the plants. Each treatment was replicated in a randomized design and observed for 45 days. The plants were studied for the length of root, length of shoot, fresh weight, total chlorophyll content, protein content, and heavy metal analysis compared to a set irrigated using distilled water as a control. The root and shoot lengths decreased with an increase in Cr concentrations in the transplants. A gradual decrease was observed in the selected parameters, with an increase in Cr levels. The values related well with increased Phyto-accumulation of chromium within the tissues of both roots and shoots. It was observed that chromium's harmful effects on all the parameters were directly proportional to the concentration of solution employed, with the inhibition of growth being more pronounced from 50 ppm onwards. As *Pennisetum glaucum* L. an edible crop despite showing a good potential for application in phytoremediation techniques, it can't be used to hyper accumulate chromium to remove it from the soil.

**Keywords:** Chromium; germination; transplants; toxicity; phytoremediation; *Pennisetum glaucum* L.

### Introduction

The term heavy metal denotes metals whose density is higher than 4 g/cm<sup>3</sup>. (Hawkes, 1997) Industrial development and urbanization have raised metals in soil, aquatic ecosystems, and the atmosphere. Some of these essential trace metals like zinc & copper act as activators of enzymatic reactions, forming metal substrate complexes (Mildvan, 1970). However, these essential metals are considered toxic when present in excessive amounts (Blay lock and Huang, 2000). A number of other heavy metals such as Cd, Hg, Cr, and As are toxic, leading to growth inhibition and death. Iron is also one of the heavy metals essential for plants and animals (Wintz *et al.* 2002). Heavy metals have been discussed to cause oxidative stress by

catalyzing the formation of OH free radicals. (Fryzova R. *et al.* 2017).

Recent concerns regarding environmental pollution have given rise to developing various technologies to clean up the environment. Conventional methods of remediation and chemical methods are costly and do not produce optimum results. One of the emerging techniques to clean up contaminated soil and water is phytoremediation. This method has been eco-friendly, affordable, and an effective solution to remove heavy metal pollutants from contaminated soil. Hyper-accumulator plants have been reported to concentrate more than 10 mg/kg of mercury (Hg), 100 mg/kg of cadmium (Cd), 1000 mg/kg of cobalt (Co),

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chromium (Cr), copper (Cu), and lead (Pb), 10000 mg/kg of zinc (Zn) and nickel (Ni) (Baker and Brooks, 1989). Based on the environmental monitoring reports, edible crops grown in these contaminated soils to accumulate metals in quantities higher than permissible limits and are capable of causing health problems in animals and human beings consuming these plants (Tiller, 1986).

Several researchers have experimented with and reported the accumulation and uptake of chromium by various crops, *Arachis hypogaea* and *Cicer arietenum* (Imam Khasim D. *et al.* 1994); *Ablemoschus esculentum* (Jasuja K. *et al.* 1997). Jayaprakash *et al.* 1994 reported chromium's effect on chromosomal aberration and reduced mitotic activity in *Allium cepa*. Purohit *et al.* 2003 reported a reduction in the length of root and shoot and decreased biomass in *Solanum melongena* and *Solanum lycopersicum* upon being treated with increasing chromium concentration.

The traditional method of heavy metal stabilization in the soil is excavation and removal, it is known to be disruptive to the environment and presents us with a problem of generated waste and is an expensive process. Another viable alternative is soil amendments in-situ to decrease the bioavailability of heavy metals, it is a less disruptive and cost-effective alternative. Recently phytostabilization of heavy metal contaminated land has emerged as a low-cost and environment-friendly alternative to traditional remediation techniques. Phytovolatilization, sequestration, microbial extraction are some of the methods employed in phytoremediation.

#### **Chromium (Cr) - Selected heavy metals as a contaminant**

Chromium is a natural element in the soil, yet the increasing concentration makes it a potential toxin. In low doses, it is considered a necessary element in human and animal

nutrition, however, large quantities have been known to cause devastating effects on humans, animals, and plants. Cr<sup>3+</sup> is one of the elements essential in low concentrations for human health, but long-term exposure to it has been reported to cause dermatitis, shortness of breath, ulceration of septum, bronchitis, pneumonia, and pulmonary problems, kidney disorders, weakened immunity, and may cause cancer.

Studies have suggested that chromium acts as a stimulant for plant growth, but certain studies have shown otherwise that it does more harm than good, posing more of a health concern in modern times due to industrialization. The problem of soil pollution due to industrial advancement has become a severe threat in India. Effluents from distilleries, electroplating plants, fertilizer and pesticide units, steel and paper industries, pharmaceuticals, petrochemical, oil refineries, thermal power plants, textile, tannery and dye industries are a source of pollutants with chromium.

Large amounts of chromium have been found in agricultural soils due to organic waste as fertilizers and wastewater for irrigation. Chromium does not degrade biologically and will remain stable for several months in the soil without changing its oxidation state. Chromium exists in several oxidation states, but the most stable and common forms are Cr (0), the trivalent Cr<sup>3+</sup>, and the hexavalent Cr<sup>6+</sup> species. The valency of chromium plays an important role in determining its toxicity, Cr<sup>6+</sup> is highly toxic and soluble compared to Cr<sup>3+</sup> as it cannot quickly transfer across cell membranes (Mertz, 1992). Phytotoxic symptoms include inhibition of seed germination, reduced root, shoot growth, and adverse effects on physiological processes. Higher concentrations of chromium also produce an adverse effect on several physiological parameters such as

reduction of the rate of photosynthesis, impairment of mineral nutrition (Sundara Moorthy, *et al.* 2010), causing oxidative stress (Shanker *et al.* 2005), leaf chlorosis, and depressed biomass (Sharma *et al.* 1995) ultimately leading to loss of plant life.  $\text{Cr}^{3+}$  is considered a micronutrient in humans, being necessary for sugar and lipid metabolism (Agency for Toxic Substances and Disease Registry, 2000) instead of  $\text{Cr}^{6+}$ , which is considered a carcinogen and can enter the human body through consumption of contaminated plant material. The Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health, 2007, recommends soil should contain less than 64mg/kg of total chromium and 0.4mg/kg of the form hexavalent chromium. The permissible limit of chromium for plants is 1.30mg/kg recommended by WHO.

Chromium (Cr) has been selected as a test metal since it has been employed in the leather industry, steel, and chemicals, to name a few. Since the effects and uptake of  $\text{Cr}^{6+}$  on *Pennisetum glaucum* L. have not been extensively studied yet; the present study was conducted to understand the  $\text{Cr}^{6+}$  toxicity by observing the morphological and physiological responses stress. Therefore, our study focuses on chromium's role in plant growth, emphasizing that *Pennisetum glaucum* L. as a potential candidate for phytoremediation of chromium from contaminated sites.

## Material and Methods

**A) Plants Selected:** The seeds of *Pennisetum glaucum* L. were purchased from a local seed dealer.

### B) Heavy metal treatment:

A 1000 ppm stock solution was prepared for the selected heavy metal. This was then diluted to prepare 1, 3, 5, 10, 50, 100, 200, 300, 500 ppm to treat seeds. All the standards were prepared by non - serial dilutions.

Chromium - Accurately weighed 2.828 g of 99.9 % of analytical grade Potassium dichromate ( $\text{K}_2\text{Cr}_2\text{O}_7$ ) in 1000 mL of distilled water.

### C) Experimental studies:

Ten surface-sterilized seeds of each species uniform in color, weight, and size were selected and individually placed in a Petri dish of 9 cm diameter on double-layered filter paper. The filter paper was moistened with varying concentrations of heavy metal solutions with 5 ml on the first day, followed by 2 ml on alternate days for 7 days or depending on the moisture every day. Each experiment's triplicates were studied in a completely randomized design and a separate control series using distilled water. Plants of *Pennisetum glaucum* L. were grown in bags filled with garden soil using cuttings after 15 days of growth. One sapling was grown in each bag, and each treatment was replicated in a randomized design. Normal growth conditions were provided to all the plants for their growth. The plants were grown for 15 days before treatment application and continued for 45 days after treatment application of 5, 10, 50, 100, 200 ppm i.e. before harvest.

### D) Selection of plant parameters:

Following morphological characters were noted: Length of the root (cm), length of the shoot (cm), and fresh weight (g) of the plants after 45 days using a centimeter-scale and a digital balance. Biochemical tests were performed for recording the Chlorophyll Content - (Arnon's Method, 1949), Total Protein Content - (Lowry's Method, 1951), and Heavy Metal Analysis for chromium was done on the Inductive Coupling Plasma Atomic Absorption Spectroscopy (ICP - AAS) facility.

### E) Statistical analysis:

To determine the significance between samples, a "Student's t - test" was carried out at  $p < 0.05$  level of significance. The data were analyzed using analysis of variance (ANOVA). Box and

Whiskers plot, along with histograms, were used for data analysis. Statistical analysis was carried out using SPSS software version 11.0.

**Result and Discussion**

**Effect of Chromium on Total Germination (%)**

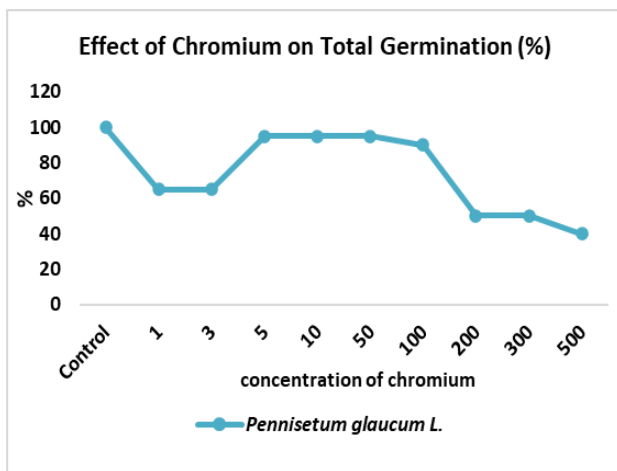
The present study showed a trend that higher chromium concentrations affected the plants' germination (Table 1, Figure 1). The total germination of the selected plants subjected to the highest chromium concentrations showed a significant difference compared to control. *Pennisetum glaucum* L. showed 90% at 100 ppm, and the least was 40% observed at 500 ppm.

**Table 1.** Effect of Chromium on Total Germination (%)

Ppm	<i>Pennisetum glaucum</i> L.
Control	100
1	65
3	65
5	95
10	95
50	95
100	90
200	50
300	50
500	40

values are an average of 30 samples.

**Figure 1.** Trend graph showing the effect of chromium on total germination (%)



**Effect of Chromium on the Length of Radicle**

**Table 2.** Effect of Chromium on Length of Radicle (cm)

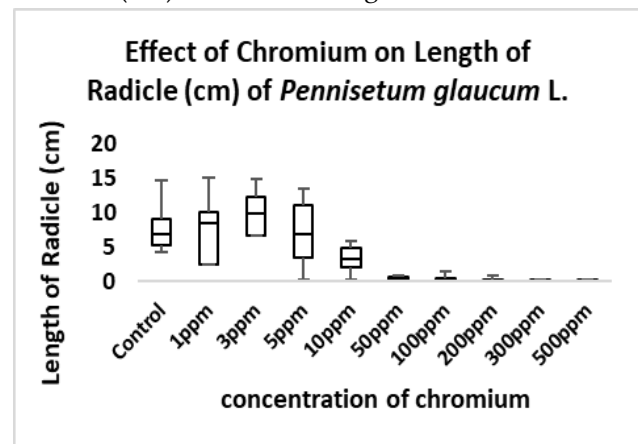
Ppm	Length of radicle	Length of plumule	Fresh weight
Control	7.63±3.10	5.95±1.10	0.0663±0.01
1	7.47±3.45**	3.98±1.74*	0.0642±0.02**
3	9.89±2.75#	5.13±1.29*	0.0462±0.01*
5	7.12±3.84**	4.58±1.29#	0.0629±0.03#
10	3.30±1.66*	4.91±1.19*	0.0444±0.01**
50	0.41±0.26*	2.96±1.67*	0.0321±0.01**
100	0.32±0.32*	2.4±1.07*	0.0296±0.01**
200	0.17±0.18*	1.27±0.72*	0.0199±0.00#
300	0.14±0.60*	0.94±0.40*	0.0178±0.00*
500	0.13±0.05*	0.49±0.46*	0.0141±0.00*

\*significant at p < .01 \*\* not significant at p < .05

#significant at p < .05 values are average of 30 samples

*Pennisetum glaucum* L.: The length of the control value was 7.63 cm. The highest length was 9.89 cm at 3 ppm and 0.13cm at 500ppm. (Fig. 2)

**Figure 2.** Effect of Chromium on Length of Radicle (cm) of *Pennisetum glaucum* L.



**Effect of Chromium on Length of Plumule**

**Table 3.** Effect of Chromium on Length of Plumule (cm)

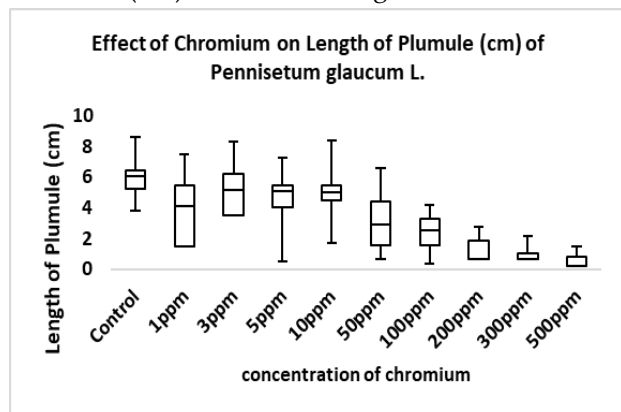
Ppm	<i>Pennisetum glaucum</i> L.
Control	5.95±1.10
1	3.98±1.74*
3	5.13±1.29*
5	4.58±1.29#
10	4.91±1.19*
50	2.96±1.67*
100	2.4±1.07*

200	1.27±0.72*
300	0.94±0.40*
500	0.49±0.46*

\*significant at p < .01 \*\* not significant at p < .05  
#significant at p < .05 values are average of 30 samples.

**Pennisetum glaucum L.:** Seedlings had a maximum value of 5.13cm length of plumule at 3 ppm and the lowest average length of plumule of 0.49cm at 500ppm. 5ppm and 10ppm concentrations also showed a length of 4.91cm and 4.98cm. The control values were 5.95 cm. (Fig 3)

**Figure 3.** Effect of Chromium on Length of Plumule (cm) of *Pennisetum glaucum L.*



**Effect of Chromium on Fresh weight**

**Table 4.** Effect of Chromium on Fresh weight (g)

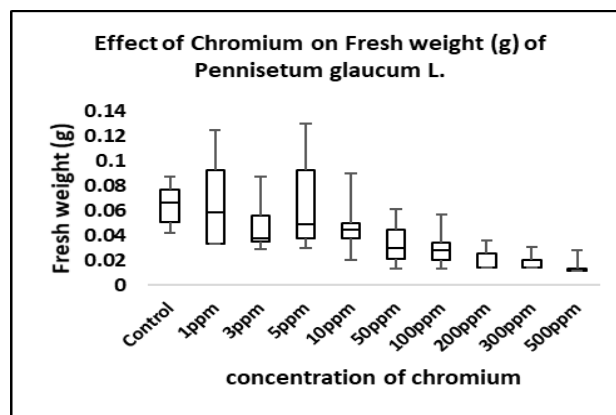
Ppm	<i>Pennisetum glaucum L.</i>
Control	0.0663±0.01
1	0.0642±0.02**
3	0.0462±0.01*
5	0.0629±0.03#
10	0.0444±0.01**
50	0.0321±0.01**
100	0.0296±0.01**
200	0.0199±0.00#
300	0.0178±0.00*
500	0.0141±0.00*

\*significant at p < .01 \*\* not significant at p < .05  
#significant at p < .05 values are average of 30 samples

**Pennisetum glaucum L.:** The lowest values of fresh weight were recorded in *Pennisetum glaucum L.* plants. Maximum fresh weight of

0.0663g for control followed by 0.0642g was noted at 1ppm and 0.0141g was the lowest average fresh weight at 500pppm. (Fig 4)

**Figure 4.** Effect of Chromium on Fresh weight (g) of *Pennisetum glaucum L.*



**Effect of Chromium on Seed Vigour Index (SVI)**

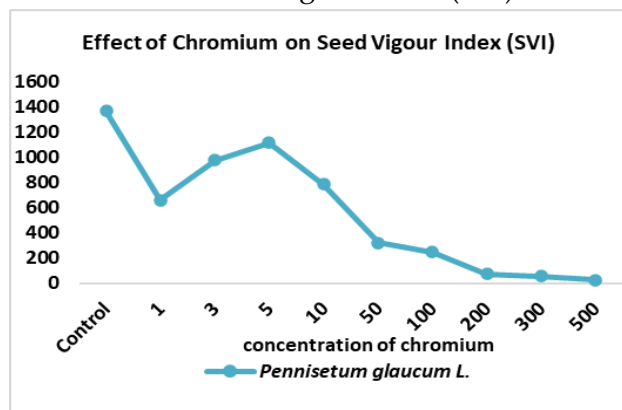
Based on the collective data of the total germination percentage and early seedling growth, which shows a decline in the overall length of radicle, plumule, and fresh weight, the SVI also follows a similar trend for the selected plant. All the plants showed a significant drop in SVI with an increasing concentration of chromium. *Pennisetum glaucum L.* recorded a drop in vigor from 1111.97 to 25.20 when the concentrations were increased from 5ppm to 500ppm.

**Table 5.** Effect of Chromium on Seed Vigour Index (SVI)

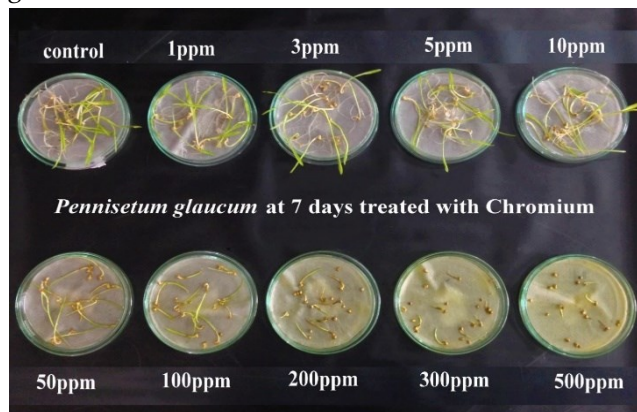
Ppm	<i>Pennisetum glaucum L.</i>
Control	1362.50
1	657.47
3	974.35
5	1111.97
10	780.90
50	321
100	244.80
200	72
300	54.25
500	25.20

values are average of 30 samples.

**Figure 5.** Trend graph showing the Effect of Chromium on Seed Vigour Index (SVI)



**Figure 6.** Effect of Chromium on *Pennisetum glaucum* L.



The transplants of the selected plants were harvested after 45 days, and the following parameters were studied. Length of root, length of shoot, fresh weight, chlorophyll a, chlorophyll b, total chlorophyll, total protein content and chromium uptake.

**Effect of Chromium on root length**

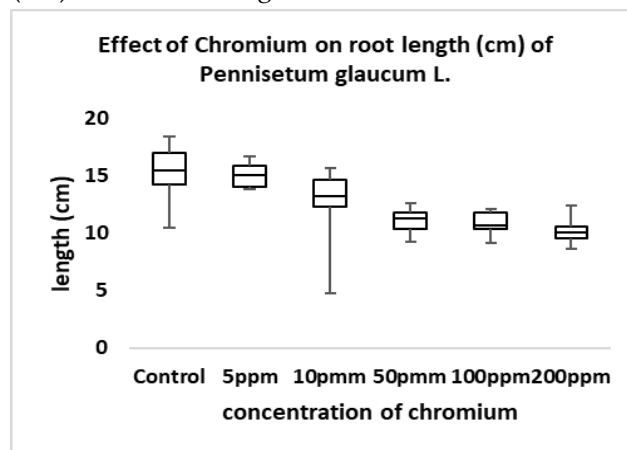
**Table 6.** Effect of Chromium on root length (cm) of selected plants

Concentration	Root length	Shoot length	Fresh weight
Control	15.18±2.30	73.82±0.97	8.02±1.79
5 ppm	15.03±1.03**	65.56±1.90*	7.81±1.11**
10 ppm	12.93±2.87*	63.37±1.55*	6.12±1.05*
50 ppm	11.09±0.95*	65.11±1.33*	7.31±1.50**
100 ppm	10.87±0.93*	43.9±1.95*	3.74±0.78*
200 ppm	10.15±1.02*	29.00±1.53*	3.20±0.71*

\*significant at p < .01 \*\* not significant at p < .05 #significant at p < .05 values are average of 20 samples

*Pennisetum glaucum* L.: The control value of the length of the radicle was 15.18 cm, the highest value for plants treated with chromium was 15.03 cm was recorded in *P. glaucum* L. at 5ppm, followed by a gradual decrease with the lowest noted length of 10.15 cm at 200 ppm. (Table 6, Fig 7)

**Figure 7.** Effect of Chromium on root length (cm) of *Pennisetum glaucum* L.



**Effect of Chromium on shoot length**

**Table 7.** Effect of Chromium on shoot length (cm) of selected plants

Concentration	<i>Pennisetum glaucum</i> L.
Control	73.82±0.97
5 ppm	65.56±1.90*
10 ppm	63.37±1.55*
50 ppm	65.11±1.33*
100 ppm	43.9±1.95*
200 ppm	29.00±1.53*

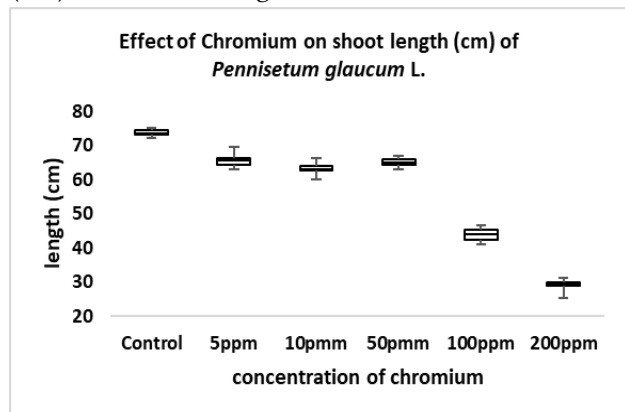
\*significant at p < .01 \*\* not significant at p < .05 #significant at p < .05 values are average of 20 samples

*Pennisetum glaucum* L.: The control value of length of shoot was 73.82 cm, highest value for plants treated with fly ash was 65.56 cm was recorded at 5ppm, followed by a gradual decrease with the lowest noted length of 29 cm at 100ppm. (Table 7, Fig 8)

*Pennisetum glaucum* L.: The lowest values of fresh weight were recorded in *Pennisetum glaucum* L. plants. A maximum fresh weight of 8.02g for control followed by 7.81g was noted at

5ppm, and 3.20g was the lowest average fresh weight at 200ppm. (Table 9, Fig. 10)

**Figure 8.** Effect of Chromium on shoot length (cm) of *Pennisetum glaucum* L.



**Effect of Chromium on Fresh weight**

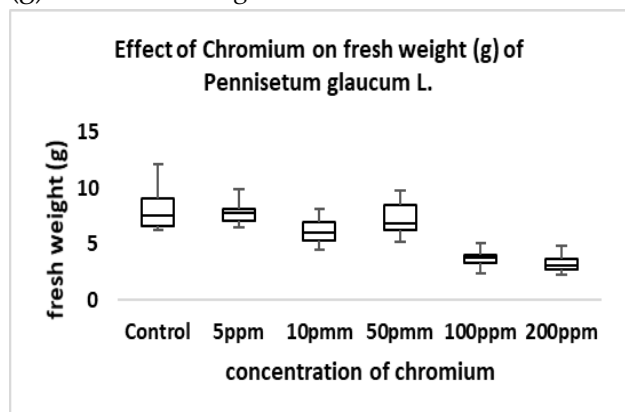
**Table 9.** Effect of Chromium on fresh weight (g) of selected plants

Concentration	<i>Pennisetum glaucum</i> L.
Control	8.02±1.79
5 ppm	7.81±1.11**
10 ppm	6.12±1.05*
50 ppm	7.31±1.50**
100 ppm	3.74±0.78*
200 ppm	3.20±0.71*

\*significant at  $p < .01$  \*\* not significant at  $p < .05$

#significant at  $p < .05$  values are average of 20 samples

**Figure 10.** Effect of Chromium on fresh weight (g) of *Pennisetum glaucum* L.



**Effect of Chromium on Chlorophyll content**

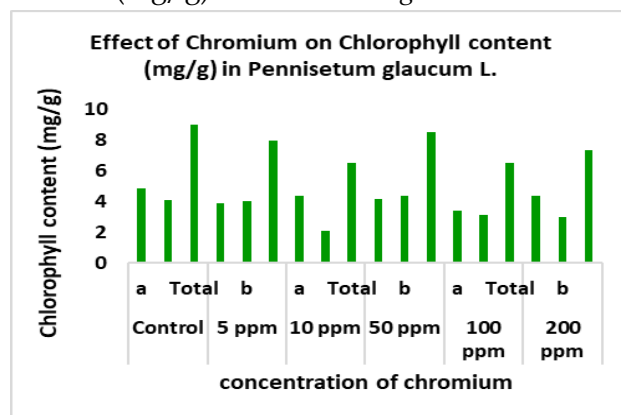
*Pennisetum glaucum* L.: The plants irrigated with varying chromium solution concentrations showed a lower total chlorophyll content than

the control. The control value was 8.98mg/g. The highest total chlorophyll content upon treatment with chromium was 8.55mg/g at 50ppm. The lowest calculated value of total chlorophyll was 6.51 mg/g at 100ppm. (Table 10, Fig. 11)

**Table 10.** Effect of Chromium on Chlorophyll content (mg/g)

Concentration	<i>Pennisetum glaucum</i> L.		
	Chl. a	Chl. b	Total Chl.
Control	4.86	4.12	8.98
5 ppm	3.89	4.04	7.93
10 ppm	4.40	2.12	6.52
50 ppm	4.19	4.35	8.55
100 ppm	3.39	3.11	6.51
200 ppm	4.38	2.98	7.37

**Figure 11.** Effect of Chromium on Chlorophyll content (mg/g) of *Pennisetum glaucum* L.



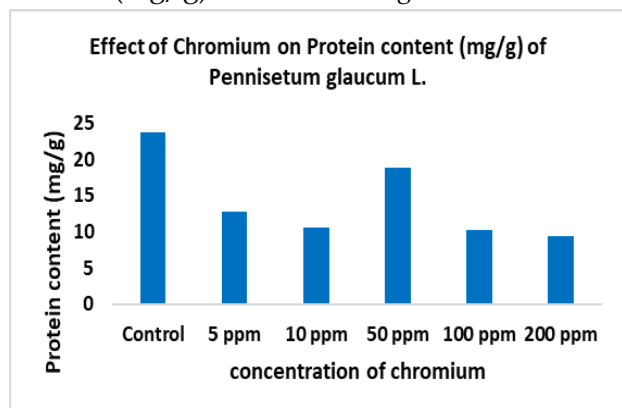
**Effect of Chromium on Protein content**

**Table 11.** Effect of Chromium on Total Protein content (mg/g)

Concentration	<i>Pennisetum glaucum</i> L.
Control	23.7
5 ppm	12.7
10 ppm	10.6
50 ppm	18.9
100 ppm	10.3
200 ppm	9.4

*Pennisetum glaucum* L.: The protein content for the control plants was 23.7mg/g. An increase in the protein content was measured at 50ppm of 18.9mg/g and a minimum of 9.4mg/g at 200ppm. (Table 11, Fig. 12)

**Figure 12.** Effect of Chromium on Protein content (mg/g) of *Pennisetum glaucum* L.



**Uptake of Chromium by selected plants**

Compared to other toxic metals like cadmium, lead, mercury, Chromium does not have a elucidated pathway of uptake in plants. There is a specific mechanism for its uptake and is dependent on metal speciation. The chromium ions have an oxidation state of VI in potassium dichromate. Hexavalent chromium is more soluble than trivalent chromium, forming stable complexes in the soil, thus increasing its bioavailability. (Lopez-Luna J. *et al.*, 2009). The pathway of Cr<sup>6+</sup> transport is an active mechanism; it depends on metabolic energy and is performed by carriers of essential ions. (Cervantes, *et al.* 2001). The readings for chromium uptake by selected plants have been expressed in ppm in the following table 12.

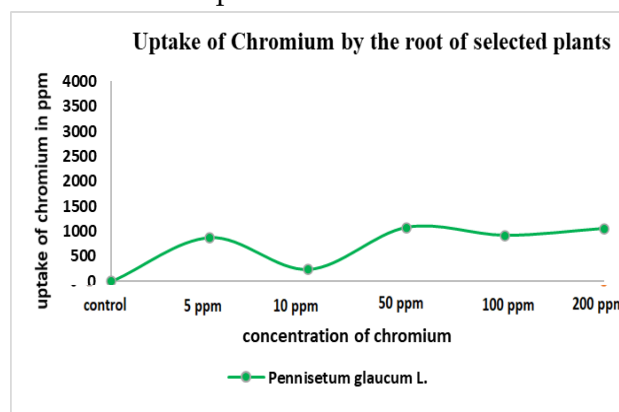
**Table 12.** Uptake of Chromium by selected plants in ppm

Concentration	<i>Pennisetum glaucum</i> L.	
	Root	Shoot
Control	ND	ND
5 ppm	870.3	994.5
10 ppm	241.4	484.0
50 ppm	1076.2	2487.9
100 ppm	918.3	1333.0
200 ppm	1054.8	1347.7

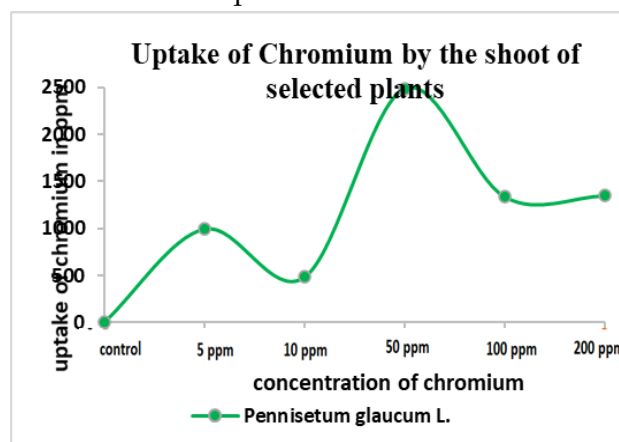
***Pennisetum glaucum* L.:** In the root samples, chromium uptake was highest at 50ppm (1076 ppm). The lowest amount was recorded at 10ppm (241 ppm), and chromium was not

detected in the control samples. Whereas in the shoot samples of *Pennisetum glaucum* the lowest amount was recorded at 5ppm (994 ppm) and the maximum accumulation was measured at 50ppm (2487 ppm) (Table 12, Fig. 13, Fig. 14)

**Figure 13.** Uptake of Chromium (ppm) by the root of selected plants



**Figure 14.** Uptake of Chromium (ppm) by the shoot of selected plants



**Conclusion**

Based on the values recorded, 5 ppm and 10 ppm of chromium indicate a favorable increase in root growth than the control, whereas at higher concentrations, an inhibitory effect was seen. Maximum inhibition of root was observed at 200 ppm chromium for all the selected plants. According to a study, 200ppm concentrations of chromium decreased paddy growth, i.e. *Oryza sativa* L. (Sundaramoorthy *et al.* 2010). The detrimental effect of chromium on roots can be explained by inhibition of the cell

division correlating with the mitotic index noted by Zou J. H. *et al.* 2006. Breakdown of root tissue and reduction in root surface caused by chromium stress may contribute to plants' decreased growth. (Oliveira H., 2012). These results have been following other researchers showing stimulation of root growth at low chromium concentrations. (Zou J.H., *et al.* 2006). Peralta J.R. *et al.* 2001 demonstrated that 5ppm showed that Cr(VI) increased root growth compared to the control, and at higher doses, there was an inhibitory effect.

Saplings of *Pennisetum glaucum* L. showed a sudden decrease in height on exposure to 100 ppm of chromium. Shoot length gradually decreased with the increase in chromium concentrations with a pronounced effect seen at 200 ppm. Overall, shoot growth was affected due to chromium's presence with a reduction in the number and size of leaves due to wilting and necrosis. This decrease in plant length and shoot growth could be correlated to reduced root growth, resulting in lesser nutrient transport and water transport to the plant's aerial parts. These results are consistent with the results reported in *Zea mays* L. (Mallick S., 2010)

Plant weight is dependent on the length and number of roots, shoots, and leaves, as chromium has negatively affected most aspects of growth, fresh weight of the transplants has decreased. The fresh weight of the plants reduced by 54.85% at 200 ppm. Poor development of lateral roots and root number was affected by exposure to chromium resulting in shorter and fewer roots hairs. (Samantary S., 2002)

A general decrease in chlorophyll content at higher chromium concentrations suggests that chlorophyll synthesis is being affected. Our results revealed a significant decrease in chlorophyll b compared to chlorophyll a as it greatly sensitive to salt stress. This decrease in

chlorophyll levels in salt-stressed plants has been considered a typical symptom of oxidative stress (Smirnoff N., 1996), resulting in chlorophyll's suppressed biosynthesis with its degradation by the enzyme chlorophyllase (Santos C.V., 2004). Vazques M.D. *et al.* 1987 reported that chromium-induced inhibition of photosynthesis is due to disorganization of chloroplasts ultrastructure.

Similarly, the protein content also decreased with the increase in chromium concentrations. A concentration-dependent decrease in soluble protein content over the control was observed in the shoot of *Albizia lebbek* (Tripathi A.K. and Tripathi S., 1999). Since plants' nitrogen content was reduced by metal stress relatively, plants' amino acids and protein content also got reduced (Crooke W.M. and Inkson R.H.E., 1955; Mayz D.M.J. and Cartwright P.M. 1984). The decrease in protein level is caused either by a reduced biosynthesis or an increased disintegration of proteins to amino acids (Todd G.W. and Arnold W.M., 1961). The decrease in protein content can also be attributed to oxidative damage caused by ROS generated under abiotic stress conditions. Proteins play an imminent role in plant stress response since they are involved in mobilizing their energy reserves, energy reserves consumption, and an enhanced protein degradation under stress.

Uptake and accumulation of chromium was mainly in the roots, with little translocation to the shoots. A maximum concentration of chromium was seen at 50 ppm in the root as well as shoot. Chromium is immobilized in the root cells' vacuoles could be a reason for higher accumulation in roots. (Shanker A.K. *et al.* 2004). Another study with temperate trees confirmed that chromium was poorly taken up into the aerial tissues but predominantly in the root. (Pulford I.D. *et al.* 2001). Bishnoi N.R. *et al.* 1993 reported that chromium toxicity had a



detrimental effect on seed germination, seedling growth, chlorophyll, and crop plants' nutrient content.

Plant yield is dependent on the plant's all-around development, including a number of roots, length of the shoot, and leaf growth as chromium affects physiological processes and the morphology in plants, productivity decreases. The present study indicated that accumulation is high in the roots compared with the shoot, thereby holding the metal firmly in the ground away from the reach of other interactions of the shoot. In this plant, chromium at low concentrations (5ppm) was found to promote growth and increase yield. However, it is not an essential element for plants, whereas increasing metals' concentration severely inhibited the growth in terms of various morphological and physiological parameters. Since it is an edible crop, despite showing a good potential for phytoremediation techniques, it can't be used to hyper accumulate this metal to remove it from the soil as *Pennisetum glaucum* L. showed more accumulation of the heavy metal in the shoot than the root.

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*Research Paper*

**ANALYSIS OF ELEMENTAL COMPOSITION OF FOLIAR DUST IN MUMBAI**

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**Abstract**

Dust pollution is one of the very dangerous types of air pollution. In Mumbai, excess of vehicles and continuous construction create a lot of dust pollution adding to major quantity of dust pollutants such as Suspended Particulate Matter (SPM), Heavy Metals, etc. in the city atmosphere. The excess of atmospheric heavy metals can lead to various health issues. The plants have been found to be very effective in monitoring and controlling dust pollution. The leaves too can capture good amounts of dust. In this research work, the foliar dust from *Ficus benjamina* L. var. *nuda* (Miq.) M. F. Barrett. was collected from various locations in the city. The elemental compositions of foliar dust samples were analyzed for their composition. Field Emission Gun-Scanning Electron Microscopes (FEG-SEM) was used to analyze Energy Dispersive Spectroscopy (EDS) at SAIF department in IIT, Powai. Carbon (C), Oxygen (O), Magnesium (Mg), Aluminium (Al), Silicon (Si), Potassium (K), Calcium (Ca), Manganese (Mn), Ferrous (Fe) and Copper (Cu) were discovered in the dust samples obtained from all the sites. Carbon (C) and Oxygen (O) were majorly seen in the dust samples. Similarly, Sodium (Na), Phosphorus (P), Sulphur (S), Titanium (Ti), Zinc (Zn) and Molybdenum (Mo) were found to be less common and if present, were available in traces.

Key words: *Dust pollution, Mumbai, SPM, Heavy Metals, FEG-SEM and EDS.*

**INTRODUCTION**

One of the major problems in Mumbai is Dust Pollution. SPM, RSPM, SO<sub>2</sub>, NO<sub>x</sub>, many inorganic and organic pollutants, trace metals are hazardous pollutants in air [Caselles et al., 2002; Maitre et al., 2006; Curtis et al., 2006; Sharma et al., 2006; Jayaraman, 2007]. SPM system ranges from <0.01cm to >100cm [Wan- Kuen et al., 2005, 2006]. As, Cd, Co, Cr, Ni, Pb and Se are dangerous respirable particulate matter i.e. <10 µm [ATSDR, 2003; Wang et al., 2006]. 40-80% of total air pollution in the city comes from vehicular

emission [Ghose et al., 2005]. The dust and urban soil show presence of heavy metals due to traffic [Mert Guney et. al., 2010]. More vehicles create more emission leading to more Particulate Matter causing air pollution [Zanini et al., 2006]. Plants can monitor and control dust pollution and leaf surfaces play vital role in catching dust [Chaphekar et al, 1980]. The plants growing closer to the highway showed higher concentrations of heavy metals in the leaf, stem and root tissues [Falusi B. A., 2010]. The vehicles emit traces of metals which are found in Petrol, Diesel, Oil, etc. [Monacci and Bargagli, 1997]. Plant species growing on the roads involving higher number of petrol-fueled vehicles showed higher concentration of heavy metals like Lead (Pb) in foliar deposits [C. Aydinalp *et al*, 2004].

## **MATERIALS AND METHODS**

The dust samples were collected from ten sites (Table 1) in Mumbai city from the leaf surfaces of *Ficus benjamina* L. var. *nuda* (Miq.) M. F. Barrett. The elemental composition of these dust samples were determined at SAIF department in IIT, Powai. Field Emission Gun- Scanning Electron Microscopes (FEG-SEM) Model: JSM-7600F, Resolution: 15 kv, 1 kv, Accelerating voltage: 0.1 to 30 kv, Magnification: x25 to 1,000,000 was used to analyse the dust samples. The dust samples were carried using small metal stubs coated with carbon paper on one end. Dust, being a non-conducting material, required a suitable metallic coating for better image quality. Platinum coating was done in an instrument (Model: JFC 1600) for 250 seconds. The Platinum coated metal stubs were then inserted in FEG-SEM instrument and to analyze elemental composition of the dust samples through EDS - Energy Dispersive Spectroscopy (Figure 1 and Figure 2).

## **RESULTS AND DISCUSSIONS**

The sites selected for collecting dust samples were Marine Drive, Sion Circle, Ghatkopar, Mulund, Borivali, Goregaon, Malad, Bandra, Bandra Kurla Complex and K. C. Marg which included highways, traffic islands, link roads, primary roads and secondary roads (Table 1). The dust samples collected from selected 10 sites were analyzed for their elemental compositions in Atomic% and Weight% (Figure 1 and Table 2).

Table 1: Description of selected sites in Mumbai City

Site No.	Name of the Sites and their Description
1	<b>South Mumbai - Marine Drive:</b> Main road, facing the sea-moderate to heavy traffic, all types except three wheelers.
2	<b>Eastern Express Highway - Sion Circle, Dr. Babasaheb Ambedkar Road:</b> Main road, heavy traffic, all types of vehicles but more of heavy vehicles. This site also shows signals leading to traffic jams.
3	<b>Eastern Express Highway - Ghatkopar:</b> Main road, heavy traffic, all types of vehicles but more of heavy vehicles. No signals for longer distance, leading to faster moving traffic.
4	<b>Lal Bahadur Shastri Marg - Mulund:</b> Major arterial road passing through an industrial area showing heavy vehicular traffic.
5	<b>Western Express Highway - Borivali:</b> Main road, Heavy traffic, construction activity, all types of vehicles. Broad road with lots of vehicles moving at high speed.
6	<b>Swami Vivekanand Road - Goregaon:</b> Main road, Moderate to heavy traffic, all types of vehicles, construction activity, including three wheelers.
7	<b>Linking Road - Malad West:</b> Frequency of vehicles is very less compared to express highways. It's a broader road and this location is the common connection for various roads.
8	<b>Linking Road - Bandra West:</b> Frequency of vehicles is very less compared to express highways. It's a broader road compared to SV road.
9	<b>Secondary Roads - Bandra Kurla Complex:</b> Derived from primary roads and shows a lesser number of vehicles. It is the link between Western Express highway and Lal Bahadur Shastri marg.
10	<b>Secondary Roads - K. C. Marg, Bandra:</b> Derived from primary roads and shows a lesser number of vehicles. One end of this site opens at Worli Sea Link and the other one connects at the junction of SV road, Mahim and Western Express highway.

Table 2: Elemental composition (in Atomic%) of dust samples at selected sites

Element	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9	Site 10										
	Weight%	Atomic%	Weight%	Atomic%	Weight%	Atomic%	Weight%	Atomic%	Weight%	Atomic%										
C	18.14	26.92	15.99	25.5	16.76	26.11	13.48	21.38	12.71	19.77	22.32	32.55	16.79	25.12	29.95	40.02	30.42	41.29	33.55	44
	47.82	53.26	45.43	54.39	47.78	55.89	48.14	57.3	51.22	59.82	45.63	49.96	50.71	56.98	50.3	50.46	46.36	47.24	46.85	46.12

	Na	Mg	Al	Si	P	S	K	Ca	Ti	Mn	Fe	Cu	Zn	Mo	Total
100	-	7.45	4.08	13.19	-	0.7	0.1	1.25	-	0.14	6.8	0.33	-	-	100
100	-	5.46	2.69	8.37	-	0.39	0.05	0.56	-	0.05	2.17	0.09	-	-	100
100	0.6	1.4	3.35	8.88	1.24	0.1	0.37	8.16	4.81	-	8.26	0.7	0.73	-	100
100	0.5	1.1	2.38	6.05	0.77	0.06	0.18	3.9	1.92	-	2.83	0.21	0.21	-	100
100	-	0.61	1.8	6.34	-	0.44	-	23.18	0.18	-	1.66	0.7	0.56	-	100
100	-	0.47	1.25	4.22	-	0.25	-	10.82	0.07	-	0.55	0.21	0.16	-	100
100	0.74	1.92	3.68	12.26	-	0.35	0.59	10.4	0.52	0.17	6.56	0.69	0.5	-	100
100	0.61	1.5	2.6	8.31	-	0.21	0.29	4.94	0.21	0.06	2.24	0.21	0.15	-	100
100	0.67	1.45	4.15	16.24	-	-	0.47	4.23	0.56	0.15	6.73	0.39	0.46	0.58	100
99.99	0.55	1.11	2.87	10.8	-	-	0.23	1.97	0.22	0.05	2.25	0.11	0.13	0.11	99.99
100	-	7.34	0.77	13.28	-	-	-	1	-	0.17	8.43	0.47	0.48	0.11	100
100	-	5.29	0.5	8.28	-	-	-	0.44	-	0.06	2.64	0.13	0.13	0.02	100
99.99	1.21	1.64	5.21	11.7	0.34	-	0.39	5.65	0.33	0.11	4.04	0.25	0.4	1.22	99.99
99.98	0.94	1.21	3.47	7.48	0.2	-	0.18	2.54	0.12	0.03	1.3	0.07	0.11	0.23	99.98
100	-	0.69	2.48	6.55	-	0.23	0.2	7.84	0.17	-	1.37	0.22	-	-	100
99.99	-	0.45	1.47	3.74	-	0.12	0.08	3.14	0.06	-	0.39	0.06	-	-	99.99
100	0.18	0.88	3.35	9.89	-	-	0.39	3.37	0.23	-	3.77	0.48	0.39	0.3	100
99.99	0.13	0.59	2.02	5.74	-	-	0.16	1.37	0.08	-	1.1	0.12	0.1	0.05	99.99
100	0.69	0.81	3.66	8.32	0.19	0.21	0.43	2.08	0.33	0.04	2.14	0.38	0.32	-	100
99.99	0.47	0.53	2.13	4.66	0.1	0.1	0.17	0.82	0.11	0.01	0.6	0.09	0.08	-	99.99



<b>Ma</b>	47.82	53.26	45.43	54.39	47.78	55.89	48.14	57.3	51.22	59.82	45.63	49.96	50.71	56.98	50.3	50.46	46.36	47.24	46.85	46.12
<b>Min</b>	0.1	0.05	0.1	0.06	0.18	0.07	0.17	0.06	0.15	0.05	0.11	0.02	0.11	0.03	0.17	0.06	0.18	0.05	0.04	0.01

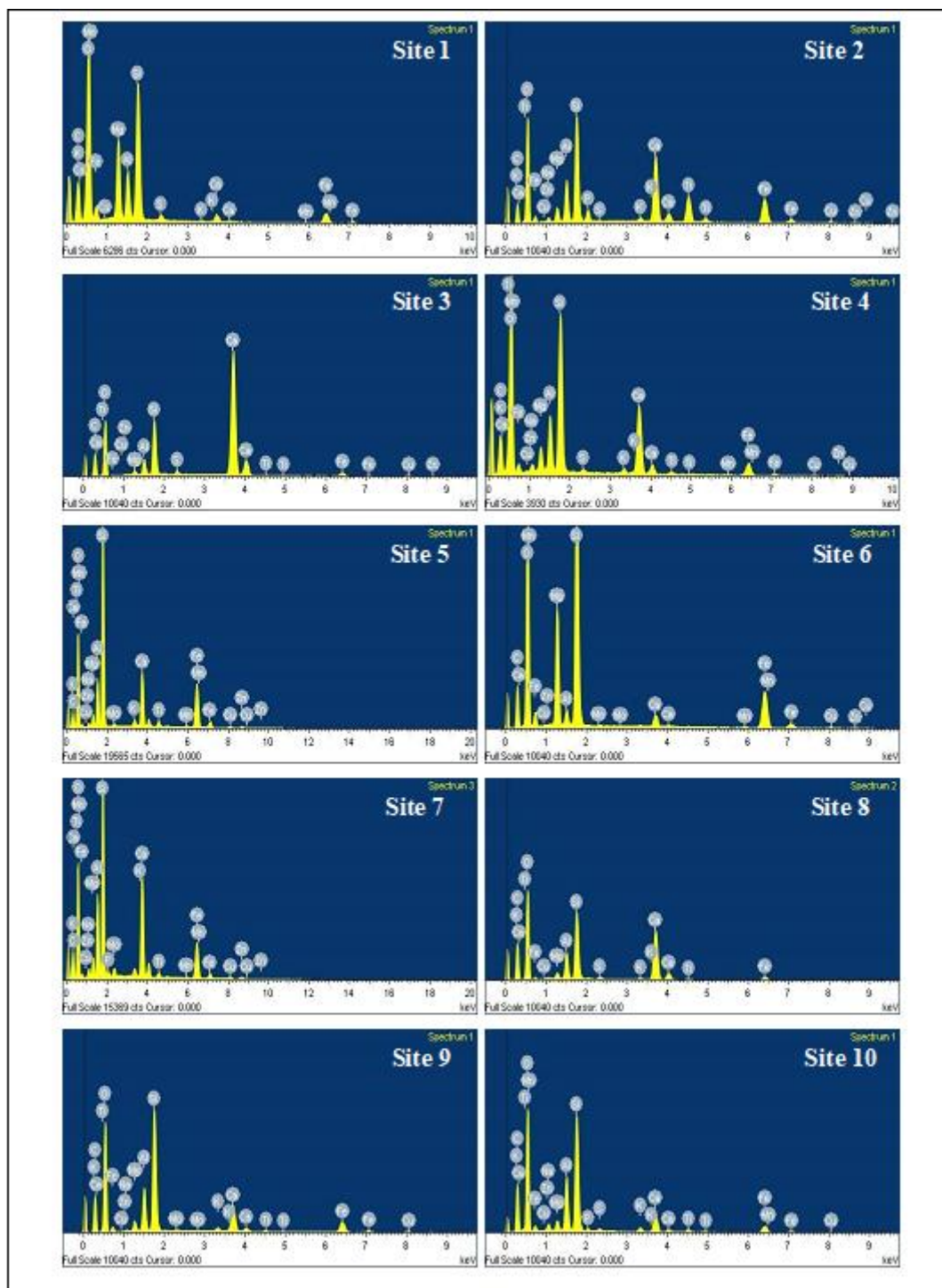


Figure 1: Elemental Composition of Dust samples from selected sites

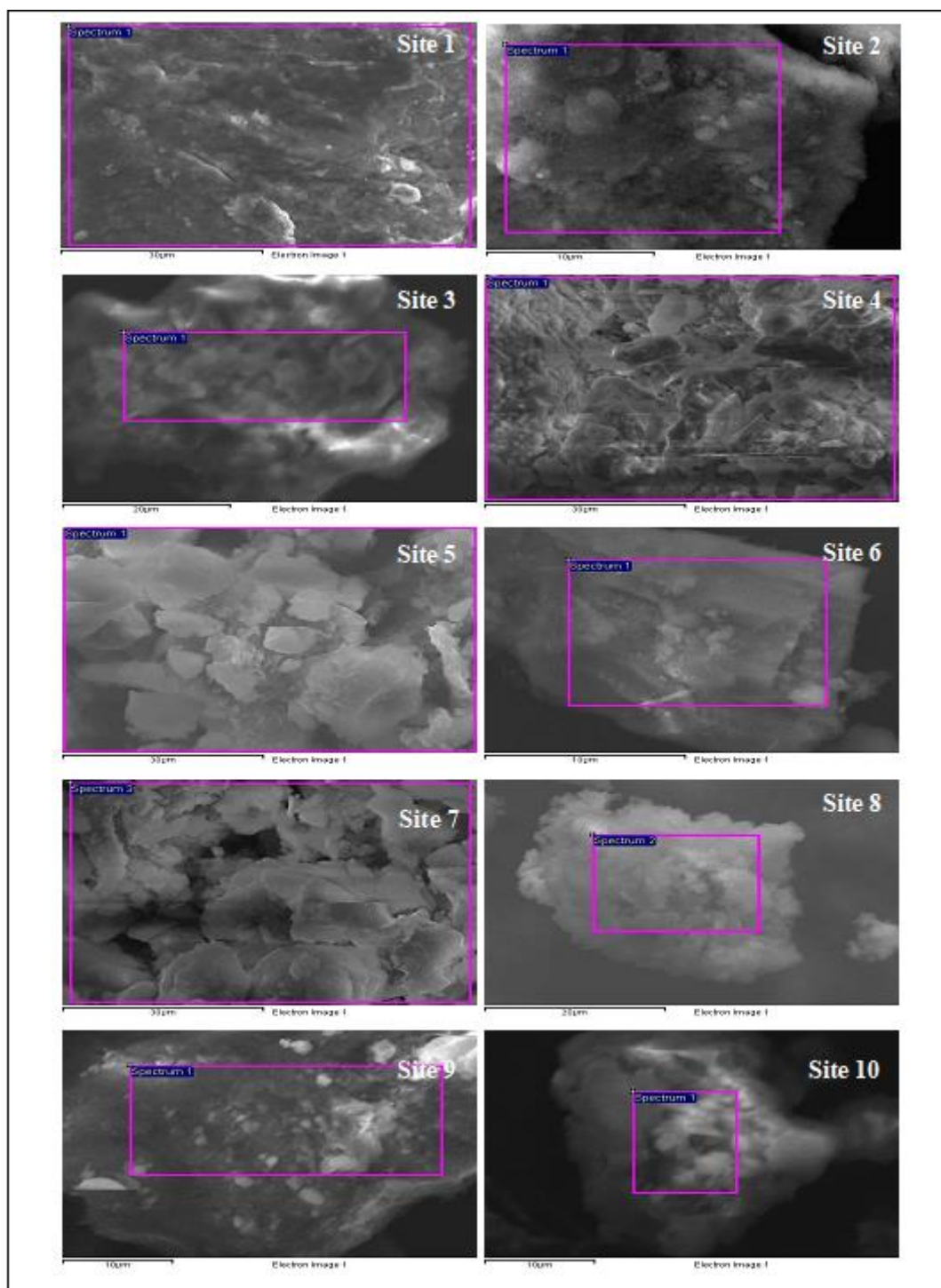


Figure 2: Scanned Electron Micrograph (SEM) of dust samples from selected sites

### Site 1 : South Mumbai - Marine Drive

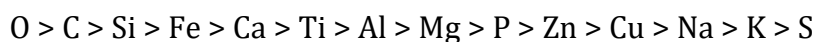
One of the most active sites of Mumbai was Marine Drive, a sea facing site with continuously moving private vehicles. Eleven elements; Carbon, Oxygen, Magnesium, Aluminium, Silicon, Sulphur, Potassium, Calcium, Manganese, Ferrous and Copper were discovered in the dust sample collected from this site. Oxygen and Carbon were found to

be maximum in proportion. Whereas Potassium was contributing the least, i.e. by weight % it was 0.1% and by atomic % it was only 0.05%. The heavy metal, Cu, was 0.33% by weight % and 0.09% by atomic % (Figure 1 and Table 2). Proportionally, the decreasing order of elemental composition was



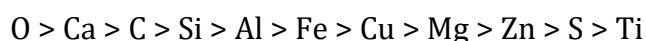
#### **Site 2 : Eastern Express Highway - Sion Circle, Dr. Babasaheb Ambedkar Road**

Sion Circle was a very active road showing continuous slow moving traffic showing all types of vehicles. Dust collected from this site showed presence of 14 elements Carbon, Oxygen, Sodium, Magnesium, Aluminium, Silicon, Phosphorus, Sulphur, Potassium, Calcium, Titanium, Ferrous, Copper and Zinc. Oxygen and Carbon were mainly present. Whereas lowest contributor was Sulphur having 0.1% by weight % and 0.06 % by atomic %. Copper and Zinc were the two heavy metals discovered in the sample. The proportion of Cu by weight % was 0.7% and that of Zn was 0.73%. Similarly the proportion of both Cu and Zn by atomic % was 0.21% (Figure 1 and Table 2). The quantitative decreasing order of these elements was



#### **Site 3 : Eastern Express Highway - Ghatkopar**

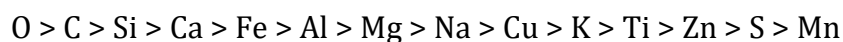
Ghatkopar being at Eastern Express highway, was a broad road including fast moving heavy vehicles. Eleven elements that include Carbon, Oxygen, Magnesium, Aluminium, Silicon, Sulphur, Calcium, Titanium, Ferrous, Copper and Zinc were found in the dust sample collected from here. The dust was mainly Oxygen and Carbon. The least content of the dust was by Ti i.e. 0.18% by weight % and 0.07% by atomic %. The traces of heavy metals viz; Cu and Zn were discovered in the sample. Copper was 0.7% by weight % and 0.21% by atomic %. Whereas Zinc was 0.56% by weight % and 0.16% by atomic % (Figure 1 and Table 2). The arrangement of elements in their decreasing proportion was



#### **Site 4 : Lal Bahadur Shastri Marg - Mulund**

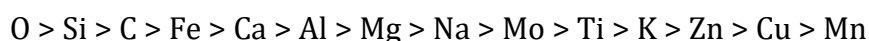
Lal Bahadur Shastri Marg in Mulund was site 4 witnessing continuous movement of all types of vehicles mainly Heavy vehicles. The dust sample contained 14 elements;

Carbon, Oxygen, Sodium, Magnesium, Aluminium, Silicon, Sulphur, Potassium, Calcium, Titanium, Manganese, Ferrous, Copper and Zinc. The dust was mainly comprised of Oxygen and Carbon. Mn was contributing the minimum i.e. 0.17% by weight % and 0.06% by atomic %. The heavy metals like Cu and Zn in the dust were 0.69% and 0.5% by weight % respectively. Similarly, by atomic % Cu was 0.21% and Zn was 0.15% (Figure 1 and Table 2). Proportionally, the decreasing arrangement of elements was



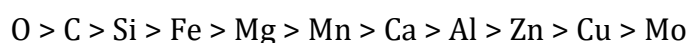
#### Site 5 : Western Express Highway - Borivali

Borivali was the site 5, located on Western Express highway, showing 2-wheelers, 4-wheelers, trucks, busses, etc. moving at high speed. The 14 elements detected in the dust sample of this site included Carbon, Oxygen, Sodium, Magnesium, Aluminium, Silicon, Potassium, Calcium, Titanium, Manganese, Ferrous, Copper, Zinc and Molybdenum. The major proportion of the dust was composed of Oxygen and Carbon whereas the least contribution was by Manganese. The weight % and atomic % of Mn were 0.15% and 0.05% respectively. The heavy metals found in this sample were Copper, Zinc and Molybdenum. The contribution of Cu, Zn and Mo was 0.39%, 0.46% and 0.58% by weight % and 0.11%, 0.13% and 0.11% by atomic % respectively (Figure 1 and Table 2). These 14 elements were showing the proportional sequence as



#### Site 6 : Swami Vivekanand Road - Goregaon

The site 6 was located in Goregaon at Swami Vivekanand road which had good frequency of public and private vehicles. The 11 elements viz; Carbon, Oxygen, Magnesium, Aluminium, Silicon, Calcium, Manganese, Ferrous, Copper, Zinc and Molybdenum were detected in the dust sample collected from this site. Oxygen and Carbon were contributing the maximum of the total dust. Similarly, Molybdenum contributed the least and the values were 0.11% as weight % and 0.02% as atomic %. The dust also showed the minimal presence of heavy metals Zinc and Copper. Both of these constituted 0.13% by atomic %. But by weight % Cu and Zn were sharing 0.47% and 0.48% respectively (Figure 1 and Table 2). Quantitatively all the elements were showing the sequence



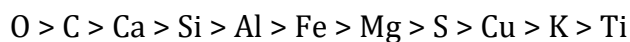
### Site 7 : Linking Road - Malad West

On Link road, in Malad, all types of vehicles were observed with a moderate traffic. There were fifteen elements detected in the dust sample of this site which include Carbon, Oxygen, Sodium, Magnesium, Aluminium, Silicon, Phosphorus, Potassium, Calcium, Titanium, Manganese, Ferrous, Copper, Zinc and Molybdenum. The proportion of Oxygen and Carbon was too high but that of other elements was too low. The least participation was made by Manganese by sharing only 0.11% weight % and 0.03% by atomic %. Copper, Zinc and Molybdenum were the heavy metals found in the dust sample. The proportion of Cu, Zn and Mo was 0.25%, 0.4% and 1.22 % by weight % and 0.07%, 0.11% and 0.23% by atomic % respectively (Figure 1 and Table 2). The proportional sequence of all these 15 elements was



### Site 8 : Linking Road - Bandra West

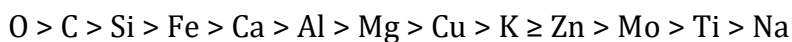
Site 8, at linking road in Bandra west, showed slow moving traffic with short distance signals. The dust sample from this site showed the presence of 11 elements; Carbon, Oxygen, Magnesium, Aluminium, Silicon, Sulphur, Potassium, Calcium, Titanium, Ferrous and Copper. The dust was mainly composed of oxygen and carbon and on the other hand remaining elements were contributing quite low. Titanium was forming 0.17% by weight % and 0.06 % by atomic % of the dust and was lowest of all elemental proportion. The sample also traced the presence of heavy metal Cu as 0.22% by weight % and 0.06% by atomic % (Figure 1 and Table 2). The decreasing order of the elements was



### Site 9 : Secondary Roads – Bandra Kurla Complex

Western and Eastern Express highways and Lal Bahadur Shastri marg were connected with each other by Bandra Kurla Complex, the site 9. His site had active traffic including all types of vehicles. 13 elements found in the dust from this site were Carbon, Oxygen, Sodium, Magnesium, Aluminium, Silicon, Potassium, Calcium, Titanium, Ferrous, Copper, Zinc and Molybdenum. The dust was concentrated with Oxygen and Carbon whereas the least proportion was of Na. The traces of Na by weight % and by atomic % were 0.18% and 0.13% respectively. The dust also showed the presence of

heavy metals Cu and Zn. The proportion of Cu was 0.48% by weight % and 0.12% by atomic % whereas that of Zn was 0.39% and 0.1% respectively (Figure 1 and Table 2). These 13 elements were arranged in decreasing order as



### Site 10 : Secondary Roads – K. C. Marg, Bandra

The site 10, Krishna Chandra Marg, was located in Bandra west which connected primary and secondary roads with Bandra Worli Sea Link and witnessed 2-wheelers, 3-wheelers, Trucks and Buses. There were 15 elements Carbon, Oxygen, Sodium, Magnesium, Aluminium, Silicon, Phosphorus, Sulphur, Potassium, Calcium, Titanium, Manganese, Ferrous, Copper and Zinc discovered in the dust sample collected from this site. The highest proportion of the dust was by Oxygen and Carbon. Similarly, the minimum contributor was Mn having 0.04% by weight % and 0.01% by atomic %. Traces of heavy metals like Cu and Zn were detected. The weight % of both these elements were 0.38% and 0.32% and the atomic % were 0.09% and 0.08% respectively (Figure 1 and Table 2). The decreasing order of the discovered elements was



### CONCLUSIONS

Presence of heavy metals in foliar dust available at various sites is an indication towards the existence of excess metallic pollutants in ambient Air. There were a total 16 elements found in the dust samples collected from all the 10 sites. There were eleven elements detected in the dust sample from Marine Drive, fourteen elements from Mulund (LBS marg), similarly eleven were discovered in the dust sample from Goregaon (SV road), the dust sample from Bandra (Linking road) also had eleven elements within it, fifteen elements were found in the dust collected from Malad (Linking road), fourteen elements were seen in the dust from Borivali (Western Express highway), dust sample from Sion Circle (Eastern Express highway) contained fourteen elements, eleven elements were available in the dust from Ghatkopar (Eastern Express highway), there were fourteen elements in the dust sample collected from Mulund (Lal Bahadur Shastri marg), fifteen were detected in the dust obtained from K.C. Marg (Bandra-W) and the dust collected from Bandra Kurla Complex showed the presence of thirteen elements.

As per FEG-SEM data, Oxygen is most commonly available in dust at all the ten sites in highest proportion. Similarly, proportionally Carbon is the second highest element in dust. Whereas Silicon had been found frequently in the foliar dust. The elements found in the dust of all the ten selected sites were C, O, Mg, Al, Si, K, Ca, Mn, Fe and Cu. Whereas Na, P, S, Ti, Zn and Mo were less common and if present, available in traces.

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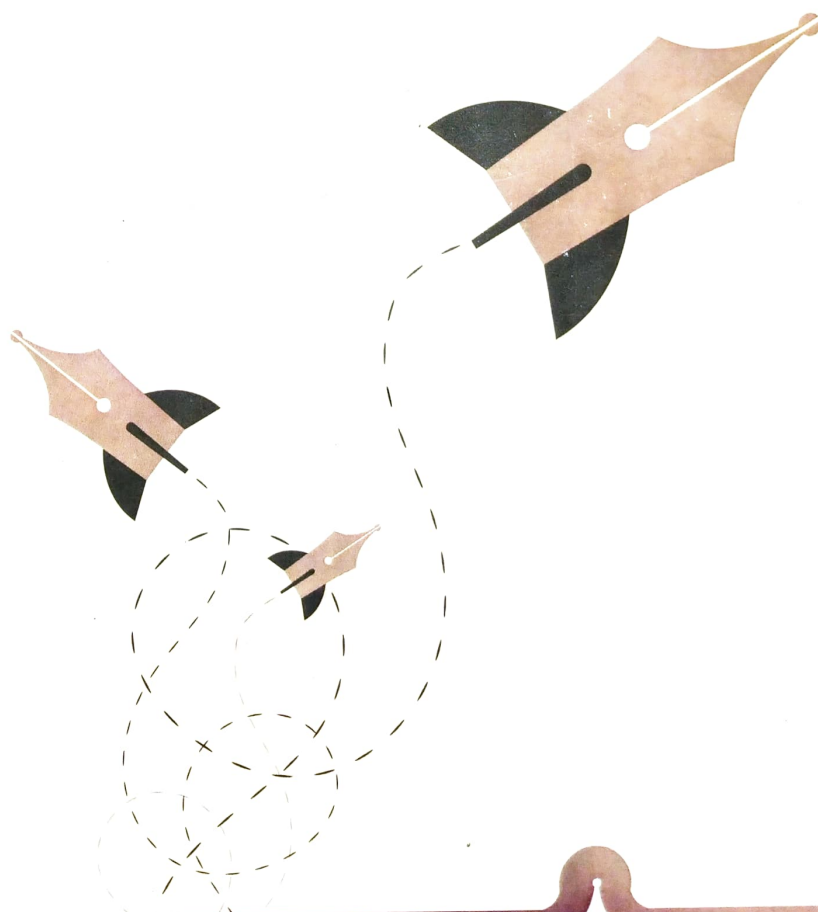
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# THE IMPACT OF ONLINE LEARNING ON CHILDREN – A PARENT PERSPECTIVE, WITH REFERENCE TO COVID-19

Dr. Khan Suhana Begum Sanaula Shabina\*

## ABSTRACT

Every sector has adopted technology, and so as education. Academicians, students, have good hands over experience over digital method of learning. Emphasizing on the present scenario, not only academicians and students but parents are also getting well versed with the concept of online learning. Online learning has created a learning platform not only for students but for parents as well. Parents, who were very much comfortable with traditional way of learning, are now getting engaged with the concept of online learning, may be necessity being one of the reason why modern or digital way of learning is been adopted.

**Keywords:** Online Learning, Digital Learning, Parent, Student

## INTRODUCTION:

The existence of digital learning was visible long back, schools, college; education institutions were making use of smart boards, projectors for innovative teaching and learning methods. However optimum utilisation and the actual impact of online learning is been observed in the present scenario. A high agreement not only from students and academicians but from parents as well. The method of online learning has brought about a change not only in students and teachers life but also in reference to parents.

Earlier parents use to drop their children to schools, wherein a connection of teacher and students was seen, whereas in the present hour it's a triangular connect, a bonding of student, teacher and the parent. Along with teacher and student, parents are playing an equally important role in online learning, specifically when it comes to students who are primary and pre-primary level.

## REVIEW OF RELATED LITERATURE:

(Zhao, et al., 2020) Conducted a study on homeschooling, according to the study the concept and practice of homeschooling was acceptable by students, parents and teachers during COVID 19, despite

teachers were in concern that this might diminish the interest, and students focus on academic.

(Bhamani, Makhdoom, Bharuchi, Ali, Kaleem, & Ahmed, 2020) Study emphasized on, home learning is a substitute to school learning, with limited resources available. The online curriculum expectations can be implemented at home, through online courses.

## OBJECTIVE OF THE STUDY:

- 1) To understand the role of parent in online learning
- 2) To identify the difficulties faced by the parent in online learning
- 3) To analyse parent perception towards online learning

## HYPOTHESIS OF THE STUDY:

**H1: Parent will create a relation with the concept of online learning**

**Null H<sub>0</sub>:** There is no significant relation between parent and online learning

**Alternate H<sub>1</sub>:** There is significant relation between parent and online learning

concept of online learning, however they still tried and overcome the barriers, parent showed an immense role towards adoption of online learning, and still looking forward to continue with the same.

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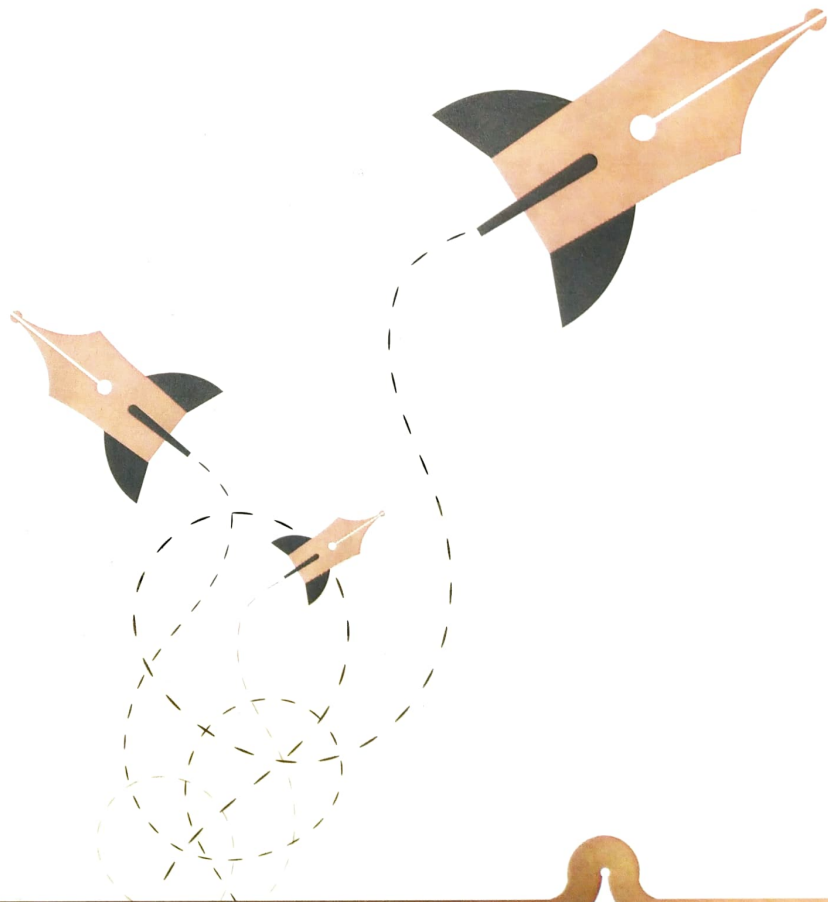
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# MOBILE MARKETING: CUSTOMER RELATION WITH ONLINE SHOPPING APPLICATION THROUGH SMARTPHONE TECHNOLOGY, WITH REFERENCE TO COVID-19

Dr. Khan Suhana Begum Sanaula Shabina

## ABSTRACT

The world is very much familiar with the COVID 19 Pandemic situation; each and every sector was, and is affected. Many will raise hands on agreement that the world will take time for revival. Though everything was shut down completely, but living was still constant, and human beings were dependent on their daily necessity as usual. What, how and in what quantity was a question for each and every one of us. The ones who were financially stable were looking forward for substitute ways to fulfill their desires, however the ones who were financially unstable, living is always been a challenge for them. We can't go out, but essentials can be delivered home, and here was the time maximum of us, maximum amongst use were getting inclined towards the use of online shopping applications through smartphone technology.

**Keywords:** Mobile Marketing, Customer, Online Shopping Application, Smartphone Technology.

### Introduction:

We have already stepped into the world of digitalisation, emphasising on the concept of marketing moving from traditional form of marketing to modern was not that simple, but necessity or convenience may be one of the factors why a huge number of customers have adopted modernisation of marketing, to satisfying one's own need. Every coin has two faces, and so there are still many of us who conserved oneself in adopting modern way of buying things. Reasons may be many, lack of physical touch, quality assurance, trust and security factors, authenticity of the product and many in line. Though there were many good reasons on why, customers were not making use of online shopping applications, but it was the Pandemic situation which provoked customers in making use of the same, either for buying essentials, or paying utility bills, admission

fee, or medical expenses. In absence of alternate options customers who were not willing to switch their traditional way of dealing commercial areas, started making use of online applications.

### Review of Related Literature:

(Musa, Saidon and Mior Harun, 2016), Study had placed importance on mobile marketing strategies, companies should place emphasis more and utilise mobile application which may not only help and organisation to expand but will also have an impact on sales. Reviving mobile marketing strategies will be favourable not only for companies but for customers as well.

(Sunitha, Gnanadhas, 2014), a general overview on online study, to understand customers preferences towards online shopping, study concluded though traditional market have variety of products to display, but online provides platform to browse multiple products.

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