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GREEN MARKETING AWARENESS AND CONSUMERS PERCEPTION TOWARDS IT: AN EXPLORATORY RESEARCH IN LUCKNOW

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[Received: Oct 2019 - Revised and Accepted – Jan 2020]

ABSTRACT: The term Green Marketing is now not new word in industry and is commonly used to describe business marketing activities which help to reduce the negative effect of the products and services towards natural environment imbalance and make it more environmentally friendly.

As society is slowly becoming more conscious about environment, business organizations have started to adapt their strategies to address these society's "new" concerns. The primary aim of this study is to understand the awareness of green marketing and consumer perception towards it to understand the value that customers gives while purchasing green products. The study has been conducted in Lucknow city of UP. While conducting this study it was found that consumers are aware of green marketing and they are willing to spend reasonably high since green products provides long term benefits to them and their environment. However, there is scope forgreen brands to innovate product at affordable prices to achieve vast market at domestic levels.

The outcome of this paper may trigger the minds of marketer to give a thought for adopting the suitable strategies which will give them a way to overcome major problems associated with regular marketing techniques and make a shift to green marketing. Keeping this thing in mind this paper is an attempt to understand awareness of consumers towards green marketing and green branding along with exploring the concept of green marketing.

Keywords: Green marketing, Eco-Friendly products, Green Brands, Consumer Perception.

INTRODUCTION

According to the “American Marketing Association”, green marketing is the marketing of products and services that are presumed to be environmentally safe. Thus green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Yet defining green marketing is not a simple task where several meanings intersect and contradict each other, an example of this will be the existence of varying social, environmental and retail definitions attached to this term. Other similar terms used are Environmental Marketing and Ecological Marketing. Thus "Green Marketing" refers to holistic marketing concept wherein the production, marketing consumption and disposal of products and services happen in a manner that is less detrimental to the environment with growing awareness about the implications of global warming, non-biodegradable solid waste, harmful impact of

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pollutants etc. Both marketers and consumers are becoming increasingly sensitive to the need for switch to green products and services. While the shift to "green" may appear to be expensive in the short term, it will definitely prove to be indispensable and advantageous in the longrun.

An average green company can be described by using the models and experiences reported by John Elkington, Peter Knight and Julia Hailes in their book The Green Business Guide (Elkington et al., 1992). A green company is based on its corporate vision that includes environmental concerns as the company's functioning. This simply means that the company realizes the needs of the ecosystem with which it interacts. For example, any company wants "to be a good company, having concern for the community and the environment". Green marketing might be a result of pragmatic policy, referring to the changes of preferences of the customers and /or to follow the mainstream development of the industry. However, there are companies, which are really centered on green values and try to realize their ecological view in their business activities (e.g. the Body Shop, Ben and Jerry's, Tom's of Main, Interface).

Polonsky (1994) defined green marketing as all activities designed to generate and facilitate exchanges intended to satisfy human needs and wants, in a way that the satisfaction of these needs and wants occurs, with no or minimal detrimental impact on the natural environment.

GREEN MARKETING

The green marketing has grown over a period of time. Peattie (2001) mentioned that the evolution of green marketing has three phases:

The first phase is known as "Ecological green marketing". In this phase the focus was to help environment and provide appropriate solutions.

The second phase is "Environmental green marketing" and the focus shifted on clean technology that involved designing of innovative new products, which take care of pollution and waste issues.

The third phase may be called as "Sustainable green marketing". It came into existence in the late 1990s and early 2000. In this phase organization started producing green products and services. This was the result of the term sustainable development which is defined as "meeting the needs of the present customers without compromising the ability of future generations to meet their forthcoming needs."

The fundamental aim of green marketing is to increase the usage of green products by manufacturing and selling green products. But when it comes to buying green products various components impact the buying decisions of consumers. These factors are like perception and attitude of consumers, education level, government role in environment protection, personal norms etc. There are many studies focusing on demographic impact on buying green products and also shown the vital differences between male and female in environmental attitudes (Brown and Harris, 1992; Tikka et al. 2000) and in overall green purchase attitudes (Mostafa, 2007).

Many people believe that green marketing is a way to promote or advertise a specific product using environmental terms, such as in a television advertisement announces a type of heaters as not to cause a shortage of oxygen but all that can 'not be named more than eco-declaration, or green advertising, which forms one components of green marketing, or of the

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green marketing claims, therefore, green marketing includes a wider range of organizational activities, such as product modification, changes to the production process, packaging changes, delivery changes, and more (Polonsky,2007).In their attempt to define green marketing, researches and practitioners have addressed several terms related with this concept,Prakash (2002), pointed out that he employed the term green marketing in his survey " to refer to the strategies to promote products by employing environmental claims either about their attributes or about the systems, policies and processes of the firms that manufacture or sell them", while (Posonsky,2007), has defined it as " green or environmental marketing consist of all activities designed to generate and facilitate any exchange intended to satisfy human need or wants, such that the satisfaction of these needs and wants occurs, with minimal detrimental impact on the natural environment ." Other researchers have defined environmental marketing as " the holistic management process responsible for identifying, anticipating and satisfying the requirement of customers and society, in a profitable and sustainable way" (Karna et al, 2001).

REVIEW OF LITERATURE

According to the authors Ottaman, (1993) and Ken Peattie, (1993) conventional marketing is slowly phasing out and green marketing is taking over the place. In the developed countries, the surge of environmental consciousness that followed Earth Day in 1990 washed over the market place rapidly. Now consumers claim they are willing to change their buying habits – and even pay more for products – to protect the environment (Pearce, 1990; Consumer Reports, 1991; Berger and Corbin, 1992; Coddington, 1993; Davis, 1993; McDougall, 1993; Ottoman, 1993). Manufacturers got the message that the Marketing Intelligence Service (Consumer Reports, 1991), which tracks new product introductions, reports that the percentage of new packaged products making some kind of green claim more than doubled between 1989 and 1990, rising from 4.5% to 11.4% of the total. During the same year, the number of green advertisements appearing on television and in major print outlets more than quadrupled, according to an audit by the advertising agency J. Walter Thompson (Consumer Reports, 1991).

Elkington (1994:93) defines green consumer as one who avoids products that are likely to endanger the health of the consumer or others; cause significant damage to the environment during manufacture, use or disposal; consume a disproportionate amount of energy; cause unnecessary waste; use materials derived from threatened species or environments; involve unnecessary use of, or cruelty to animals etc.

According to the Joel makeover (a writer, speaker and strategist on clean technology and green marketing), green marketing faces a lot of challenges because of lack of standards and public consensus to what constitutes "Green". Green marketing is a vital constituent of the holistic marketing concept. It is particularly applicable to businesses that are directly dependent on the physical environment; for example, industries like fishing, processed foods, and tourism and adventure sports etc. and changes in the physical environment may pose a threat to such industries. Many global players in diverse businesses are now successfully implementing green marketing policies and practices. Ginsberg, J.M. & Bloom, P.N. (2004).

Choosing the Right Green-Marketing Strategy. MIT Sloan Management Review, 46(1), pp. 79-88.

Although public opinion polls consistently show that consumers would prefer to choose a green product over one that is less friendly to the environment when all other things are equal, those "other things" are rarely equal in the minds of consumers. How then, should companies handle the dilemmas associated with green marketing? They must always keep in mind that consumers are unlikely to compromise on traditional product attributes, such as convenience, availability, price, quality and performance. It's even more important to realize, however, that there is no single green-marketing strategy that is right for every company. It is suggested that companies should follow one of four strategies, depending on market and competitive conditions, from the relatively passive and silent "lean green" approach to the more aggressive and visible "extreme green" approach - with "defensive green" and "shaded green" in between. Managers who understand these strategies and the underlying reasoning behind them will be better prepared to help their companies get benefited from an environmentally friendly approach to marketing and helping consumers additionally.

RESEARCH METHODOLOGY

For conducting the research, the researcher has used structured questionnaire with a five point Likert scale for measuring consumer attitude towards green marketing and green branding. Primary data was collected from respondents of Lucknow city and around through a questionnaire with a sample of 200 respondents by using the mail survey method due to limitation of time factor. Random sampling method was adopted by the researcher and selected the samples from Lucknow region representing both the genders, different age groups, education level, marital status and monthly income. The data collected from the respondents are coded, tabulated and analyzed into logical statements using mean and percentage analysis. Secondary data was also referred and collected from the available literatures, journals and web searches wherever necessary.

Due to shortage of time the researcher has used only descriptive statistical tool- Mean and percentage to arrive at findings and conclusion.

OBJECTIVES

The study has been carried out keeping in mind the following primary objectives:

- To understand and analyze the awareness of consumers towards green marketing.
- To assess and analyze the attitude of consumers towards green branding.

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DATA ANALYSIS AND INTERPRETATION

Table 1. Demographic Profile of Respondents with mean scores (N=200)

Age	**%**	**Gender**		**Occupation**
		Male	**Female**	
20-30	60	156	44	Part Time employees
30-40	26			Full Time Employees
Above 40	14			Sr. Executive/Entrepreneur
	100			
Monthly Income	**%**			
0-5K	20			
6-10K	35			
10-20K	30			
25-30K	10			
>40K	5			

Table 1 depicts the demographic information about the respondents which reveals that 60% of the respondents were under the age group of 20-30, 26% of the respondents come under 30-40 and 14% of respondents were above 40 years of age.

Consumers awareness towards green marketing is high

1. I believe in the concept of green marketing?

Table 2. Ratings given by respondents about the concept of green marketing

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	69	4.52(>4.5 consideredthe next higher value)
4	Agree	22	
3	Neither Agree nor Disagree	3	
2	Disagree	4	
1	Strongly Disagree	2	
	Total	100	

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Table 2 clearly depicts that Respondents said strongly agree that they believe in the concept of green marketing. This can be inferred from the computed mean.

2. I am aware of companies going green?

Table 3. Consumer's awareness of companies going green

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	69	4.79(> 4.5 =5)
4	Agree	23	
3	Neither Agree nor Disagree	3	
2	Disagree	4	
1	Strongly Disagree	2	
	Total	100	

Table 3 depicts that Respondents Strongly Agree about the awareness of companies going green which can be inferred from the computed mean.

3. I know about the advantages of green products in an organization?

Table 4. The advantages of green products in an organization

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	47	4.09(=4)
4	Agree	31	
3	Neither Agree nor Disagree	12	
2	Disagree	4	
1	Strongly Disagree	6	
	Total	100	

Table 4 depicts that Respondents agree that there is an advantages of green products in an organization**.**

4. I feel that the regular marketing techniques harm the environment

Table 5. The regular marketing techniques can harm the environment.

Rating Scale		% of Respondents	Mean score
5	Strongly Agree	72	4.52(>4.5 considered the next higher value)
4	Agree	18	
3	Neither Agree nor Disagree	3	
2	Disagree	4	
1	Strongly Disagree	3	
	Total	100	

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Table 5 depicts that Respondents strongly agree that the regular marketing techniques may harm the environment.

5. Employees in any organization feel that their work schedule gets affected by implementing green concept

Table 6

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	47	4.19(=4)
4	Agree	35	
3	Neither Agree nor Disagree	6	
2	Disagree	10	
1	Strongly Disagree	6	
	Total	100	

Table 6 clearly indicates that respondents agree that organization feels that their work schedule get affected by implementing green marketing. Respondents Agree that employee in any organization feel that their work schedule gets affected by implementing green concept.

6. Green marketing concept is in existence for long time back but it is not implemented by most of the companies in India

Table 7

	% of Respondents
Yes	67
No	33
Total	100

Table 7 depicts that 67% of the Respondents said that green marketing concept existed for long time but it is not implemented by many companies in India. 33% of the Respondents said no. Respondents have realized that green marketing existed for long time due to lack of various factors it is not implemented in many companies in Indian context.

7. Productivity can be improved drastically by using green marketing (paper less office)

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Table 8

showing productivity can be improved by using green marketing**.**

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	72	4.57(5)
4	Agree	20	
3	Neither Agree nor Disagree	3	
2	Disagree	3	
1	Strongly Disagree	2	
	Total	100	

Table 8 depicts that the Respondents strongly agree that productivity can be improved drastically by using green marketing.

8. Companies are reluctant in implementing green marketing concept

Table 9.

The companies are reluctant in implementation of green marketing concept.

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	47	4.09(4)
4	Agree	31	
3	Neither Agree nor Disagree	12	
2	Disagree	4	
1	Strongly Disagree	6	
	Total	100	

Table 9 depicts that Respondents agree that companies are reluctant in implementing green marketing.

9. It is difficult for all the companies to implement green marketing

Table 10.

Respondents Strongly Agree

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	70	4.58(5)
4	Agree	23	
3	Neither Agree nor Disagree	3	
2	Disagree	3	
1	Strongly Disagree	1	
	Total	100	

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Table 10 showing Respondents Strongly Agree that it is difficult for all the companies to implement green marketing.

10. Huge investment is required to develop green products

Table 11

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	43	4.07(4)
4	Agree	37	
3	Neither Agree nor Disagree	10	
2	Disagree	4	
1	Strongly Disagree	6	
	Total	100	

Table 11 clearly indicates that Respondents agree that huge investment is required to develop green products.

11. Government should take initiative in making companies to go green.

Table 12

Rating Scale		% of Respondents	
5	Strongly Agree	68	4.6(>4.5 considered as 5)
4	Agree	28	
3	Neither Agree nor Disagree	1	
2	Disagree	2	
1	Strongly Disagree	1	
	Total	100	

Table 12 clearly indicates that respondents Strongly Agree that government should take initiative in making companies go green.

12. Everyone is responsible for successful green marketing concept.

Table 13

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	75	4.67(5)
4	Agree	18	
3	Neither Agree nor Disagree	3	
2	Disagree	3	
1	Strongly Disagree	1	
	Total	100	

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Table 13 clearly indicates that Respondents Strongly Agree i.e. everyone is responsible for successful green marketing concept**.**

13. Green marketing is just an old concept.

Table 14

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	8	3.02(3)
4	Agree	20	
3	Neither Agree nor Disagree	50	
2	Disagree	10	
1	Strongly Disagree	12	
	Total	100	

Table 14 clearly indicates that Respondents indicated that they neither agree nor disagree that green marketing is just an old concept.

Consumers attitude towards green branding is high

14. I am familiar with green brand?

Table 15

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	71	4.63(5)
4	Agree	23	
3	Neither Agree nor Disagree	3	
2	Disagree	2	
1	Strongly Disagree	3	
	Total	100	

Table 15 clearly indicates that Respondents strongly agree that they are familiar with green brand.

15. I am interested to know more about green branding

Table 16

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	80	4.56(5)
4	Agree	9	
3	Neither Agree nor Disagree	3	
2	Disagree	3	
1	Strongly Disagree	5	
	Total	100	

Table 16 clearly indicates that Respondents strongly agree that they are interested to know more about green branding.

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16. Green marketing is more effective than regular marketing?

Table 17

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	21	3.24(3)
4	Agree	20	
3	Neither Agree nor Disagree	34	
2	Disagree	12	
1	Strongly Disagree	13	
	Total	100	

Table 17 clearly indicates that Respondents neither agree nor disagree with the fact that green marketing is more effective than regular marketing.

17. Do you believe in the concept of complete green marketing conditions throughout theworld?

Table 18

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	34	3.68(4)
4	Agree	31	
3	Neither Agree nor Disagree	12	
2	Disagree	15	
1	Strongly Disagree	8	
	Total	100	

Table 18 showing Respondents agree that they will believe in the concept of complete green marketing conditions throughout the world.

18. Transition from regular marketing to green branding is quite difficult in India

Table 19

Rating Scale		% of Respondents	Mean Score
5	Strongly Agree	36	3.71(4)
4	Agree	32	
3	Neither Agree nor Disagree	11	
2	Disagree	9	
1	Strongly Disagree	12	
	Total	100	

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Table 19 showing Respondents agree to the fact that transition from regular marketing to green branding is difficult in India.

19. Do you realize the importance of green branding.

Table 20

	% of Respondents
Yes	69
No	31
Total	100

Table 20 clearly indicates that 69% of the Respondents realize the importance of green branding and 31% of the Respondents doesn't realize the importance of green branding.

Findings and Conclusion

The above findings are tabulated after having used **L**ikert scale for measuring the awareness of consumers towards green marketing and attitudes of consumers towards green branding. (Highest Rating is 5-Strongly Agree and 1-Strongly Disagree)

Table 21. The computed mean and percentage of respondents

Consumers awareness towards green marketing is high			
Sl No	**Description(filled by Respondents – likert scale)**	**% of Respondents**	**Mean Score**
1	I believe in the concept of green marketing		**4.52**(5) considered the next higher value)
2	I am aware of companies going green		4.79(5)
3	I know about the advantages of green products in an organization		4.09(4)
4	I feel that the regular marketing techniques harm the environment		4.52(5)
5	Employees in any organization feel that their work schedule gets affected by implementing green concept		4.19(4)
6	Green marketing concept is existed for long time back but it is not implemented by many companies in India	67 % said Yes ,33% said No	
7	Productivity can be improved drastically by using green marketing (paper less)		4.57(5)
8	Companies are reluctant in implementing green marketing concept		4.09(4)
9	It is difficult for all the companies to implement green marketing		4.58(5)
10	Huge investment is required to develop		4.07(4)

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	green products		
11	Government should take initiative in making companies to go green		4.6(5)
12	Everyone is responsible for successful green marketing concept		4.67(5)
13	Green marketing is just an old concept		3.02(3)
Consumers attitude towards green branding is high			
14	I am familiar with green brand		4.63(5)
15	I am interested to know more about green branding		4.56(5)
16	Green marketing is more effective than regular marketing		3.24(3)
17	Do you believe in the concept of complete green marketing conditions throughout the world		3.68(4)
18	Transition from regular marketing to green branding is quite difficult in India		3.71(4)
19	Do you realize the importance of green branding	69% saidYes 31% said No	

After having understood the concept of green marketing and green branding this paper triggers a thought for marketers about the impact of significant changes in green marketing for effective utilization of resources and the final product and services which company develops should be less detrimental to the environment which can be concluded from the following paragraphs related to awareness of consumer towards green marketing and green branding.

CONSUMERS AWARENESS TOWARDS GREEN MARKETING IS HIGH

Consumers have expressed strong concerns about the concept of green marketing and companies going green. Further, consumers are well aware of the fact that the productivity of companies can be drastically improved over a period of time after using and implementing green marketing phenomenon in their respective organization. People are aware of green environment because it is less detrimental to natural resources available and companies can look into implementation of this concept for betterment of business. From the results of data analysis given in table 21 we can infer that the role of government plays a vital role in green marketing. Some consumers neither agree nor disagree for the fact that green marketing is just an old concept. As far as initiation of green marketing is concerned everyone are responsible for green marketing. If we analyze the facts pertaining to green marketing the significant results are positive at one end. On other end**,** consumers say that it is difficult for all the companies to implement green marketing. Environmental education refers to organized efforts to teach about how natural environments function and particularly how

human beings can manage their behavior and ecosystems in order to live sustainably (Wikipedia, 2009).

CONSUMERS ATTITUDE TOWARDS GREEN BRANDING IS HIGH

As far as green branding is concerned the consumers strongly expressed that they are familiar with green brand and shown interest to know more about green branding. In India, at present the transition from regular marketing to green brand is difficult. Most of the consumers realize the importance of green branding which means that there is a positive sign for betterment of the environment as well as for business.

FUTURE SCOPE OF THE STUDY

This exploration into green marketing or eco-friendly marketing is a positive sign for transition from India to a greener and greater India. Further Research can be carried out pertaining to implementation of eco-friendly marketing and green branding and advanced statistical tools may be used to achieve accuracy of results which may add more and advanced version to this paper.

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ROLE OF MICROFINANCE ON EMPOWERMENT OF WOMEN: WITH SPECIAL REFERENCE TO SHG IN RAJGARH DISTRICT

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ABSTRACT: Microfinance is playing a vital role in overall growth of economically active but financially constraint poor people. People who are out of the formal fold of financial institutions, needs credit for consumption as well as for production purposes. Microfinance through small groups is becoming the best option for poverty alleviation and empowerment. Microfinance includes a wide range of services viz., credit, saving, insurance, education, health, women empowerment, skill development, self employment, gender equality etc.

This paper provides an insight of the role played by microfinance through SHG in empowering women of rajgarh district of Madhya Pradesh. Primary data were collected from SHG members of Sarangpur&Narsingarh block of Rajgarh district for study. This paper examines the socioeconomic background, finance availability, skill development and awareness among the members. This study reveals that microfinance has positive impact on the beneficiaries' self confidence, courage and they are becoming self employed by participating different income generating activities.

INTRODUCTION

Robert Adams define the term: 'Empowerment: the capacity of individuals, groups and/or communities to take control of their circumstances, exercise power and achieve their own goals, and the process by which, individually and collectively, they are able to help themselves and others to maximize the quality of their lives.

Empowerment as a concept is rapidly gaining ground especially in the emerging context of microfinance. It is associated with the idea of self autonomy of those individuals who are economically backward by providing them financial and non financial services. Women empowerment relates to social, political, behavioral as well as economical empowerment of women, their self confidence, power, self decisions, ownership of productive assets, knowledge skills, and entrepreneurial skills, awareness, mobility, empowers them. Education plays a vital role in women empowerment, one educated women educates whole family.

Rural women of India have to face many challenges in their lives viz., rigid norms, man dominance, no voice in family major decisions, along with that poverty is great obstacle in women empowerment.

Various Government schemes for women empowerment are there at national, state and local level. The micro finance schemes of NABARD, restructuring ofSGSY to NRLM have made a smooth path to role played by microfinance in eradicating poverty and empowering women.

Microfinance is not limited to credit and savings, it extended its wings to insurance, remittances and most essentially capacity building activities. It's become boon for the poor

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who have capabilities to become financially self dependent but having constraints of money, guidance and linkages.

Microfinance through SHG formation is core practices of NRLM; it focuses on women empowerment & poverty eradication by building sustainable livelihood for the poor through continuous efforts on capacity building, trainings, creating awareness, providing upward and backward linkages.

OBJECTIVES

1. To study different dimensions of women empowerment.
2. To study the role of microfinance on the socio-economic and personal empowerment of women of the area under study.

FORMULATION OF HYPOTHESIS

Null hypothesis: There is no significant differenceof income level of respondent after joining SHG of selected sample area of Rajgarh district. $H0=\mu d=0$

Alternate Hypothesis: There is significant difference in income level of respondent after joining SHG of selected sample area of Rajgarh district.

$H1= \mu d\neq 0$

RESEARCH METHODOLOGY

The data required for the study are collected from both the primary and secondary sources. The Primary data was collected from interviews and schedule. Secondary data is collected from various sources like journals, books, manuals, and reports of the state concerned for literature part. Data collected both from primary and secondary sources have been interpreted with the help of statistical devices such as, tables, figures, average, percentage and other related statisticaltechniques.The sample comprises of 40 members of Self Help Groups selected on the basis of simple random sampling technique from the villages of Sarangpurand Narsingarh blocks of Rajgarh district of Madhya Pradesh.

Hypothesis testing: Paired T-test is used to find is result statistically significant. T test is used to determine whether the mean difference between two set of observations is zero.If p value <0.05 null hypothesis fails and alternate hypothesis is accepted, and if p value>0.05 so null hypothesis is accepted and alternate hypothesis is to be rejected.

PROFILE OF RAGARH DISTRICT

Madhya Pradesh is heart of India having large scope for Microfinance Institutions and Microfinance activities. Rajgarh is the districtwhichfalls under one of the eight districts of Madhya Pradesh, which have been listed as most backward district in the country by NITI AYOG in 2018.According to census 2011, district total population is approx 15 lakh, out of which 82% belongs to rural area and literacy rate of rural area is 57.64% and women rural literacy rate is only 44.63% (census 2011). Villagers are still struggling with basic amenities as surveyed villages having a great problem of proper water supply.

Microfinance institutions and NRLM structured SHG formation, financial and capacity building support to poor women of the villages is changing the scenario at a great pace.SHG promoted by NRLM in Rajgarh district is playing a dynamic role in the overall development of women in rural areas. Women are participating more actively in SHG

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activities.Word microfinance itself creates charismatic energy, enthusiasm and connects to livelihood activities, to the women of Rajgarh district of Madhya Pradesh.

FINDING AND ANALYSIS

S**o**cio-economic profile of Respondent:

Age, education, caste, religion, marital status, family income, housing conditions etc. are some of the important variables that affect women empowerment and development. In this part of the study, an attempt has been made to analyze the socio- economic profile of the respondents in the study area.

Table: 1Age of the members:

S. No.	Age	Frequency	Percentage	Marital Status	F.	%
1	Less than 25	2	5%	Unmarried	0	0
2	25-35	20	50%	Married	33	83
3	35-45	8	20%	Widow/divorced	7	17
4	45 and above	10	25%			
	Total	40	100%	Total	40	100

Resource: Primary data survey.

Table 1 depicts the age of the respondent.50% of the respondent belongs to the 25 to 35 age group and only 5% belongs to less than 25 age group.Tablehighlights that majority of the women are married and only 17% are either widow or divorced, none of the member is unmarried.

During the survey it was found that group formation is based on long term, it is preferred that members are homogeneous, known to each other and married women are preferred. Even though in some other groups unmarried women are taking part in group activities as a book keeper etc.

Table2: Education level

S.No.	Education	Frequency	%
1	Illiterate	1	2.5
2	Functionally literate	13	32.5
3	Primary	7	17.5
4	Middle	9	2.25
5	High School	7	17.5
6	Higher Secondary	2	5
7	Graduate	1	2.5
Sum	Total	40	100

Source: field survey.

Data reveals that only a single woman is illiterate in the survey sample. Once the woman becomes the member of the group, different type of training provides by trainers of

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NRLM, emphasis is given on making them functionally literate, at least they can sign instead of giving thumb impressions on important documents.

Table: 3 members in the family& Type of family

S. No.	Members	Frequency	%	Family Type	F.	%
1	3 or Less than 3	3	7.5	Nuclear	1	2.5
2	4-6	22	55	Joint	31	97.5
3	7 or more than 7	15	37.5			
		40	100	Total	40	100

Table: 4Occupation, main source of income& Landholding

S.No.	Occupation	Fre.	%	Land-holding	Fre.	%
1	Labor	32	80	Landless	34	85
2	Agriculture And Labor	2	5	Less than 5 bigha	5	12.5
3	Agriculture	3	7.5	5-10 bigha	1	2.5
4	Self Employed	3	7.5	More than 10 bigha	0	0
	Total	40	100	Total	40	100

All the respondents except one belongs to the joint family structure, majority of the respondent having more than 4 members in the family, 80% of the surveyed sample are other backward caste. Main source of income of the respondents through wages, they works as field labor at time of sowing, cutting crops. Some of them are labor in the factory. Only 15% of the respondent having agricultural land, they are marginal farmers.

Table: 5 Income of SHG members

Income	pre	Post	Pre %	Post %
unemployed	32	4	0.8	0.1
>2000	3	12	0.075	0.3
2000-4000	4	15	0.1	0.375
4000-6000	0	2	0	0.05
6000-8000	0	2	0	0.05
8000-10000	0	1	0	0.025
<10000	1	4	0.025	0.1
total	40	40	1	1

As per the responses given by SHG members 80% of them were unemployed before joining SHG and nowthis percentage decreased to 10%, as well as earner members' average monthly income of the respondents is also increased.

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SHGs is became a source of easy finance. Poor need it for it consumption as well as for productive purposes, after satisfying consumption needs they take loan for productive purposes and loan amount is put to income generating activities.

Field survey reveals that SHG members have chosen different economic income generating activities like tailoring, dairy, surf, sanitary pads making, soap, incense sticks making, domestic home and food products, and artisan, mid day meal activity. Active women are indulging in more than one activity. SHGs participants trained for different capacity building activities, i.e., swacchhataprerak, social audit etc. and are getting paid for their active participation.

Field survey reveals that there are more than 90% of respondents who are financially enjoying being a part of SHG member, remaining are also eager to become financially independent. Their saving is also increased after joining SHG.

It was observed that more than 85 % women feels more confident, improved self esteem and increased decision making power. They are more aware about child education, health and sanitation as this all they chant during their meeting as 12 sutras.

CALCULATION OF HYPOTHESIS TESTING

T test is used to know the significant difference between mean of two income data is equal to zero, at 0.05 significant levels (95% confidence interval), two tailed pair sample, where :
N= 40, degree of freedom; df =39, $\mu = 0$,

	Mean	**SD**	**SEM**
Pre	650	1915.52	302.87
Post	3350	3246.69	513.35

DIFFERENCE SCORES CALCULATIONS

Mean: 2700

$\mu = 0$

$S^2 = SS/df = 284400000/(40-1) = 7292307.69$

$S^2_M = S^2/N = 7292307.69/40 = 182307.69$

$S_M = \sqrt{S^2_M} = \sqrt{182307.69} = 426.98$

T-value Calculation

$t = (M - \mu)/S_M = (2700 - 0)/426.98 = 6.32$

The value of t is 6.323555. The value of p is < .00001. The result is statistically significant at $p < .05$.

So the null hypothesis is rejected and alternate hypothesis is accepted, that microfinance through SHG has changed their income level significantly.There is significant difference in income level of respondent after joining SHG of selected sample area of Rajgarh district.

CONCLUSION

This study reveals that there is positive impact of microfinance through SHG on women empowerment in the selected sample area. It clearly shows that if opportunities are given to them they will surely grab it. Some SHG members are facing problem of upward marketing linkages.

It is important to promote relevant activities in the groups. Social, economic and entrepreneurial development of women will depend upon the microfinance policies and their own effort to skill development and capacity building.

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CAN KERWAN RESERVOIR BE CONSIDERED AS A POTENTIAL SITE FOR CONSERVATION OF THREATENED FISH? CASE STUDY OF ITS PHYTOPLANKTONS

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ABSTRACT: The present study comprises analyses of biological parameters of Kerwan reservoir . In fact, this parameter is complementary to other physico and chemical parameters when projected together to present an integrated image of the reservoir in regard to its suitability for propagation and multiplication of threatened fish fauna mahseer. The world-famous game fish Mahseer are declining in their numbers and sizes in different parts of India, due to indiscriminate fishing of brood stock and juveniles, fast environmental degradation of aquatic ecosystems, construction of dams, barrages, weirs, etc. under various river valley projects.The methodology adopted to conduct above mentioned study is as follows. Monthly samples of water were collected from the four sampling stations of kerwan reservoir for a period of eighteen months. The parameters were analyzed according to the Standard Methods of Golterman et al. (1978), Boyd (1979), NEERI (1986) and APHA (1995).

During the period of study it was observed that the minimum number of chlorophyceae species recorded were 23 and maximum was 37 . Minimum number of species of bacillariophyceae was 10 maximum was 15 . Number of species of cyanophyceae recorded was 6, and was minimum and 9 species were recorded , which was maximum.Number of species of euglenophyceae ranged between 1 which was minimum and 3, which was maximum.

The quantitative analysis reveals that the range of phytoplankton remained between 800 organisms/ltr. to 3050 organisms/ltr. As discussed by Welch (1952) lakes with high plankton abundance are known as eutrophic. The values of phytoplankton in Kerwan reservoir also indicate its eutrophic state, though to a lesser degree.

Thus,it could be inferred by the observations and as it has been stated by several investigators the mahseer species has shown adaptability from riverine to lacustrine condition it can be concluded that this fish can be well protected in Kerwan reservoir if managed scientifically.

INTRODUCTION

Habitat destruction, aquatic pollution and introduction of exotic species are few reasons for decline in the number of this important game fish and food fish .There are several examples in India where this fish is being protected in lakes and reservoirs. Kerwan reservoir, which is subject to investigation in this study, is also one of such reservoirs.

Kerwan reservoir is selected to conduct study due its suitability for conservation of mahseer. The topography of this subject suits mahseer development. It is located at the

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outskirts of Bhopal, around 12 km. away from the capital city, at the latitude 23°-9'-55" N and longitude 77°-22'-25" E. The reservoir harnesses the water of Kerwan river, a tributary of Kaliasot river, which in turn joins the Betwa river system.

Only a few houses exist in the vicinity of the reservoir at the dam site. Consequently, it is not exposed to a major source of pollution. However, a certain amount of pollution is caused by the surrounding villages of the Kerwan river. Since the reservoir is also used as a popular picnic spot it is also polluted to some extent by the dumping of wastes by the visitors.

Though Mahseer is mainly herbivorous, to a lesser degree it also exhibits carnivorous habits. Its feeding preferences are filamentous algae, gastropods, insects and their larvae, aquatic weeds and their seeds, crabs, earthworms, insects and shrimps. Kerwan reservoir, which falls in the jurisdiction of M.P. Matsya Mahasangh is an irrigation reservoir that has been declared as restricted for fishing by the Mahasangh. Thus, the present study is an effort to understand the role of biological parameters(phytoplanktons) of the reservoir in reflection to its suitability for conservation of a fish species, i.e. mahseer.

MATERIALS & METHODS

As throughout the stretch of the reservoir it is seen that there has been an apparent similarity and uniformity in the physical appearance of water . It was also observed that the aquatic macro vegetation was remarkably scarce. Four sampling stations S-1,S-2,S-3,S-4 were selected at this reservoir. Samples were collected from all the three stratas i,e surface, middle and bottom layers of the water.

For estimation of phytoplankton one ltr. of water sample was collected in a bottle.Lugol's solution was added to the bottle so as to preserve the phytoplanktons for further analysis . The sample was brought to the laboratory for quantitative and qualitative analysis. It was then centrifuged for total sedimentation. Supernatant liquid was taken out with the help of pipette and the sample was concentrated up to 10 ml. as described by Wetzel and Likens (1979).

QUANTITATIVE ANALYSIS OF PHYTOPLANKTON

Drop count method was used for the quantitative estimation of phytoplankton. The abundance of phytoplankton was expressed as organisms per litre by using following formula -

$$\text{Organisms/ltr.} = \frac{N \times Y \times X}{V}$$

where,

N = number of organisms per drop.
V = volume of original sample.
X = total volume of the concentrated sample (ml.)
Y = volume of one drop (ml)

QUALITATIVE ANALYSIS OF PHYTOPLANKTON

Identification of phytoplankton was done according to the keys given by Pennak (1953), Edmundson (1959), Ward and Whipple (1959), Needham and Needham (1962) and APHA (1995).

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OBSERVATIONS AND DISCUSSION

QUALITATIVE AND QUANTITATIVE ANALYSIS

Minimum number of chlorophyceae species recorded during the period of study were 23 at S-4 and maximum was 37 at S-3. Minimum number of species of bacillariophyceae was 10 at S-3 maximum was 15 at S-2. Number of species of cyanophyceae recorded at S-4 was 6, and was minimum and 9 species were recorded at site 2, which was maximum.

Minimum number of reported species of euglenophyceae was 1 at S-2 and at S-1 it was recorded to be 3, which was maximum(Figure 1)

During the study period at S-1 the minimum number of phytoplankton recorded were in the month of February and it was 950 organisms/ltr. and in July maximum number observed was 3050 organisms/ltr. . Similarly at S-2 the minimum number of phytoplankton were recorded in February and was 850 organisms/ltr. with a maximum number of 3000 organisms/ltr. in July .

At S-3 the minimum reading of 800 organisms/ltr. was recorded in the month of Feb and and maximum value was recorded in June and July months which was 2750 organisms/ltr. respectively. At S-4 only 800 organisms/ltr. which were noted to be minimum were recorded in the month of February and 2600 organisms/ltr. was the maximum in June .Thus the study indicated that the range of phytoplankton remained between 800 organisms/ltr. to 3050 organisms/ltr. which also shows a remarkable ascending trend in the number in the rainy season as compared with the rest of the months (Figure 2).

As the study revolves around the availability of food for the purpose of conservation of fish species, the qualitative analysis of the producers play a crucial role for deciding whether Kerwan reservoir could be considered as a conservation site or not. Sitewise readings through the qualitative analysis reports that at S-1 and S-2, sampling station Chlorophyceae, Bacillariophyceae, Cyanophyceae and Euglenophyceae were represented by 26, 12, 8 and 3 and 30, 15, 9 and 1 species respectively. At S-3 sampling station Chlorophyceae 37, Bacillariophyceae 10, Cyanophyceae 6 and Euglenophyceae 2 species were recorde and 23, 12, 6 and 2 species respectively at S-4 sampling station in Kerwan reservoir. Among the species which were identified as bioindicators of eutrophic state of water quality in Kerwan reservoir were Scenedesmus abundans belonging to Chlorococcales, Cyclotella meneghiniana and Melosira granulate of Bacillariophyceae, Microcystis aeruginosa and Anabaena circinalis of Cyanophyceae.Microcystis and Cyclotella are considered as eutrophic indicators Rawson (1956) , Melosira granulata as an indicator of eutrophic waters, Teilling (1955) . Mason (1996) observed that in addition to Melosira and Microcystis, Anabaena, Stephanodiscs and Scenedemsus are also associated with eutrophic lakes.

As biological indicators react either positively or negatively to the changing parameter of water the are used for assessing the water quality. Phytoplankton, which are one of the primary producers of the organic matter in an aquatic ecosystem, are microscopic, free floating or freely swimming plant organisms known to have a typically short life span. Therefore, whenever any kind of utilization of water from a natural source is discussed, the study of phytoplankton is of primary interest. As we also know that phytoplankton posses unique ability to fix inorganic carbon and build up organic matter through primary

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productivity which makes them a subject of prime importance.Here the context of the study is to select the natural water body for the purpose of conservation of a threatened fish species thus the qualitative and quantitative analysis of the producer of this ecosystem play a very crucial role in decision , .

Welch (1952) classified the lakes with high plankton abundance as eutrophic.In the present study in Kerwan reservoir the total number of phytoplankton ranged from 800 to 3050 org/lit, these values of phytoplankton also indicate its eutrophic state, though to a lesser degree. In the summer season high values were observed in the reservoir of our interest which coincides with the findings of Oswald et al. (1957) and Vincent and Silvester (1979), who have also reported high summer values of phytoplankton.Blooms often cause heavy mortality of fish,Jhingran (1983) ,and the mortality of the fish is being variously attributed to oxygen depletion due to rich growth of algae, to the physical choking of the gills to their probable decomposition,and to the toxins liberated by the metabolism of algae. However, no such incidence of mortality of fishes was recorded in Kerwan reservoir and hence it could be assumed that there is no significant stress on fish particularly Mahseer.

CONCLUSION

As the availability of food acts as a major factor for conservation of fish in the natural or artificial ecosystem, and this study also emphasizes on the qualitative and quantitative analysis of the phytoplanktons in the Kerwan reservoir, this would lead to a conclusion. The significance of this biological form can be considered of prime importance.. It is seen that phytoplankton comprises a considerable part of food of Tor tor. According to Bisth and Das (1981) algae, insects, crustaceans and diatoms are the major constituents of food of Tor tor. In the present study we found that the phytoplankton population ranging from 800-3050 org/lit was recorded which can be explored as a natural source of food for Mahseer species if proper stocking is practiced.

Throughout the study period we found that the quantitative analysis of phytoplanktons indicates that the reservoir is slightly heading towards eutrophic state. However, the growth of this magnitude cannot be considered as the blooming condition, which may many times prove to be fatal to fish population. Thus, in the era of ecotourism where tourism and conservation are considered as faces of coin such site could be considered for conservation of species which are dwindling in number day by day,On the basis of the above findings it can be concluded that Kerwan reservoir can provide suitable habitat for thriving the Mahseer fish, if the stocking, raising and management practices are adopted scientifically. Any conservation effort of an endangered species can be futile if the feeding ecology of particular species is not taken care of. As seen from food preferences of Narmada Mahseer for aquatic plants, and filamentous algae, the utility of this species in biological control of macrophytes in tanks and reservoirs is very promising.

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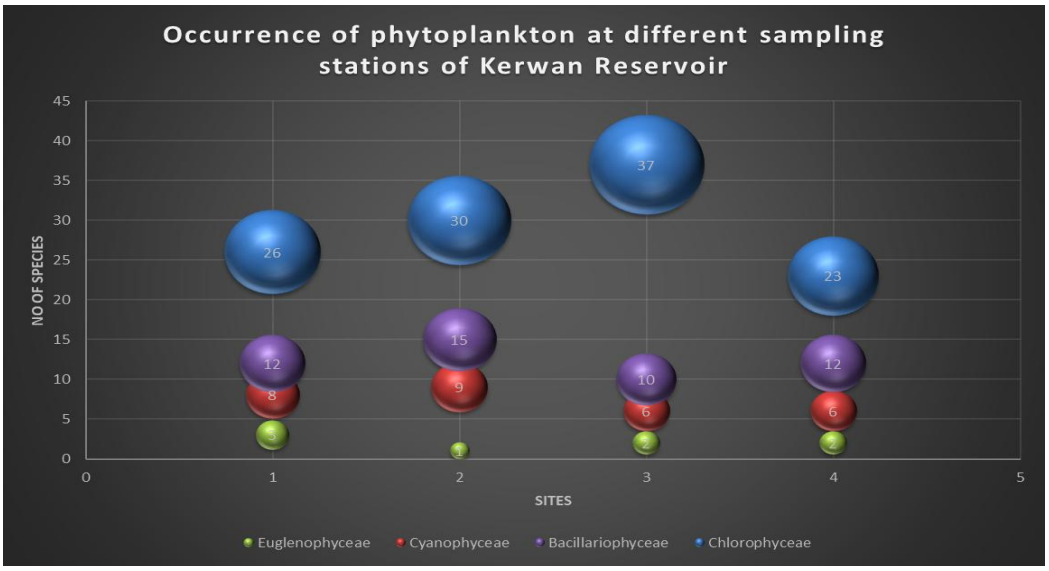
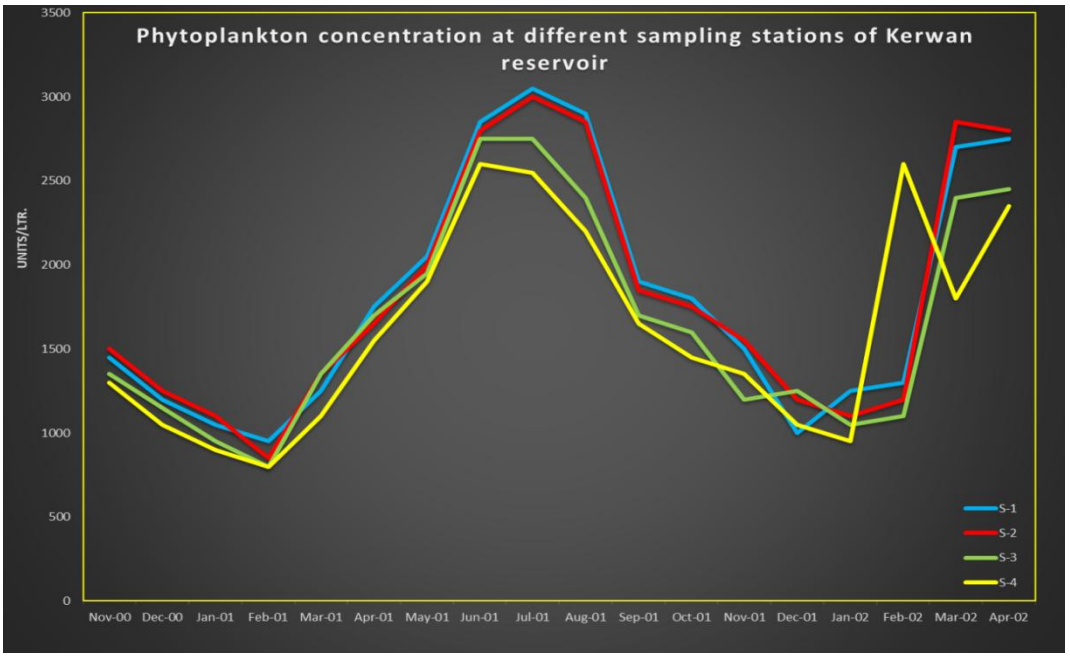


Figure 2: Phytoplankton concentration at different sampling stations of Kerwan reservoir



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IMPACT OF DYNAMIC CHANGES IN TECHNOLOGY ON INSURANCE SECTOR IN INDIA

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ABSTRACT: Like every other industry, the global insurance sector, worth over $5 trillion, has undergone an immense overhaul because of disruptive technologies in recent years. Customer expectations have changed, and the digitally savvy people who have grown up in the last couple of decades are used to personalized interactions and instant gratification.
Admittedly, the insurance industry (risk, premium, claims) has been slow to keep pace with digitization and are only slowly beginning to grasp the power of becoming more customer-centric and offering faster response times, increased transparency. Legacy players are now forced to compete with "insurtechs" who are coming up with better, innovative ways to speak to the customer and provide satisfaction at a lower cost.

INTRODUCTION

It is now well established that over the last 12-18 months, "technology" is at the front and centre of every industry. In many ways, it is now easy to conclude that every business is a technology company.

For the insurance industry, it is now at a wonderful inflection point. On one hand, the demand for new insurance products is ever growing – from the traditional life and health insurance to insurance against natural disasters and cyber-attacks. On the other hand, the industry is unable to keep up with the very same market potential and requires a disruptive change in technology in order to adapt faster than ever before – retaining customer loyalty and improving customer experience adds a third dimension to the already challenging landscape.

Direct digital interaction with customers: In the last few years, online insurance aggregators email and social marketing, search engine marketing and website + tele-assist based direct sales have established themselves as key digital marketing and distribution channels. Growth witnessed in these channels leaves no doubt about their potential. By leveraging analytics and advances in technology and digital infrastructure, direct digital interactions and marketing to the customers will become highly personalized, more engaging and automated using natural language processing.

The global trend of digitizing the core insurance processes of sales, claims settlement as well as back-office operations is also gaining roots in India. A number of insurers have launched processes and apps for distribution partners and customers. Apart from productivity

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gains, digitization also helps improve process quality through standardization, process risk controls and lower manual involvement. For process digitization 2.0, insurers will leverage the rapidly developing digital infrastructure in the country as well as the latest technological advances.

LITERATURE REVIEW

A literature review is conducted to generate a theoretical and scientific analysis of a particular phenomenon and uncover what is known and the gaps related to that topic.

According to the Ernst & Young survey on frauds in insurance, the Indian insurance sector incurs a loss of more than 8% of its total revenue, the study indicates that the average ticket size of a single fraud ranges between INR25, 000 and INR75,000. Increase in frauds indirectly drives up the premiums collected from policy holders as insurers ultimately recover the losses by increasing the prices. Inclusion of Technology in the insurance fraud detection has reduced the fraudulent claims by 3%, further development of technology will surely help to increase the percentage of reduction of fraudulent claims.

Fraudulent and dishonest claims are a major hazard not only for the insurance industry but also for the entire nation's economy. Concrete proof as evidence including documentation, statements made by the customer and his family members and even neighbors are taken into consideration.

ROLE OF IOT IN INSURANCE SECTOR

The Internet of Things (IoT) will have its implications on claims servicing as well. Using big data, insurance companies will have improved their claims-processing capabilities. IoT improves turnover timefor initiation of claims by tracing the exact location and cause of loss. The early warning system can reduce the frequency and severity of losses. We will be able to identify and report events in a fast and effective manner. Claim assessment, too, can be automatically assigned based on the performance of the adjuster and complexity of the claim. The technology will also usher in an era of transparency and will help in minimizing frauds which otherwise would have gone unnoticed or been detected after a long time, with the culprit getting enough time to get away.

SCOPE &OBJECTIVE/ HYPOTHESIS

- The main objective of the study is to prevent the fraud in insurance sector with the help of technology.
- Let's reflect to a back. In 1995, I make a claim for my scenario a few yearsMaruti 800 and get my claim amount of Rs 20,000 within one-and-a-half months and I am happy.
- In 2005, I file for a claim for my Honda City and I am glad to receive my payment within 20 days. Today, if my car meets with an accident I expect my claim instantaneously. Is it possible to receive a claim within minutes? Has the insurance industry evolved out of its traditional mode to cater to today's customers or to the millennials who are looking at instant services and more contextual and personalized solutions? The moot question is whether the industry today is equipped to reach out to the hugely untapped potential that India offers. The insurance industry is undergoing a transformation today.

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- Digitalization has opened up major opportunities for us. It has given us a breakthrough to deal with the challenges that we have been battling over decades. The advent of the insurance business in India dates back to 1818. The industry has had its presence in the country for over 150 years, yet its penetration is less than 3 percent of the GDP.
- A conventional approach, coupled with lack of infrastructure, has been the root cause of the industry's inability to realize its full potential and penetrate the Indian market. However, today, the industry is embracing digitalization and transforming the way business is done. It has affected all the areas of operation of an insurer, including employees, customers and business partners. Most importantly, it has helped us address some of our major challenge.

METHODOLOGY

Important technological methods impacting the the insurance industry in driving the growth and evolution of the sector.

- Blockchain
- IOT
- Artificial Intelligence
- Big Data
- Augmented Reality

BLOCKCHAIN AND ITS IMPACT ON THE INSURANCE INDUSTRY

Along with cutting down operational costs and ensuring fast, reliable, and secure applications, blockchain has the potential to disrupt existing business models in several ways.

With blockchain, the distributed ledger technology (DLT) which ensures that digital data is safe, there are fewer chances of identity theft or fraud.

IoT AND ITS IMPACT ON INSURANCE INDUSTRY

IoT devices, sensors, and telematics have been fast gaining adoption in the insurance sector. Several data streams and sources (wearables, sensors embedded in vehicles, location-based sensors, GIS) coupled with advanced analytics can help insurers improve risk assessment, price policies based on real data in real time, and proactively encourage customers to buy policies for loss prevention.

More usage-based insurance models for connected vehicles and precise actuarial models are expected with the huge amounts of data (or touchpoints) available thanks to today's amazingly connected world. In the auto insurance sector, for example, the data (speed, time, braking patterns, distance) gives buyers more say in their premiums; risky driving patterns can serve as warning signs.

ARTIFICIAL INTELLIGENCE AND AUTOMATION IN THE INSURANCE INDUSTRY

Automation and AI have transformed almost every sector across the world, and the insurance industry is no exception.Automation of more complex tasks (other than compliance checks or data entry) such as property assessment and personalized consumer interactions over the years has brought frictionless experiences and cut down redundancy.

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Employing AI in the claims process has brought better quality and lesser time for handling (e.g. RightIndem, Shift Technology). AI algorithms can save millions lost to fraudulent claims by scouring data and identify errors and trends. The future is definitely touchless!

BIG DATA AND PREDICTIVE ANALYTICS IN INSURANCE

Although seemingly unmanageable amounts of data are churned out every day, advanced analytics has been helping insurers manage risk, drive profitability, settle claims, and price premiums better and faster. Extracting value from data using powerful analytics and data warehousing platforms have enabled evidence-based decision making.

According to a Willis Towers Watson survey, big data and predictive analysis will expand customer relationships, improve internal performance management, and enhance customer value proposition by about 20 to 30%.

In the claims cycle, using exception reporting, text mining, rules, and database searches, the predictive analysis identifies fraud more effectively. Claims and fraud analytics will better insurer profitability.

Identifying subrogation opportunities sooner using text analytics, loss expenses can be minimized, and loss recovery can be maximized.

AUGMENTED REALITY/VIRTUAL REALITY

AR apps-based tutorials and games can be valuable marketing tools and can help gather customer insights and reduce the cost of training by enhancing the learning experience.

It is important to note that one of the fastest growing insurance is Cyber insurance; mixed reality will bring a slew of new risks (health, behavioral, privacy, and information security risks) and new growth opportunities for insurers.

EXPECTED OUTCOME

Fraud Prevention: Fraud comes in all shapes and sizes. Insurance fraud costs companies billions of dollars per year across the globe. Insurance companies should establish a technology framework, tap into advanced automation and analytics, and take steps to prevent it.

Digital Signature Technology: Digital signature technology is without a doubt lowering fake insurance account activation and hence a fraud. for example, the case of claims on a said date when insurance is purchased after accident can be brought down with digital signatures verifying the purchase to be after the incident.

– Data analytics: The technology involves data mining tools and quantitive analysis. Data analytics can be applied to detect fraud. Predictive analytics helps improve the fraud detection process, helping prevent claims payouts. Analytics on claims and fraud transactions helps enhance risk management.

Lower underwriting cost: The number of internet-connected devices and sensors is projected to reach 50 billion by 2020, which will have a significant impact on the availability of real-time information that insurers can use for better pricing/underwriting. Drones are satellites on steroids at least as far as underwriting is concerned. Satellites have dramatically changed how home insurance policies are written due to fire. All sorts of things to come from drone footage underwriting: Houses that you can't even see due to trees.

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Billing efficiency:

Billing systems are not only integrated but now can accept varied forms of payments allowing ultimate flexibility to the customer and thereby making the billing systems efficient. The automated systems can inform and remind customers of approaching due dates for premiums thereby lowering unintentional defaults.

Specialized insurance:

Each type of insurance is different from the other and the factors that are suited to one are not suited to the other. This requires the insurance agents to have specialized knowledge and the internet helps. however, Machine learning is vitally important here. It has the capability to learn and analyze billions of patterns and identify suitable underwriting clauses as well as identify specific customised plans for the customers based on the data provided. This can change the customer perception of the insurance company and provide an engaged customer who is likely to stay longer.

Emerging technologies have produced various opportunities for Insurers to walk with today's world, provide seamless customer experience to their customers and create new services and products.

CONCLUSION

Fraud detection will be done in dynamic manner and Technology will play a very important role in this.In conclusion, the rise in the insurance sector will be marked by a favorable demography, penetration opportunities, relevanttechnology, financial inclusion and risingfinancial literacy. To tap the penetration opportunities and increase profitability, thefocus should be on retail segments like motor, individual, health, as well as SME segments through agents, bank assurance products and banking correspondents. Additionally, for rural penetration opportunities, there is a need for large scale tie-ups with common service centers and public sector banks for distribution of micro insurance products. In the years to come, ease of insurance portability, competitive e-policy pricing and customized health insurance policies are expected to fuel the growth of the sector. The only way to benefit from these changes is to embrace them, prepare for them and to be equipped to respond effectively to them.

This is one of the very few industries that pursue a noble cause with social benefits as well as provide support to the nation and the Government; we as a society must collectively support its growth and development. The industry undoubtedly has a great growth potential and may very well double in size by 2020, but if some of the aspects outlined above play out favorably, they will be decisive in providing the right stimuli.

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''डिजिटल इण्डिया एवं युवा वर्ग''

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सारांशः वर्तमान केन्द्रिय बजट किसानोन्मुखी है, लेकिन राष्ट्रीय डिजिटल साक्षरता मिषन को गति देना इके अन्तर्निहित कारक में शामिल है। इसके तहत आने वाले तीन वर्ष में आठ करोड़ घरों के ग्रामीण नागरिकों को डिजिटल दुनिया से जोड़ देने का लक्ष्य हासिल करना है।

इसे पाने के लिए बजटीय सावधानों से वृहद् डिजिटल संरचना का निर्माण करना है। डिजिटल साक्षरता को बढ़ाना आर डिजिटल तरीके से सेवा प्रदान करने के काम को गति देनी है। डिजिटल इण्डिया के वांछित लक्ष्य को साहिल करने के क्रम में रोजगार की अपार सम्भावना पैदा होने की उम्मीद जाहिर की गई है।

डिजिटल इण्डिया की उपयोगिताः

डिजिटल साक्षरता के दायरे में आम भारतीयों को ले आना डिजिटल इण्डिया का प्रधान लक्ष्य है। इसके जरिये आसान पहुॅच बनाकर नागरिकों तक सभी सरकारी सेवा उपलब्ध कराना है। इसके तहत पूरे देश का डिजिटलीकरण एक महत्वपूर्ण कार्य है। इसके कार्यक्रम में तीन मुख्य दृष्टिकोंण है। पहला, सरकारी विभागों और प्रमुख कम्पनियों (राष्ट्रीय और अन्तराष्ट्रीय स्तर) के एकीकरण के डिजिटल रूप से सशक्त भारतीय समाज का निर्माण करना है। इसके लिए योजनागत पहल होनी है। दूसरा, भारतीयों के लिए जनोपयोगी सेवा को तेज गति की इंटरनेट सेवा पहुॅचाकर सुलभ एवं सम्भव बनान है।

यह कार्यक्रम नागरिकों को जीवनपर्यन्त अनोखा, ऑनलाईन और प्रामाणिक रूप से डिजिटल पहुंचाना उपलब्ध करायेगा। यह किसी भी ऑनलाईन सेवा जैसा बैंक खाता सम्भालना एवं वित्तीय प्रबन्धन में मददगार होगा। इसके जरिये लोगों को सुरक्षित और सुनिष्चित साइबर स्पेस उपलब्ध कराना सम्भव होगा। शिक्षा व दूरस्थ षिक्षा आदि के लिए बेहद कारगर होगा। इससे सुशासन की मॉग को पूरा किया जा सकेगा। ऑनलाईन सेवा को डिजिटलीकरण से वास्तविक समय पर लोगों तक पहुॅचाया जा सकेगा। डिजिटल रूप में बदलती हुई सेवा के वित्तीय लेन–देन को आसान बनाया जा सकेगा। इलेक्ट्रॉनिक और बिना नगद व्यवहार वाले ऑनलाईन व्यापार के लिए लोागों को प्रोत्साहित किया जा सकेगा।

केन्द्र व राज्य में ताल–मेल की जरूरतः

इस लक्ष्य को हासिल करने के लिए संघीय व्यवस्था में केन्द्र व राज्यों के विभिन्न सरकारी विभाग जैसे आईटी, शिक्षा कृषि आदि के द्वारा सेवा युक्त परियोजनाएॅ परस्पर सम्बद्ध होगी। दूरसंचार और सूचना तकनीक मंत्रालय को नोडल एजेंसी बनाया जायेगा। इसका उद्देश्य आम भारतीयों को समान रूप से सुनहरे अवसर प्रदान किया जाना है। देष के लगभग 2,50,000 गायों और देष के दूसरे आवासिय इलाकों मे तेज गति के इंटरनेट कनेक्शन को उपलब्ध कराने के लिए राज्य सरकार के द्वारा एक योजना बनायी गयी थी। इस प्रोजेक्त में ''भारत ब्राडबैन्ड नेटवर्क लिमिटेड'' की ओर से एक महत्वपूर्ण भमिका अदा की गयी है। डिजिटल इण्डिया में डाटा का डिजिटलीकरण आसानी से होगा। जो भविष्य मे चीजों को तेज और ज्यादा दक्ष बनाने में सहायक होगा। ये कागजी कार्य, समय और मानव श्रम की बचत करेगा। सरकार और निजी क्षेत्र के बीच आपसी सहयोग और गठबन्धन के जरिये

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योजनाओं को गति दी जायेगी। तेज गति नेटवर्क के साथ आपस में जुड़े हुए बड़ी संख्या में गॉव वास्तव में पिछड़े क्षेत्रों से पूर्ण रूप से डिजिटली लैस इलाकों के रूप में एक बड़े बदलाव से गुजरेगा। भारत में सभी शहर, नगर और गॉव ज्यादा तकनीकी की होंगे। मुख्य कम्पनियों (राष्ट्रीय और अन्तर्राष्ट्रीय) के निवेश के साथ इस प्रोजेक्ट को पूरा करने की योजना है।

यह एक प्रभावशाली ऑनलाईन मंच है जिसके जरिये शासन प्रणाली में लोगों को शामिल किया जा सकता है। सार्वजनिक व व्यक्तिगत चर्चा कार्य करना और वितरण जैसे काम को आसान बनाया जा सकेगा। ई. हस्ताक्षर संरचना से नागरिक अपने दस्तावेजों को ऑनलाईन हस्ताक्षर कर पायेंगे। ई. अस्पताल से महत्वपूर्ण स्वस्थ्य पर सेवाओं को आसान बनाया जा सकेगा। ऑनलाईन रजिस्ट्रेशन डॉक्टर की उपलब्धता का पता लगाना उनसे मिलने का वक्त लेना, फीस जमा करना, खून आदि की जॉच रिपोर्ट हासिल करना आदि मुमकिन होगा। डिजिटलीकरण से पूरे देश में युवाओं के लिए सरकारी व निजी सेवाओं के प्रभावषाली वितरण को आसान बनाना मुमकिन हुआ है। ई. चैपाल के भारत नेट कार्यक्रम (तेजगति का डिजिटल हाईवे) के जरिये देश को सभी ग्राम पंचायतों को जोड़ा जाना है।

निष्कर्ष:

आज डिजिटल इण्डिया युवा वर्ग के सपनों का साकार करने का माध्यम बनने के मार्ग को प्रषस्त कर रहा है। इसके माध्यम से रोजगार की अपार सम्मानता दिखाई देती है। इस जरूरत के बीच डिजिटल इण्डिया को समय पर कार्यान्विन करना अधिक आवष्यक है क्योंकि इससे भारत को सशक्तीकृत किये जाने का राष्ट्रीय दायित्व पूरा होना दरअसल कई समस्याओं की पहचान का काम कियान्वयन के क्रम में सामने आने वाली परेषारियों को समझकर ही सम्भव हो पायेगा। अगर बात करें की डिजिटल इण्डिया एक ओर पूरे तरीके से पूरे भारत को युवा वर्ग की एक सपना साकार कर रहा है। वही इसके दुष्परिणाम भी बहुत ज्यादा है। आज हर एक व्यक्ति के पास में अपना एक डिजिटल फोन है। वहीं इसके घातक परिणाम भी है। जहां एक ओर युवा वर्ण अपनी सरकार सभ्यता से जहां दूर होता जा रहा वहीं दूर परिवार से भी दूरी होती जा रही है। जहां एक ओर छोटी–छोटी घटनाएं शोसल मीडिया के माध्यम से उनकी गलत जगह जहां न्यूज जाती है। वहीं जाति के नाम सम्प्रदाय के लोगों में दगे और समाज के बीच में एक बहुत बड़ी खाई बनती जा रही है जहां एक ओर इसमें जातिगत संघर्ष देखने को मिल रहा वहीं समाज भी अछूता यही समाजिक संघर्ष भी पूरे देश में एक दीमक की तरह फैलता जा रहा है और जहां एक ओर भारत जैसे देश के लिए बोला जाता था की यह अनेक प्रकार की भाषा अनेक जाति अनेक सम्प्रदाय के लोग निवास करते हैं। और सब मिल–जुलकर अपनी त्यौहार मनाते हैं। और वहीं आज के इस डिजिटल युग में सबसे बड़ा खतरा यही है कि आज देश में इतनी ज्यादा जातिगत घटनाऐं घटित हो रही जिसकी कोई सीमा नहीं इतने सम्प्रदायिक दंगे होते हैं की हम सब कुछ भूल चुके हैं कि हम हिन्द, मुस्लिम, सिख, ईसाई सब भाई–भाई करके रहते थे आज देश में जहां एक ओर डिजिटल क्रान्ति आई वहीं देश में आज इस क्रान्ति के कारण सभी सौहाद्र भी बिगड़ चुका है। इस के लिए बहुत आवश्यक है। हम शोसल मीडिया फेक न्यूज और फर्जी खबरों में हम सक्त कानून की जरूरत है। जब हमारा जातिगत सौहाद्र और सामजिक सौघट बच पायेगा, अगर इनमें रोक नहीं लगाई गई तो देश पता नहीं किस गति में जायेगा। जहां डिजिटल क्रान्ति एक ओर सबका सपना पूरा कर रही है। वहीं एक ओर इसका काला सच यह भी है।

अंतः में बोलना चाहूंगा कि जो भी सरकार हो से वे इनमें कड़े कानून बनाने की जरूरत है। तब देश का डिजिटल क्रान्ति का सपना सही और देश के विकास में इसका सही ढंग से इसका उपयोग हो पायेगा आज जहां हर एक के पास में एक हैं तो इन्हीं के माध्यम से एक छोटी– छोटी घटनाऐं कितनी रोद्र रूप ले लेती है। और इन सब घटनाओं में रोकने के लिये एक कड़े कानून बनाने की जरूरत है।

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नैतिक मूल्यों के विकास में संगीत की भूमिका

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सारांश: नैतिक मूल्यों में संगीत की भूमिका विषय पर चर्चा करने से पूर्व संक्षेप में संगीत शब्द की चर्चा करना आवष्यक है। संगीत शब्द की व्याख्या अनेक प्रकार से कर सकते हैं :–**'समेन गीयते इति संगीतम्'**, सम् शब्द का अर्थ सहित, इस रूप में जो वाद्य आदि के साथ गाया जाय वही 'संगीत' है। सम् शब्द का एक और अर्थ –**समताया भावः इति समः, तेन सह गीयते इति संगीतम्** भी हो सकता है। यह तथ्य हमारे सम्मुख संगीत के आध्यात्मिक एवं मानवीय दोनों पक्षों को मुखर करता है। गीत के माध्यम से हम स्वयं में समता का भाव सहज रूप से विकसित कर सकते हैं। इस समता के भाव की व्याख्या करते हुये श्री कृष्ण भगवान ने श्रीमद् भगवद् गीता में कहा है –**समः शत्रो च मित्रै च तथा मानापमानयोः, शोतोष्ण सुखदुः खेषु समः संगविवर्जितः।**
वस्तुतः संगीत के माध्यम से हम अपनी पाषविक प्रवृत्तियों का शमन कर उस उच्च अवस्था तक पहुंच कर समरसता की अनुभूति का सकते हैं।

शोध–पत्र

आदिकाल से ही मानव और संगीत में अटूट संबंध रहा है, अर्थात् संगीत का जन्म सृष्टि के साथ ही हुआ। संगीत के द्वारा जीवन में प्राण का संचार होता है। प्राणी मात्र में चेष्टा और ध्वनि के द्वारा भावों को प्रकट करने की लालसा स्वभाव से ही होती है। चेष्टा और ध्वनि में अभिव्यंजना की दृष्टि से चेष्टा सर्वोपरि है क्योंकि उसे किसी धर्म, जाति अथवा देष की अपेक्षा नहीं होती। चेष्टा को यदि नाद की सहायता और मिल जाए तो उसका प्रभाव बहुत व्यापक हो जाता है। चेष्टा ने नाट्य को जन्म दिया और ध्वनि अथवा नाद से भाषा और संगीत की सृष्टि हुयी है। ध्वनि से उत्पन्न व्यंजन शब्द को जन्म देता है, शब्द अर्थ को, अर्थ से स्पन्दन उत्पन्न होता है, स्पन्दन से पुनः स्वर का जन्म होता है और उस स्वर से सौन्दर्य की सृष्टि का आध्यात्मिक आनन्द ही सौन्दर्य तत्व है। इस प्रकार संगीत द्वारा भी सौन्दर्य बोध होता है, संगीत द्वारा **सत्यंषिवं सुन्दरं** की प्राप्ति होती है निष्चय ही नाद का स्वर रूप ही संगीत है जो शून्य से उत्पन्न होता है एवं अनहत् भाव से समस्त विष्व में व्याप्त है।

संसार में समस्त क्रिया कलाप, ध्वनि और गति पर आधारित है। प्रत्येक शारीरिक संवेदना और विचार भी भिन्न गतियों से संयोजित ध्वनि का परिणाम है।

नाद व चेष्टा के आश्रित जितनी भी कलाएं हैं वे सब मनुष्य को आनन्द प्रदान करती हैं और व्यक्तिगत राग और द्वेष से ऊपर उठकर ब्रह्मानन्द के समान अलौकिक आनन्द उपलब्ध कराकर मनुष्य को मुक्ति के मार्ग की ओर अग्रसर करती है। इसलिए समस्त ललित कलाओं में संगीत कला को सर्वोच्च स्थान दिया गया है।

सभी ललित कलाओं में श्रेष्ठ संगीत कला का माध्यम अति सूक्ष्म है, मात्र सात स्वर सा रे ग म प ध नि जो अमूर्त भावनाओं को मूर्त रूप प्रदान करते हैं। प्राचीन काल से अधुना पर्यन्त जब हम दृष्टिपात करते हैं तो पाते हैं कि हमारा जगत नाद के अधीन है–

''न नादेन बिना ज्ञानम् , न नादेन बिना शिवम् ।
नाद रूपम् परम ज्योति , नाद रूपी स्वयं हरि''।।

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– नाद के बिना ज्ञान प्राप्ति नहीं और न ही मानव कल्याण संभव है।

विषय वस्तु को दृष्टिगत करते हुये जब हम नैतिक मूल्यों के विकास में संगीत की भूमिका पर दृष्टिपात करते हैं तो पाते हैं कि संगीत का महत्व मानव जीवन में तो महत्वपूर्ण स्थान रखता है साथ ही व्यक्ति के आचार– विचार, व्यक्तित्व विकास, मानव जीवन में महत्वपूर्ण नैतिक मूल्यों के विकास में भी विषेष भूमिका का निर्वहन करती है। क्योंकि संगीत के द्वारा ही हम नैतिकता को बढावा दे सकते हैं व संपूर्ण मानव का विकास कर सकते हैं। संगीत के लिये ठीक ही कहा गया है– 'Music is an universal language'. संगीत के संदर्भ में जब हम स्वरों की बात करते हैं तो निष्चय ही स्वरों का मनोवैज्ञानिक प्रभाव पड़ता है। संगीत हमारे अन्दर एक प्रकार से प्रेरक शक्ति उत्पन्न करता है। ध्वनि कम्पन्न का प्रभाव, जिससे मस्तिष्क की तरंगे प्रभावित होती हैं, जिसका प्रभाव हम अपनी इच्छा शक्ति, तनाव से मुक्ति आदि पर विजय प्राप्त कर लेते हैं। जैसा कि '**मार्क**' ने अपनी पुस्तक 'split of music' में लिखा है कि ''संगीत केवल सामान्य ध्वनि नहीं अपितु यह सूक्ष्म अंतर्वृत्तियों के उद्घाटन का सबल साधन है।''

'कार्ल स्टम्फ' ने भाषा की उत्पत्ति के बाद मनुष्य द्वारा ध्वनि की एकतारता को ही स्वर की उत्पत्ति माना है।

भारतेन्दु हरीषचन्द्र के अनुसार, संगीत की उत्पत्ति मानवीय संवेदनाओं से हुई। निष्चय ही संगीत का मानव जीवन में विषेष महत्व है। आधुनिक मानव भौतिकवादी और पाष्चात्य संगीत के कारण धीरे–धीरे स्वयं को प्रकृति से तथा प्राकृतिक संगीत से स्वतः को दूर कर लिया है। आज कठिन, संघर्षमय भागदौड़ के युग में मानव अपने मानसिक संतुलन को सहज और संतुलित नहीं रख पा रहा है। मानव का संगीत से दूरी बनाकर भौतिकवाद की तरफ आकर्षित होता है, जिससे मानव में अनैतिकता की भावना का जन्म अतिषीघ्रता से विकास की अवस्था की ओर अग्रसर होती जा रही है। संगीत के उद्देष्य एवं महत्व पर दृष्टिपात करें तो पाते हैं कि सुर के सान्निध्य में रहकर हमारे ऋषि मुनियों ने मोक्षप्राप्ति की। निष्चय ही समाज में संगीत का योगदान एक संतुलित और सहज मानवीय व्यक्तित्व के निर्माण के रूप में, राष्ट्र के विकास में, सहभागिता व आज जो कुछ भी यत्र तत्र नैतिक मूल्यों को न स्वीकार कर अनैतिकता की भावना का तीव्रता से बढ़ना अतः इसमें संगीत की भूमिका अहम है क्योंकि संगीत द्वारा ही हम अपने नैतिक मूल्यों को विकसित कर सकते हैं। नैतिक मूल्यों को विकसित कर हिंसात्मक प्रवृत्ति का नाष भी संगीत द्वारा ही किया जा सकता है। संगीत द्वारा ही 'Father hood of God & Brother hood of Man' की भावना को विकसित कर सकते हैं।

निष्कर्षतः संगीत कला हमें दूषित भावनाओं को परिष्कृत कर मानव बनने के लिये व उन्नत होने के लिए प्रेरित करती है। मात्र सात स्वर समस्त जड़–चेतन, पशु–पक्षी व मानव सभी के अन्दर एक विषेष प्रेरणा देते हैं, जिसका प्रभाव मानव के नैतिक गुणों पर पड़ता है व जो मानव के नैतिक गुणों को बल प्रदान करने में अवष्य संभावी है।

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A DETAILED STUDY OF SOFTWARE COMPLEXITY BASED ON NEURAL NETWORK AND MACHINE LEARNING TECHNIQUES

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ABSTRACT: This paper describes a development method for neural network by engineering principles and practices. In this work we have seen, there are some software tools and Techniques to measure the complexity of software and we have also seen some machine learning techniques to obtain more accurate results regarding software complexity and with this we will find out the result through neural network. In this paper we have identified the major engineering problems associated with neural network development, the lack of repeatability and predictability of the development process. To counteract these problems we have proposed a development process which incorporates specialized methods to address the issues specific to neural network development. We will determine that neural network is often used as another methodology to grasp and find out the computer code complexness on the bases of given input and knowledge during this work, a neural network (perception) based mostly computer code quality prediction technique is planned. This method, will predict the standard of the ensuing computer code throughout the first phases of the lifecycle, saving time and resources on future elimination of style errors and maintenance. This sort of work is going to be useful for industry altogether their software engineering related work incurred while software development, particularly in medium and enormous size projects.

Keywords: Software quality perceptron, prediction, Neural, Netwok, Artificial Techniques Automation, Supervise, idiomatic expressions, identifying observed, guiding, proof-based work, annotative model, applied work, structured and unstructured enquiries, systematic, validity.

INTRODUCTION

Software complexity analysis is a key issue essential to improve the code quality, reduce the maintenance cost, increase the robustness and meet the architecture standards. The measures have been developed for determining a quantitative measure of complexity directly from the operators and operands in the module Software complexity measuring is the important constituent of software system and it is concerning the cost of software development and maintenance. In order to improve the software quality and the project controllability, it is necessary to control the software complexity by measuring the related aspects.

SOFTWARE QUALITY ANALYSIS

This may be a key issue essential to boost the code quality, scale back the upkeep price, increase the lustiness and meet the design standards. The lives are developed for

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deciding a quantitative measure of quality directly from the operators and operands within the module computer code quality measure is that the necessary constituent of package and it's regarding the price of computer code development and maintenance. so as to boost the computer code quality and therefore the project controllability, it's necessary to regulate the computer code quality by measure the connected aspect.

PRODUCTIVITY OF SOFTWARE

System has grownup in size, complexity, and additionally price. One in all complexness factors is demand. A unit of demand used as a choice to the planning section of development. The necessity is additionally a main possibility in verification method. Therefore the necessity complexness during this analysis is employed as parameter to predict the software system complexness.For this reason, we tend to see tons of potentialities to make automatic systems that analyze (and work on) these machine learning knowledge to boost the protection, performance, and dependability of financially complicated package services. There's conjointly tons of exciting analysis around "ML on code": mil has tremendous opportunities in continuous automation of bug fixing, testing, deployment, and code improvement.

MACHINE LEARNING

In this work we will judge the aptitude of neural networks in predicting software package complexness and compare its prediction performance against well-known strategies software package complexness metrics within the context of at random generated dataset. Fashionable software package systems unleash "machine data" that square measure crucial to detective work and understanding the abuse, however the dimensions and complexness of this knowledge way exceeds the human ability to perform the mandatory analysis and capture. Timely action

MACHINE LEARNING

Machine Learning (ML) is that the discipline that studies ways for mechanically inferring models from knowledge. Machine learning has been with success applied in several areas of software system engineering starting from behavior extraction, to testing, to bug fixing. More applications are nonetheless being outlined. However, an improved understanding of cubic centimeter ways, their assumptions and guarantees would facilitate software system engineers adopt and determine the suitable ways for his or her desired applications. We tend to argue that this selection may be guided by the models one seeks to infer. During this technical informing, we tend to review and replicate on the applications of cubic centimeter for software system engineering unionized in keeping with the models they manufacture and therefore the ways they use.

Machine learning techniques, particularly deep learning, have achieved exceptional breakthroughs over the past decade. At present, machine learning applications are deployed in several fields. However, the outcomes of code engineering researches don't seem to be continually simply utilized within the development and preparation of machine learning applications. Machine learning techniques are evolving quickly however faces inherent technical and non-technical challenges that complicate their lifecycle activities.

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Machine-learning techniques are needed to enhance the accuracy of prognostic models. Reckoning on the character of the business downside being addressed, there are totally different approaches supported the sort and volume of the information. During this section, we tend to discuss the classes of machine learning.

Supervised learning

Supervised learning usually begins with a longtime set knowledgeof knowledge of information} and a definite understanding of however that data is classed. Supervised learning is meant to search out patterns in knowledge that may be applied to Associate in nursing analytics method. This knowledge has labeled options that outline the means of information. For instance, you'll produce a machine-learning application that distinguishes between numerous animals, supported pictures and written descriptions.

Unsupervised learning

Unsupervised learning is employed once the matter needs a vast quantity of unlabeled knowledge. For instance, social media applications, like Twitter, instagram and Snap chat, all have giant amounts of unlabeled knowledge. Understanding which means behind this knowledge needs algorithms that classify the information supported the patterns or clusters it finds. Unattended learning conducts associate degree repetitive method, analyzing knowledge while not human intervention. It's used with email spam-detecting technology. There square measure way too several variables in legitimate associate degreed spam emails for an analyst to tag uninvited bulk email. Instead, machine-learning classifiers, supported cluster and association, square measure applied to spot unwanted email.

Reinforcement learning

Reinforcement learning may be a activity learning model. The formula receives feedback from the info analysis, guiding the user to the simplest outcome. Reinforcement learning differs from different kinds of supervised learning, as a result of the system isn't trained with the sample information set. Rather, the system learns through trial and error. Therefore, a sequence of roaring choices can end in the method being bolstered; as a result of it best solves the matter at hand [3].

NEED OF MACHINE LEARNING

We need machine learning for tasks that area unit too complicated for humans to code directly, i.e. tasks that area unit therefore complicated that it's impractical, if not not possible, for US to figure out all of the info and code for them expressly. So instead, we offer a machine learning algorithmic program with an oversized quantity of knowledge and let it explore and seek for a model which will compute what the programmers have come into being to realize.

EXAMPLES

It is terribly laborious to write down programs that solve issues like recognizing a 3D object, from a completely unique viewpoint, in new lighting conditions, in a much littered scene. We have a tendency to don't apprehend what program to write down as a result of we have a tendency to don't acumen it's wiped out our brain. Even though we have a tendency to have a decent plan for the way to try and do it, the program may be horrendously sophisticated.

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It's laborious to write down a program to reason the likelihood that MasterCard dealing is fallacious. There might not be any rules that area unit each straightforward and reliable. We want to mix an awfully sizable amount of weak rules. Fraud may be a moving target; however the program must keep ever-changing.

Machine Learning Approach

A machine learning formula then takes these examples and produces a program that wills the duty. The program created by the educational formula might look terribly completely different from a typical hand-written program .It is going to contain uncountable numbers. If we tend to roll in the hay right, the program works for brand spanking new cases, because the ones we trained it on. If the information changes, the program will modification too by coaching from the new information. You ought to note that conducting large amounts of computation is currently cheaper than paying somebody to write down a task-specific program. Rather than writing a program by hand for every specific task, we tend to collect variant examples that specify the right output for a given input.

NEURAL NETWORKS

Neural networks can be trained by adjusting the connection strengths in order to abstract the relations between the presented input/output data.A neural network configuration begins by defining a collection of processing elements. Processing elements (nodes, neurons, units) are simple elements performing relatively simple signal processing so as to work out the output. In other words, each node receives input values from its nearest neighbors per which it computes and transmits one output value. A neural network is inherently parallel within the sense that an outsized number of processing elements make simultaneous computations.

A neural network contains three styles of nodes: input, output, and hidden. Input nodes receive input signals from outside sources that's, sources outside the network. Output nodes transmit signals that have output values outside the network. Each node transmits signals of various strengths to its neighbors (the nodes to which it's connected).

Neural Networks are a category of models within the last word machine learning literature. Neural networks are a selected set of algorithms that have revolutionized machine learning. They're inspired by biological neural networks and also the current so-called deep neural networks have proven to figure quite well. Neural Networks are themselves general function approximations, which is why they'll be applied to almost any machine learning problem about learning an elaborate mapping from the input to the output space.

A neural network incorporates an oversized amount of processors. These processors operate parallels but are arranged as tiers. The primary tier receives the raw input quite like how the optic nerve receives the raw information in folks. Each successive tier then receives input from the tier before it so passes on its output to the tier after it. The last tier processes the last word output. Small nodes structure each tier. The nodes are highly interconnected with the nodes within the tier before and after. Each node within the neural network has its own sphere of data, including rules that it had been programmed with and rules it's learnt by itself. The key to the efficacy of neural networks is that they are extremely adaptive and

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learn very quickly. The inputs that contribute the foremost towards the correct output are given the only weight.

A NEURAL NETWORK IS CHARACTERIZED BY:

1. A set of processing elements;
2. Connectivity of those elements;
3. The rule of signal propagation through the network;
4. Activation or transfer functions; and
5. Training algorithms (learning rules or learning algorithms).

TYPES OF NEURAL NETWORK

Different types of neural networks use different principles in determining their own rules. There are many types of neural networks, each with their unique strengths. Here are some of the most important types of neural networks and their applications.

PERCEPTRON

Considered the primary generation of neural networks, perceptron are simply computational models of one neuron. Also called feed-forward neural network, a perceptron feeds information from the front to the rear. The error that's back propagated is typically the difference between the input and therefore the output data. If the network has enough hidden neurons, it can always model the connection between the input and output. Practically, their use could be a lot more limited, but they're popularly combined with other networks to make new networks

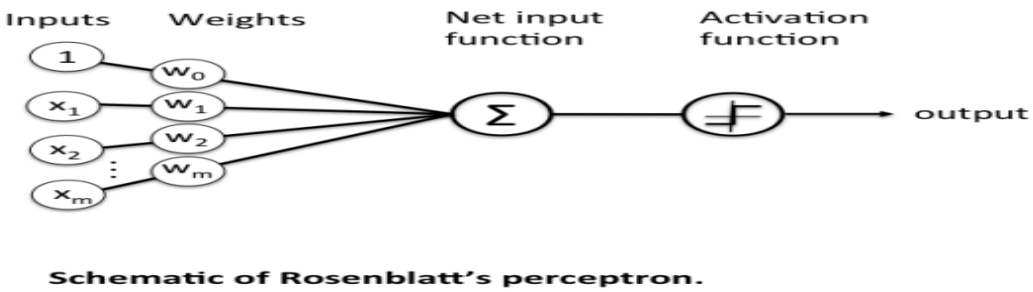

Figure 1 Schematic of Rosenblatt's Perceptron

If you select features by hand and have enough, you'll be able to do almost anything. For binary input vectors, we will have a separate feature unit for every of the exponentially many binary vectors and that we can make any possible discrimination for binary input vectors. However, perceptron do have limitations: once the hand-coded features are determined, there are very strong limitations on what a perceptron can learn.

There are two types of Perceptron: Single layer and Multilayer.

SINGLE LAYER PERCEPTRONCAN LEARN ONLY LINEARLY SEPARABLE PATTERNS.

Multilayer perceptron or feedforward neural networks with two or more layers have the greater processing power.Multilayer Perceptron.A multilayer perceptron has three or more layers. It is used to classify data that cannot be separated linearly. It is a type of

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artificial neural network that is fully connected. This is because every single node in a layer is connected to each node in the following layer.

A multilayer perceptron uses a nonlinear activation function (mainly hyperbolic tangent or logistic function). Here's what a multilayer perceptron looks like.This type of neural network is applied extensively in speech recognition and machine translation technologies.

The Perceptron algorithm learns the weights for the input signals so as to draw a linear decision boundary. This enables you to tell apart between the 2 linearly separable classes +1 and -1. Note: Supervised Learning may be a style of Machine Learning accustomedlearns models from labeled training data with this we canfind out the output for future data.

Recurrent neural networks (RNNs) are basically perceptron. However, unlike perceptron, which are stateless, they have connections between passes, connections through time. RNNs are very powerful, because they combine two properties: 1) a distributed hidden state that allows them to store a lot of information about the past efficiently and 2) non-linear dynamics that allow them to update their hidden state in complicated ways. With enough neurons and time, RNNs can compute anything that your computer can compute. So what kinds of behavior can RNNs exhibit? They can oscillate, settle to point attractors, and behave chaotically. They can potentially learn to implement lots of small programs that each capture a nugget of knowledge and run in parallel, interacting to produce very complicated effects[7]

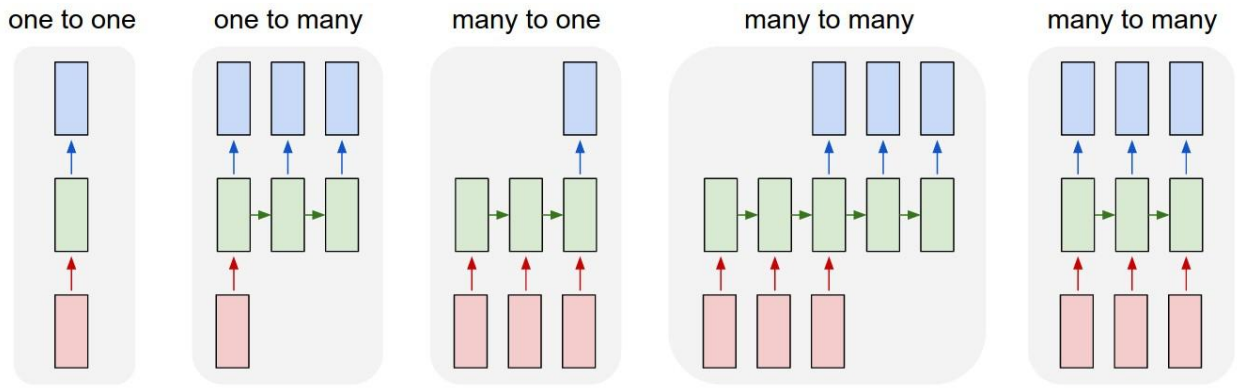

Figure 2 Networks-for-machine-learning

One big problem with RNNs is the vanishing (or exploding) gradient problem, where, depending on the activation functions used, information rapidly gets lost over time. Intuitively, this wouldn't be much of a problem because these are just weights and not neuron states, but the weights through time are actually where the information from the past is stored. If the weight reaches a value of 0 or 1,000,000, the previous state won't be very informative. RNNs can, in principle, be used in many fields, as most forms of data that don't actually have a timeline (non- audio or video) can be represented as a sequence. A picture or a string of text can be fed one pixel or character at a time, so time dependent weights are used for what came before in the sequence, not actually what happened x seconds before. In

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general, recurrent networks are a good choice for advancing or completing information, like auto completion.

DEEP BELIEF NETWORKS

Back-propagation is taken into account the quality method in artificial neural networks for calculating the error contribution of every neuron after a batch of information is processed. First, it requires labeled training data while most data is unlabeled. Second, the educational time doesn't scale well, which suggests it's very slow in networks with multiple hidden layers. Third, it can grind to a halt in poor local optima, so for deep nets, they're removed from optimal.

To overcome the restrictions of back-propagation, researchers have considered using unsupervised learning approaches. This helps keep the efficiency and ease of employing a gradient method for adjusting the weights, while also using to model the structure of the sensory input. Specifically, they adjust the weights to maximize the probability that a generative model would have generated the sensory input. The question is what reasonably generative model should we learn? Can or not it's an energy-based model sort of a Boltzmann machine? Or a causal model fabricated from idealized neurons.

ARTIFICIAL NEURAL NETWORKS

An artificial neural network could be a system of hardware or software that's patterned after the working of neurons within the human brain and system. Artificial neural networks are a spread of deep learning technology which comes under the broad domain of computer science.

FEED FORWARD NEURAL NETWORK – ARTIFICIAL NEURON

This is one of the simplest types of artificial neural networks. In a feed forward neural network, the data passes through the different input nodes till it reaches the output node. In other words, data moves in only one direction from the first tier onwards until it reaches the output node. This is also known as a front propagated wave which is usually achieved by using a classifying activation function. Unlike in more complex types of neural networks, there is no back propagation and data moves in one direction only. A feed forward neural network may have a single layer or it may have hidden layers.[8]

In a feed forward neural network, the sum of the products of the inputs and their weights are calculated. This is then fed to the output. Here is an example of a single layer feed forward neural network.

Feed forward neural networks are used in technologies like face recognition and computer vision. This is because the target classes in these applications are hard to classify. A simple feed forward neural network is equipped to deal with data which contains a lot of noise. Feed forward neural networks are also relatively simple to maintain.

RADIAL BASIS FUNCTION NEURAL NETWORK

A radial basis function considers the distance of any point relative to the center. Such neural networks have two layers. In the inner layer, the features are combined with the radial basis function.

Then the output of these features is taken into account when calculating the same output in the next time-step.

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Radial Basis Function Neural Network

The radial basis function neural network is applied extensively in power restoration systems. In recent decades, power systems have become bigger and more complex.
This increases the risk of a blackout. This neural network is used in the power restoration systems in order to restore power in the shortest possible time.

CONVOLUTIONAL NEURAL NETWORK

A convolution neural network (CNN) uses a variation of the multilayer perception. A CNN contains one or more than one convolution layers. These layers can either be completely interconnected or pooled. Before passing the result to the next layer, the convolution layer uses a convolution operation on the input. Due to this convolution operation, the network can be much deeper but with much fewer parameters. Due to this ability, convolution neural networks show very effective results in image and video recognition, natural language processing, and recommender systems.
Convolution neural networks also show great results in semantic parsing and paraphrase detection. They are also applied in signal processing and image classification.CNNs is also being used in image analysis and recognition in agriculture where weather features are extracted from satellites like LSAT to predict the growth and yield of a piece of land. Here's an image of what a Convolution Neural Network looks like

RECURRENT NEURAL NETWORK (RNN)

A Recurrent Neural Network is a type of artificial neural network in which the output of a particular layer is saved and fed back to the input. This helps predict the outcome of the layer. The first layer is formed in the same way as it is in the feed forward network. That is, with the product of the sum of the weights and features. However, in subsequent layers, the recurrent neural network process begins.

From each time-step to the next, each node will remember some information that it had in the previous time-step. In other words, each node acts as a memory cell while computing and carrying out operations. The neural network begins with the front propagation as usual but remembers the information it may need to use later.

If the prediction is wrong, the system self-learns and works towards making the right prediction during the back propagation. This type of neural network is very effective in text-to-speech conversion technology. Here's what a recurrent neural network looks like.

MODULAR NEURAL NETWORK

A modular neural network has a number of different networks that function independently and perform sub-tasks. The different networks do not really interact with or signal each other during the computation process. They work independently towards achieving the output.

As a result, a large and complex computational process can be done significantly faster by breaking it down into independent components. The computation speed increases because the networks are not interacting with or even connected to each other. Here's a visual representation of a Modular Neural Network.

There are many types of artificial neural networks that operate in different ways to achieve different outcomes. The most important part about neural networks is that they are

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designed in a way that is similar to how neurons in the brain work. As a result, they are designed to learn more and improve more with more data and more usage. Unlike traditional machine learning algorithms which tend to stagnate after a certain point, neural networks have the ability to truly grow with more data and more usage.

That's why many experts believe that different types of neural networks will be the fundamental framework on which next-generation Artificial Intelligence will be built. Thus taking a Machine Learning Course will prove to be an added benefit.

The Architecture of a network refers to the structure of the network ie the number of hidden layers and the number of hidden units in each layer. According to the Universal approximation theorem feed forward network with a linear output layer and at least one hidden layer with any "squashing" activation function can approximate any Borel measurable function from one finite-dimensional space to another with any desired non-zero amount of error provided that the network is given enough hidden units. This theorem simply states that no matter what function we are trying to learn there is always an MLP which will be able to represent the function.

BACK PROPAGATION NEURAL NETWORK

Back-propagation is just a way of propagating the total loss back into the neural network to know how much of the loss every node is responsible for, and subsequently updating the weights in such a way that minimizes the loss by giving the nodes with higher error rates lower weights and vice versa.

Back-propagation is the essence of neural net training. It is the practice of fine-tuning the weights of a neural net based on the error rate (i.e. loss) obtained in the previous epoch (i.e. iteration). Proper tuning of the weights ensures lower error rates, making the model reliable by increasing its generalization.

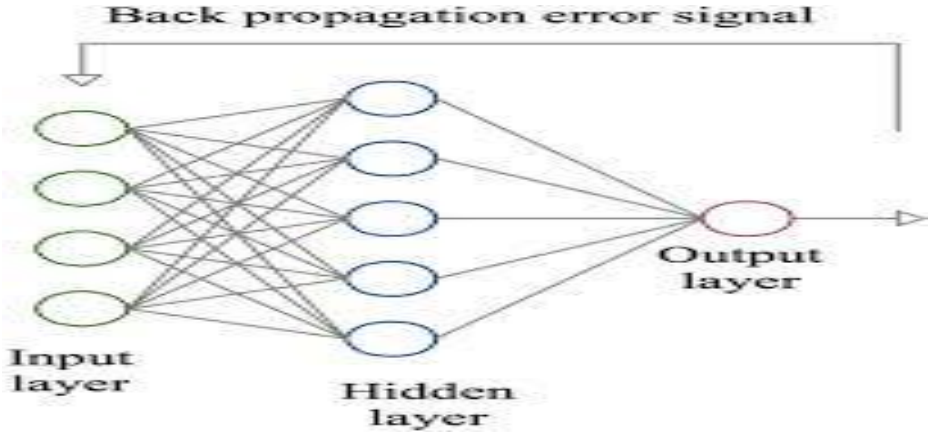

Figure 3 Back Propagation error signal

Artificial Neural Network (ANN) bases its assimilation data on the approach that the human brain processes information. The brain has billions of cells known as neurons that method data within the type of electrical signals. External data, or stimuli, is received, once that the brain processes it, so produces AN output. With extreme violations of those

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assumptions, multiple correlation models become unstable and lose most of their prognosticative quality. Since neural network models carry no information assumptions, these models may well be a lot of applicable than regression models for modeling software package faults. During this paper, we tend to explore a neural network methodology for developing models that predict the amount of faults in program modules. We tend to apply this technique to develop neural network models based mostly upon information collected throughout the event of 2 business software package systems. Once developing neural network models, we tend to apply multiple regression strategies to develop regression models on constant information. For the info sets thought of, the neural network methodology made higher prognosticative models in terms of each quality of match and prognosticative quality.[9]

SOFTWARE ENGINEERING

Software engineering is Associate with the development of product creating use of well-defined scientific principles ways, during which the very best results of code package take place. The process of developing a product package engineering principles and strategies is noted as package evolution. Software engineering is Associate in nursing engineering discipline that is applied to the event of software system in an exceedingly systematic approach (called a software system process). it is the application of theories, methods, and tools to style build a software system that meets the specifications expeditiously, cost-effectively, and guaranteeing quality[8]

SOFTWARE ENGINEERING ACTIVITIES

Customer Communication
Planning
Modeling (Evaluation, Design)
Construction (Coding, Testing)
Deployment

The aim of this paper is to produce a number of the ways needed to deal with the issues in neural network development bestowed on top of, and to permit the event of neural networks for specific issues to be incorporated into ancient, planned, code engineering comes. Within the literature the method of developing neural networks has generally started with needs then affected to implementation, usually feat style decisions implicit. However, creating these style decisions specific encompasses a variety of benefits. In section a pair of, we have a tendency to gift AN approach that aims to enumerate the set of style decisions and may be accustomed observe correlations between specific decisions and ensuing development outcomes. By recording style decisions, repeatability is feasible as a result of all of the data needed to repeat the event is documented.

This remainder of this section is dedicated to a lot of careful presentation of the method model for neural network development. This development method may be extended by practitioners to deal with problems not expressly lined during this paper.

Neural network creation is that the method of consistently applying the training algorithmic rule with every associated parameter assortment as outlined within the downside specification. The matter specification and neural network creation steps facilitate America to attain method certainty and repeatability. We are able to live the resources needed

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foroneiteration of the neural network creation step employing a single parameter assortment. Successively the info from these measurements offer America with a basis for predicting the resources needed to use the training algorithmic rule with all of the parameter collections. If we've got historical information from previous comes, we are able to create this prediction before neural network creation begins. By recording all of the parameters related to neural network creation we tend to (and others) will repeat the event by following and applying the training algorithmic rule with the parameter collections recorded within the downside specification document.

SCORING OF DIFFICULTY LEVELS

Processing levels:Now if we calculate manually than the scoring is as follow
Data processing, report generation (one unit/function 1 point)
Image processing (2 points per function)
Data analysis(2 points per function)
Solution architecting, information architecting (5 points per instance)
Data Mining, pattern recognition (2 points per function)
Data modeling (5 points per unit)
Data Integration, visualization (2 points per instance)
Knowledge processing (3 points per instance)
Inference, knowledge representation, interpretation, reasoning (3 points per function)
Scoring will be based on—requirements difficulty level, class diagram difficulty level, and code complexity
Requirement difficulty scoring: 1 point for each functional requirement 2 points for each non-functional requirements, for each functional requirement there will be a additional point of .1 for each level—for example any requirement falling in 9th level the functional requirement will weigh 1 + 0.9 = 1.9
Class diagram difficulty level: It is collected of three varieties of link, relation, induction, and gathering, through which models are more complex to understand. We are providing seen results which gives idea of logic to allow an aim of compound and continuity.
On the bases of processinglevels on which we have worked manually we will put all the scoring into neural network as an input and on the bases of that inputs we will work and find out how neural network will work and provide a better result with these levels.

DATA PROCESSING, REPORT GENERATION

In neural network data illustration of close surroundings is made public by price taken on by parameters like weight and biases of network. 3 neural network methodology.

a) Feed forward network: It regards perception Back propagation model and performance network as representative.
b) Feedback network: It regards Hopfield separate model and continuous Model as representative.

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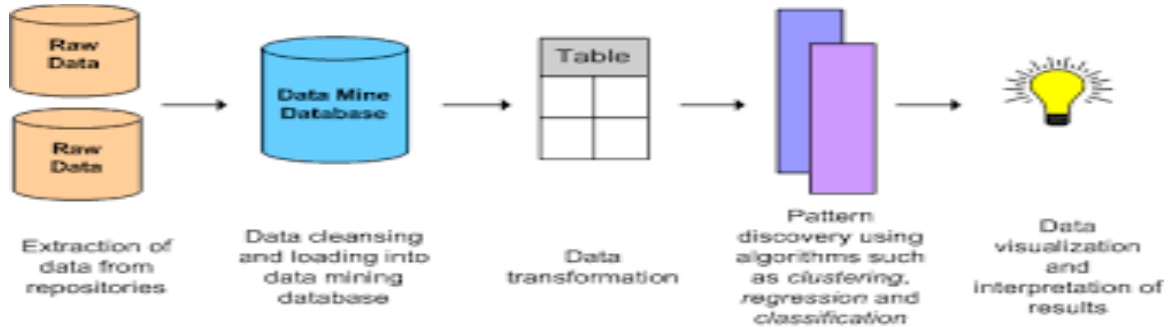

Figure 4 Data processing Steps[23]

IMAGE PROCESSING

Neural networks are an interconnected collection of nodes called neurons or perceptron. Every neuron takes one piece of the input data, typically one pixel of the image, and applies a simple computation, called an activation function to generate a result. Image classification using convolutional neural networks (CNNs)

DATA ANALYSIS

A complex algorithmic program used for prognosticative analysis, the neural network, is biologically galvanized by the structure of the human brain. ... The structure of a neural-network algorithmic program has 3 layers: The input layer feeds past knowledge values into following (hidden) layer. The black circles represent nodes of the neural network[14]

DATA MINING, PATTERN RECOGNITION

Neural networks are accustomed model complicated relationships between inputs and outputs or to search out patterns in information. In a man-made neural network, straightforward artificial nodes, referred to as "neurons", "neurodes", "processing elements" or "units", are connected along to make a network that mimics a biological neural network.

DATA MODELING

The most common neural network model is that the Multilayer Perceptron (MLP).Finally the information is increased by interconnection weights then processed one last time at intervals the output layer to supply the neural network output. The MLP and plenty of alternative neural networks learn mistreatment Associate in nursing algorithmic program known as backpropagation

DATA INTEGRATION, VISUALIZATION

This work proposes a neural network model for locating relationships between organic phenomenon and matter profiles of introgressed lines.InformationIntegration Platform. Simulators sometimes have some style of inherent visual image to observe the and in sales information to optimize provisioning and to enhance work quadrants.

CONCLUSIONS

In our research work we have established scoring methods for complexity evaluations, which we wish to implement with appropriate neural network architecture. To start our further work we have identified feed forward neural network. Other than this, in this paper

we have identified the major engineering problems associated with neural network development, the lack of repeatability and predictability of the development process. To check these problems we have proposed a development process which incorporates specialized methods to address the issues specific to neural network development. The development process and the specific methods have been applied to a number of examples. We present an extendible method for specifying neural network software and methods for the verification and validation of these specifications. The verification and validation method employs prototypes and benchmarking. We are still experimenting with the method but it has been trialed in a number of examples. We will work with neural network and provide our inputs and then we will get the better result.

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COMPARATIVE STUDY OF ANTIOXIDANT DEFENSE MECHANISM UNDER SALINITY STRESS IN TWO WHEAT CULTIVARS WITH CONTRASTING SALT TOLERANCE

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Abstract: Abiotic stress like salinity causes negative impact on growth and production capacity of plants. The major reason for soil salinization is improper agricultural practices and poor quality of water.Production of reactive oxygen species is one major consequence of abiotic stress leading to ionic stress. Plants have evolved two types of antioxidant defense mechanism. Enzymatic (SOD, CAT, POX) and non-enzymatic osmolytes (sugars, proline). These two systemswork together to quench ROS. This study was aimed to perform an integrated analysis of role of antioxidants and their correlation to photosynthetic ability in two cultivars of wheatKRL1-4 and UP2338 atthree different levels of salinity (100, 200 and 300mM). Samples from 20DAS to 60DAS were studied forantioxidant enzyme assays and biochemical estimation of proline, sugar, chlorophyll and carotenoid was done to understand the defense mechanism of both the cultivars and its correlation with the photosynthetic pigments.The cultivar KRL1-4 showed higher activity of antioxidantenzymes like peroxidase, catalase and superoxide dismutase at high salinity. The cultivar UP2338 displayed increase in proline and sugar contents in parallel but strong reduction in photosynthetic pigment contents.Our data indicate that higher level of tolerance of KRL1-4 cultivar is related to simultaneous triggering of manyinterrelated physiological mechanisms like increased osmolyte production, prevention of photosynthetic pigments and oxidative protection by increased activity of antioxidant enzymes.

Keywords- Salinity, Proline, SOD, Osmolyte.

INTRODUCTION

Soil salinity is among the foremost abiotic stresses for crop species. Saline soil is characterized by the presence of toxic levels of sodium and its chlorides and sulphates. Over a million hectaresof land throughout the world (6% of total cultivated land area) is salt affected either by salinity (397mha) or their associated condition of sodocity (434m ha) (FAO, 2005). It is a major constraint to food production by limiting the use of land previously uncultivated. Secondary salinization in particular exacerbates the problem. Sodium chloride is the most soluble and abundant salt released.

Salt in soil inhibits plant growth for two reasons. First it decreases the osmotic potential of soil solution and reduces the plant's ability to take up water which leads to slower growth as a result of the osmotic or water deficit effect. Secondly high salt concentration causes ion toxicity, because Na+ is not easily sequestered into vacuoles. Finally the

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interaction of salts with mineral nutrients may result in imbalances and deficiencies. Consequently membrane disorganization, photosynthesis inhibition, generation of toxic metabolites and reactive oxygen species (ROS) and attenuated nutrient acquisition could occur, followed eventually by cell and whole plant death. Wheat is an important cereal crop and a salt sensitive glycophyte (Xueetal., 2004). Growth and grain yield of wheat are significantly reduced by salinity.

At cellular level plants have developed different mechanism that facilitates ion exclusion/sequestration (Yeo and Flowers 1983), accumulation of compatible solutes, allowing pressure potential maintenances (Serrano and Gaxiola, 1994) and detoxification of free radicals by antioxidant systems.Organic solutes like simple sugars (glucose and fructose), complex sugars (trehalose, raffinose and frutans), and methylatedionositol accumulate in the cyotosol acting as osmoprotectant. (Bohnert and Jensen 1996).

Even under optimal conditions many metabolic processes produce ROS like superoxide anion (O_2-),hydrogen peroxide (H_2O_2) and hydroxyl radicals(OH^-) particularly in choloroplast and mitochondria.(Mittler 2002, Masood et al 2006).The production of toxic derivatives increase as a result of all types of abiotic and biotic stresses .Plants possess both enzymic and non-enzymatic mechanism for scavenging ROS. The enzymicmechanisms are designed to minimize the concentration of O_2 and H_2O_2. The enzymes overproduced are superoxide dismutase (SOD), peroxidase (POX), catalase (CAT), glutathione reducatse (GR) and glutathione-synthesizing enzymes (Asada, 1992;;Prochazkova and Wilhelmova, 2007).
This study was aimed to perform an integrated analysis of role of antioxidants and their correlation to growth and photosynthetic ability in two cultivars of Wheat KRL1-4 and UP2338 at different levels of salinity.

MATERIAL AND METHOD

Plant material

Two wheat genotypes, i.eKRL1-4 (relatively salt -tolerant), UP2338 (relatively salt-sensitive) were obtained from Department of Plant Pathology, Narendra Dev Agriculture University

Healthy grains of wheat were surface sterilized with ethanol for 5 min followed by thorough wash with distilled water. Surface sterilized grains were inoculated with 96 h grown culture of Azotobacter (of equal densities (0.05 O.D. at 610 nm) for 24 hrs. at 25ºC to 30 ºC control sets were also maintained.

After 24 hrs. of soaking, the grains were sown in earthenware pots (30×30 cm) containing sterilized sand during winter. Saline water containing 100mM, 200mM, 300mM NaCl (Corresponding E.C was recorded as 9.83, 21.9 and 32.5 dS/m respectively) was supplied to these pots during the experimental set up at every seven day starting from 15 DAS . Hoagland's nutrient solution was given weekly. To maintain the salt level (300ml.) water was supplied to each pot daily. It also kept the sand moist. The plants grown in sand culture were taken for studies.

Plant sampling: The plants were sampled and observations were takenof antioxidant enzymatic (SOD, POD, and CAT) and non-enzymatic (proline, sugar, chlorophyll and carotenoids) parameters at 20-60 DAS at 10 day interval from wheat plants as

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describedbelow. For every treatment, three replications with five pots in each replication were maintained. The total number of pots was 240 (5 × 3 replications × 4 treatments × 4 genotypes = 240) and in each pot three plants were maintained for sampling. Primary leaves were taken for sample.

ASSAY OF ENZYME ACTIVITIES

The estimation of activities of enzyme such as peroxidase, catalase and superoxide dismutase were done in primary leaves at different stages of plant growth starting from 20 DAS to 60 DAS at ten day interval.

ASSAY OF PEROXIDASE ACTIVITY

The peroxidase [E.C.1.11.1.7] activity was determined in the primary leaves by the method of Shannon et al. (1966). The enzyme was assayed by the in-vivo method by using freeze thaw method. For this 200 mg fresh leaves were cut into narrow strips. Sliced leaves were placed in 10 ml capacity vials containing 3ml phosphate buffer (pH 6.8). The leaf strips were frozen for 3 hr. at -4^{0}C followed by thawing. The reaction was initiated by adding 1.0 ml enzyme extract to the assay mixture at 30^o C .The assay mixture contained 1 ml of 15mM pyrogallol, 1ml of 50mM H_2O_2 and 5ml distilled water. This reaction mixture was incubated for 15 minute at 25^{o}C, after incubation reaction was stopped by adding 0.5ml of 5% H_2SO_4.The amount of colour formed was determined by measuring the absorbance at 420nm in UV/VIS systronics spectrophotometer type No.118. The activity of peroxidase has been calculated in terms of µ mol H_2O_2 destroyed $h^{-1}g^{-1}$ fresh weight from standard curve prepared from H_2O_2.

ASSAY OF CATALASE ACTIVITY

The catalase [E.C.1.11.1.6] activity was determined in primary leaves by the modified method of Chance and Maehly, 1955. The enzyme was assayed by the in-vivo method. For this 200 mg fresh leaves were cut into narrow strips. Sliced leaves were placed in 10 ml capacity vials containing 3ml phosphate buffer (pH 6.8). The leaf strips were frozen for 3 hr. at -4^{0}C followed by thawing. The reaction was initiated by adding 1.0 ml enzyme extract to 2.0ml of 2.5mM H_2O_2 for 10 min at 37ºC inside an incubator. The reaction was stopped by adding 1ml of 1% Titanic sulphate (in 2.5% H_2SO_4 w/v) and the mixture was centrifuged at 10,000 rpm for 15 minutes. The intensity of yellow colour was measured at 410nm in UV /VIS systronics spectrophotometer No.118.

ASSAY OF SUPEROXIDE DISMUTASE ACTIVITY

The superoxide dismutase (SOD, EC 1.15.1.1) activity was measured in the primary leaves by the modified method of Giannopolites and Ries (1977). The enzyme was assayed by the in-vivo method. For this 200 mg of fresh leaves were cut into narrow strips. Sliced leaves were placed in 10 ml capacity vials containing 3ml phosphate buffer (pH 7.8). The leaf strips were frozen for 3 hr.at -4^{0}C followed by thawing. The reaction was initiated by adding the 0.1 ml enzyme extract to the incubation mixture at 30ºC. The assay medium contained, 13mM methionine, 75µM p-nitrobluetetrazolium chloride, 2µm riboflavin, 0.1mM EDTA. In last Riboflavin was added and the test tubes were placed under two, 15 W fluorescent lamps. The reaction was stopped after 10 min by removal from light source. The absorbance was read at 560nm. A non-irradiated reaction mixture did not develop colour and served as

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control. The reaction mixture lacking enzyme develop maximum colour as a result of maximum reduction of NBT. One unit of enzyme activity was determined as the amount of the enzyme to reach an inhibition of 50% NBT reduction rate.

BIOCHEMICAL ESTIMATION

The biochemical estimation included proline, reducing sugar, in dry sample of leaveswhereas chlorophyll and carotenoids in fresh primary leaves. Fresh sample of leaves were harvested on the same days on which enzyme activity was measured. The plant samples were dried in an oven at 60±2ºC for 48h. The dried samples were powdered and used to estimate the desired metabolite.

Proline was estimated by the method of Bates et al (1973).Total reducing sugar was estimated by Somogyi's method (1952) from dried leaf sample.The amount of Chl'a' and Chl'b' and total chlorophyll was measured in the primary leaves by the method of Arnon(1949) and calculated in terms of mg per gram fresh weight of leaf by the following formulae.

$$\text{Chlorophyll 'a'} = [12.7(D_{663})-2.69(D_{645})] \times \frac{V}{1000 \times W}$$

$$\text{Chlorophyll 'b'} = [22.9(D_{645})-4.68(D_{663})] \times \frac{V}{1000 \times W}$$

$$\text{Total Chlorophyll} = [20.2(D_{645}) +8.02(D_{663})] \times \frac{V}{1000 \times W}$$

Where,

D = is the optical density observed for chlorophyll Extract at the particular indicated wavelength.

V = Final volume of the chlorophyll extract in 80% Acetone.

W = Fresh weight of leaves in mg

$$\text{Carotenoid} = O.D._{440} \times \frac{V}{196 \times W}$$

The data have been statically analyzed. Least Significant Difference (LSD) has been calculated for data where F test was found significant.

RESULT

The enzyme activity was measured from day 20 up to day 60 at ten day interval for all treatments and in both cultivars of wheat. The activity of enzyme increased up to 40DAS. A significant variation was observed in superoxide dismutase activity in the leaves of salt treated plants. The activity of enzyme superoxide dismutase increased gradually with increase in salt concentration in both the cultivars. However the tolerant cultivar showed maximum activity of enzyme at 200mM conc. of NaCl, at which the activity of the enzyme in sensitive cultivar had declined. The highest SOD 90.23+_0.45was recorded at 200 mM on 40DA in tolerant whereas in sensitive highest activity 80.67+ 1.2 was recorded at 100mM on 40DAS.(Fig 1a&1b).

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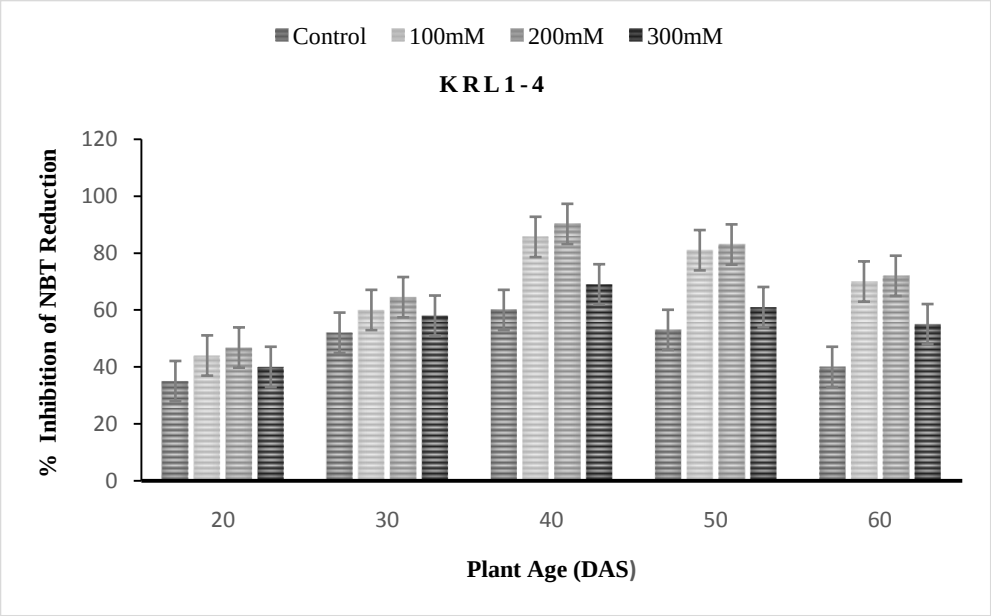

Fig. 1a. Superoxide Dismutase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

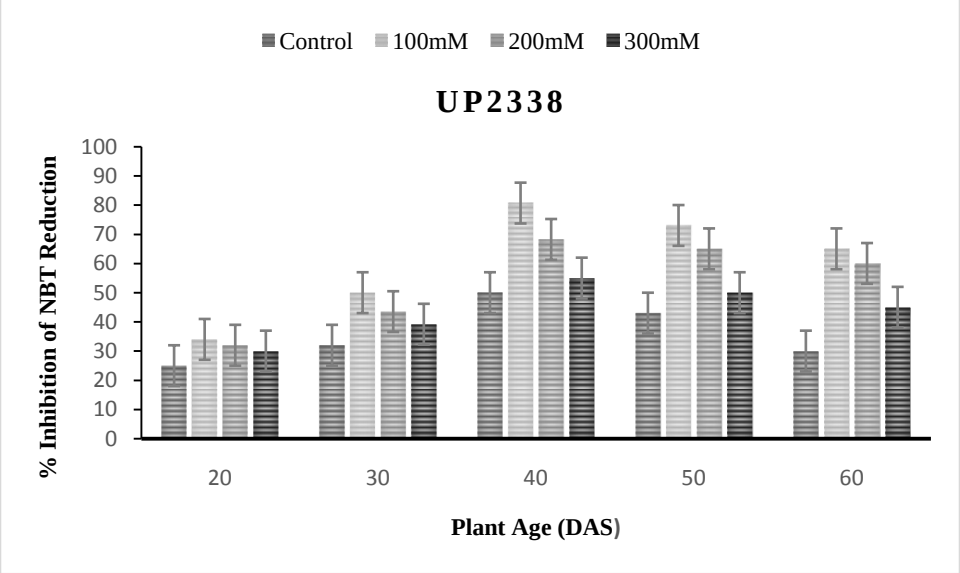

Fig. 1b. Superoxide Dismutase activity of plants at different age of growth in UP2338cultivar under different NaCl concentrations

The activity of Catalase enzyme was higher in tolerant cultivar compared to sensitive at all levels of salt concentration. In the sensitive cultivar the activity of catalase declined after 100mM where as in tolerant cultivar catalase activity increased till 200mM concentration. (Fig.2a&2b).

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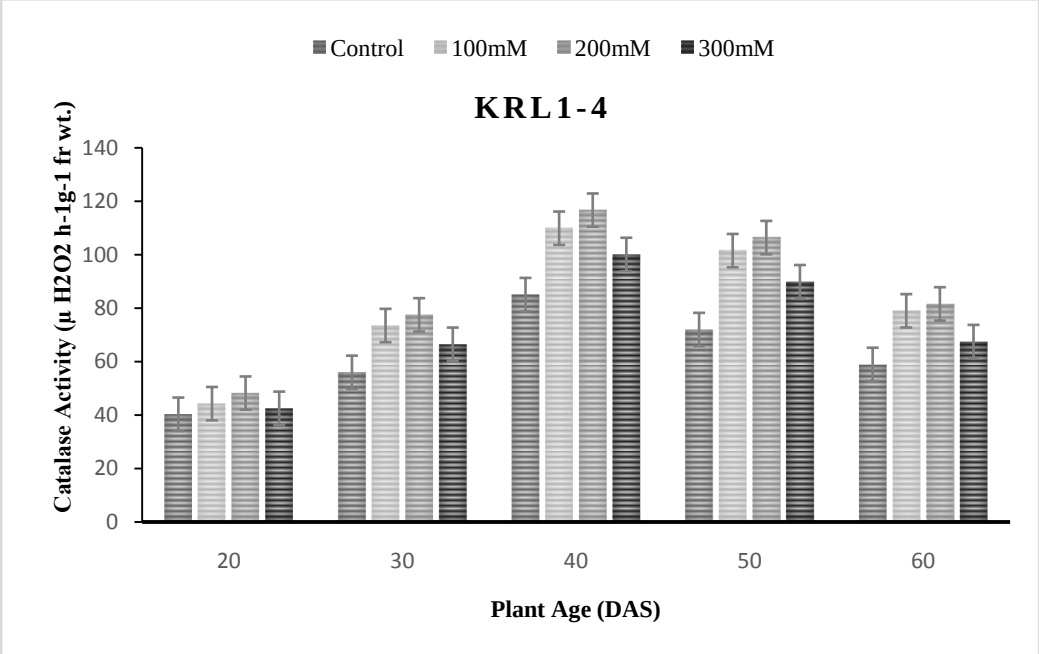

Fig. 2a. Catalase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

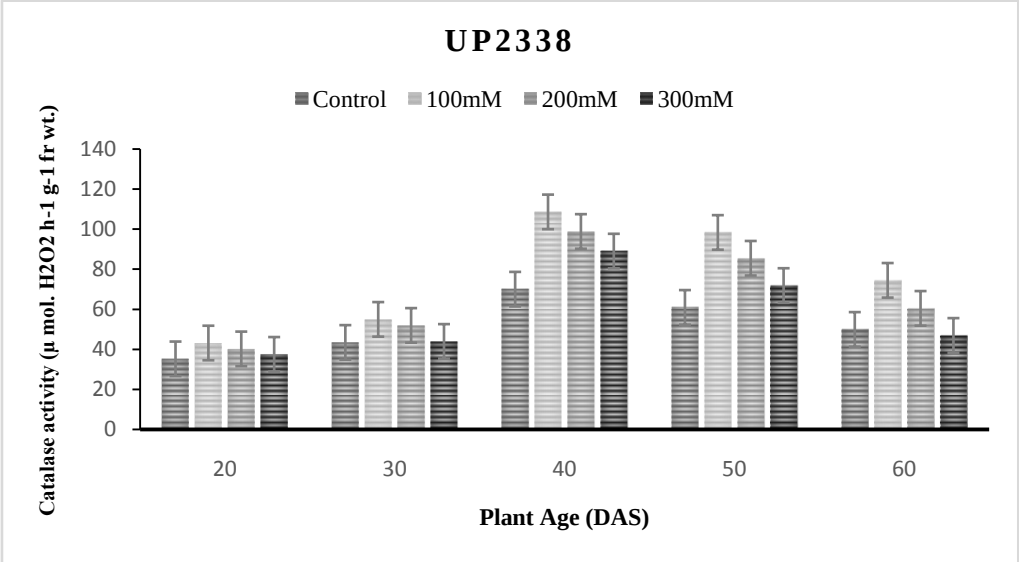

Fig. 2b. Catalase activity of plants at different age of growth in UP2338cultivar under different NaCl concentrations.

The activity of Peroxidase followed the same trend. (Fig. 3a &3b). The maximum increment of peroxidase in tolerant cultivar in 200mM was about 40% than control plants whereas in sensitive the increase was 31.1%.

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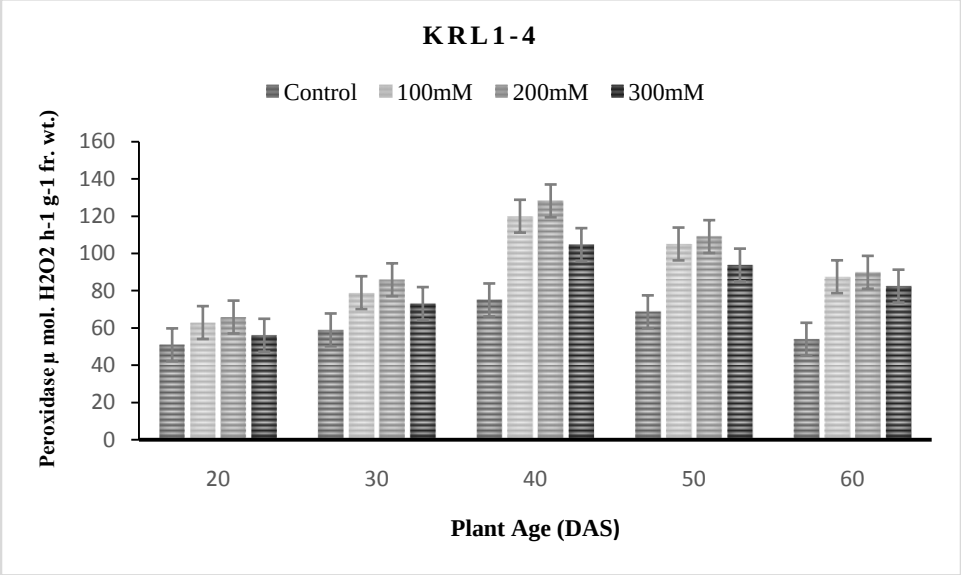

Fig. 3a. Peroxidase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

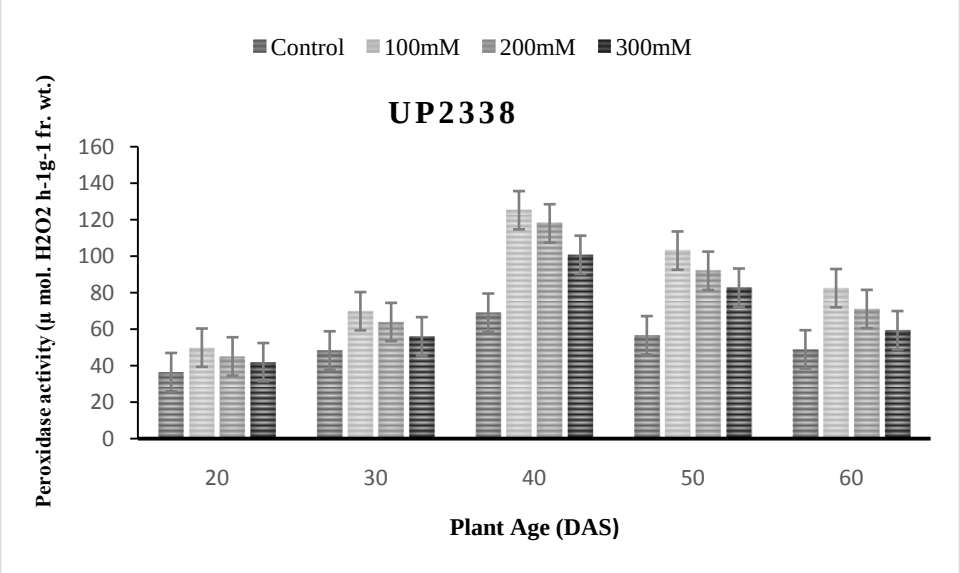

Fig. 3b. Peroxidase activity of plants at different age of growth in KRL1-4 cultivar under different NaCl concentrations

In the present study proline showed a gradual increase from 20 DAS to 40DAS followed by a gradual decline till 60 DAS. The study indicates higher levels of proline and reducing sugar in both the cultivars at each salt concentration. Shoot proline content increased by 35-65 % in KRL1-4 and 25-60% in UP2338 cultivar. Maximum shoot proline was reported in KRL1-4 at 300mM concentration. (Fig 4a & 4b).

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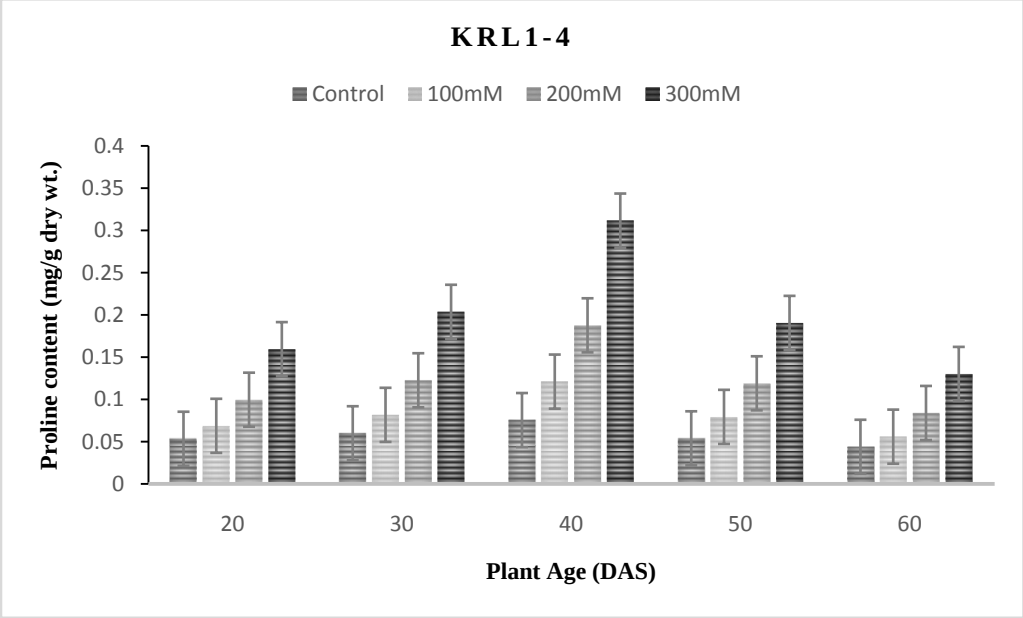

Fig. 4a. Proline content ofplants at different age of growth in KRL1-4 cultivar under different NaCl concentrations.

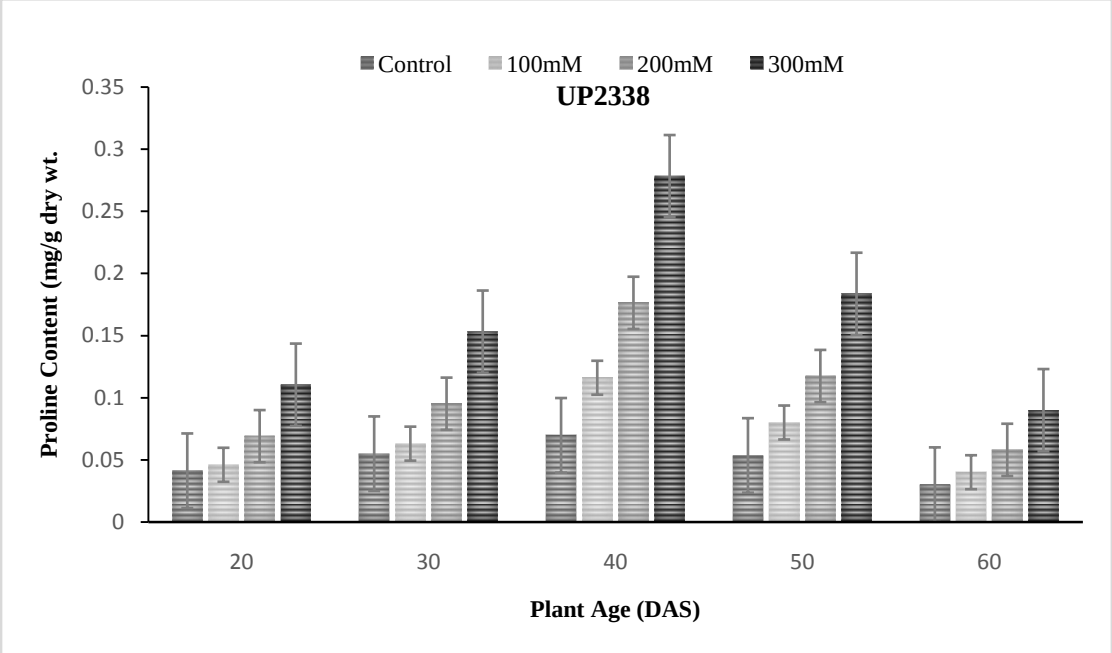

Fig. 4b. Proline content of plants at different age of growth in UP 2338cultivar under different NaCl concentrations.

In the tolerant cultivar the amount of sugar was higher at high salinity compared to the sensitive cultivar. The maximum sugar content in sensitive cultivar at 200mM whereas in tolerant highest sugar was reported in 300mM salt concentration. (Fig 5a & 5b).

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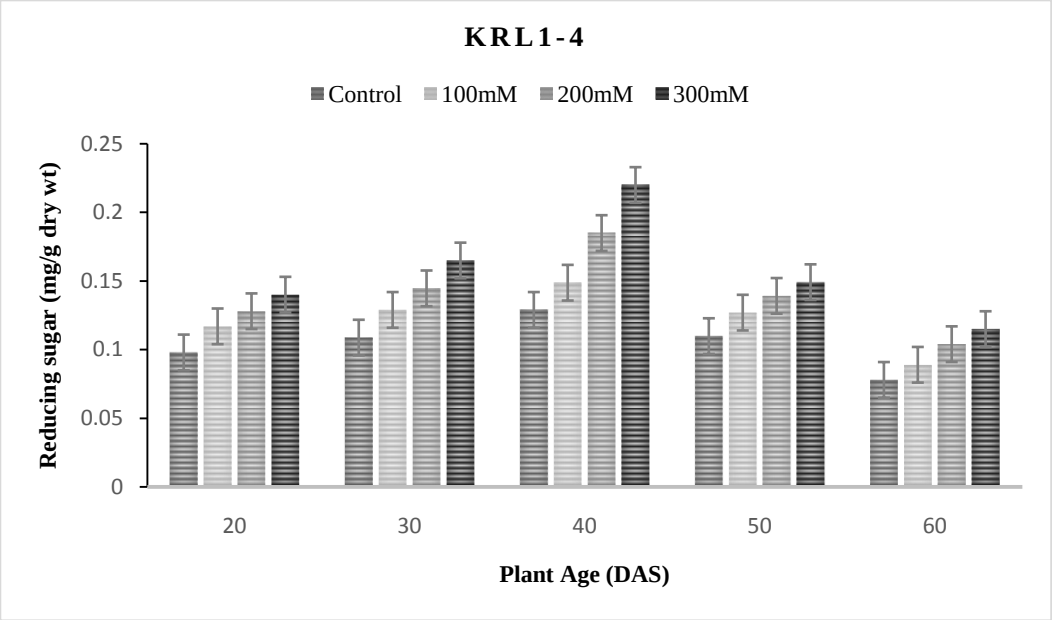

Fig. 5a. Reducing sugar content of plants at different age of growth in KRL1-4cultivar under different NaCl concentrations.

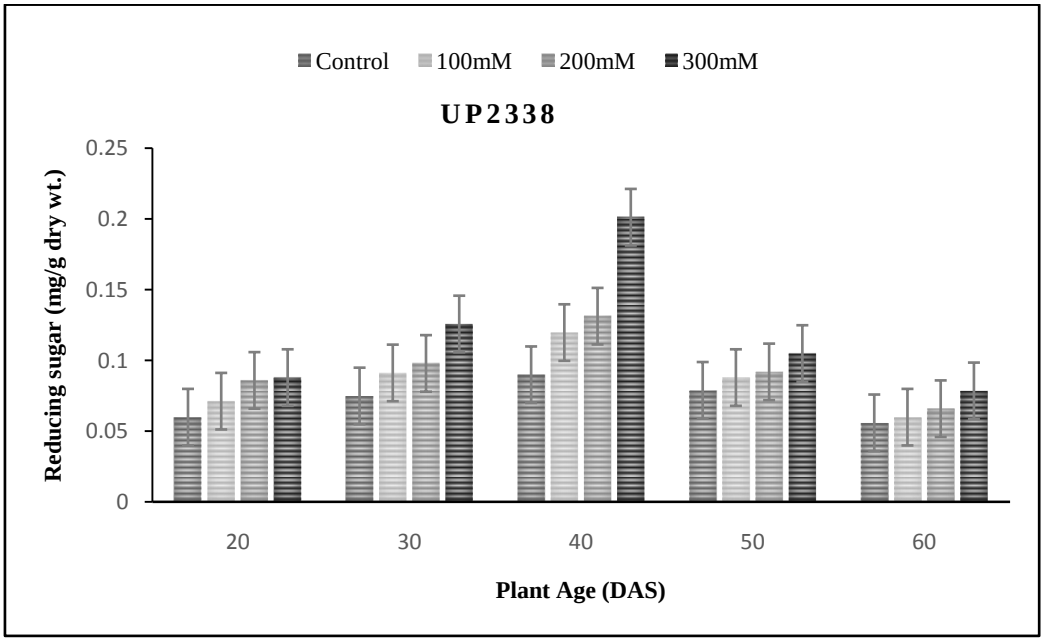

Fig. 5b. Reducing sugar content of plants at different age of growth in UP2338cultivar under different NaCl concentrations.

Chlorophyll ‘a’, ‘b’ and total chlorophyll increased up-to 40 DAS and then decreased till 60 DAS at all NaCl concentrations. In tolerant cultivar (KRL1-4) the decrease was less compared to the sensitive cultivar (UP2338). (Table 1a and 1b). Higher chlorophyll content in tolerant cultivar indicates its superior defense mechanism.

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Table 1a: Chlorophyll 'a' Chlorophyll 'b' and total chlorophyll content (mg/gm) at different age of growth in KRL1-4 cultivar treated with different NaCl concentration.

Treatment (NaCl)	Chlorophyll	Chlorophyll content mg/g fr. wt.x10^{-3}				
		Plant age (Days)				
		20	30	40	50	60
Control	Chl 'a'	1.96±.010	2.20±.020	2.60±.030	2.10±.026	1.60±.026
	Chl 'b'	0.76±.020	0.79±.026	0.84±.010	0.73±.052	0.53±.040
	Total Chl	2.72±.020	2.99±.010	3.44±.026	2.83±.026	2.13±.030
100mM	Chl 'a'	1.93±.021	2.10±.017	2.40±.021	2.06±.034	1.50±.030
	Chl 'b'	0.74±.020	0.76±.020	0.81±.026	0.62±.036	0.52±.020
	Total Chl	2.66±.020	2.82±.017	3.21±.020	2.68±.026	2.02±.045
200mM	Chl 'a'	1.88±.030	2.05±.010	2.25±.035	2.03±.017	1.20±.030
	Chl 'b'	0.71±.030	0.73±.010	0.76±.030	0.60±.036	0.51±.030
	Total Chl	2.59±.010	2.78±.020	3.01±.036	2.63±.021	1.71±.036
300mM	Chl 'a'	1.71 x10^{-3}	1.97 x10^{-3}	2.10±.020	1.87±.020	1.01±.025
	Chl 'b'	0.71 x10^{-3}	0.69 x10^{-3}	0.66±.020	0.56±.026	0.49±.034
	Total Chl	2.41x10^{-3}	2.60 x10^{-3}	2.76±.050	2.40±.034	1.50±.017

Table 1b: Chlorophyll 'a' Chlorophyll 'b' and total chlorophyll content (mg/gm) at different age of growth in UP2338cultivar treated with different NaCl concentration.

Treatment (NaCl)	Chlorophyll	Chlorophyll content mg/g fr. wt. x10^{-3}				
		Plant age (Days)				
		20	30	40	50	60
Control	Chl 'a'	2.02 ±.017	2.35 ±.020	2.54±.040	1.80±.020	1.40±.020
	Chl 'b'	0.59± .010	0.65 ±.043	0.65±.020	0.56±.026	0.48±.026
	Total Chl	2.61±.010	2.99 ±.040	3.19±.050	2.35±.060	1.80±.026
100mM	Chl 'a'	1.94±.017	2.14±.034	2.05±.043	1.70±.052	1.21±.036
	Chl 'b'	0.54±.026	0.59±.045	0.56±.010	0.49±.026	0.44±.026
	Total Chl	2.48±.026	2.72±.036	2.60±.060	2.19±.044	1.67±.020
200mM	Chl 'a'	1.83±.030	2.07±.036	1.92±.030	1.34±.020	1.00±.045
	Chl 'b'	0.53±.026	0.56±.030	0.54±.034	0.44±.020	0.38±.050
	Total Chl	2.35±.043	2.63±.020	2.45±.052	2.22±.026	1.38±.034
300mM	Chl 'a'	1.69±.040	1.65±.020	1.51±.026	1.00±.036	0.94±.026
	Chl 'b'	0.49±.036	0.48±.036	0.42±.020	0.38±.043	0.30±.043
	Total Chl	2.18±.036	2.13±.030	1.93±.020	1.38±.035	1.23±.026

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The carotenoid content decreased with increasing salt concentration in both the cultivars when compared to control however the tolerant cultivar KRL1-4 showed higher carotenoid content than UP2338 at all levels of salt concentrations.(Table 2a & 2b).

Table 2a.Carotenoid content in mg/gm at different age of growth in KRL-14 cultivar under different NaCl concentration.

Treatments (NaCl)	Carotenoid Content mg/g fr.wt x10^{-3}				
	Plant age (Days)				
	20	30	40	50	60
Control	0.613±.003	0.623±.003	0.653±.003	0.542±.002	0.342±.003
100mM	0.593±.003	0.602±.004	0.630±.002	0.510±.004	0.314±.004
200mM	0.570±.005	0.577±.002	0.604±.003	0.484±.002	0.284±.003
300mM	0.540±.005	0.546±.001	0.572±.003	0.448±.001	0.252±.003

Table 2b. Carotenoid content in mg/gm at different age of growth in UP2338 cultivar under different NaCl concentration.

Treatment (NaCl)	Carotenoid Content mg/g fr.wt x 10^{-3}				
	Plant age (Days)				
	20	30	40	50	60
Control	0.567±.004	0.577±.002	0.610±.004	0.495±.004	0.295±.002
100mM	0.542±.004	0.551±.003	0.582±.001	0.465±.003	0.269±.003
200mM	0.512±.001	0.518±.003	0.549±.002	0.431±.003	0.236±.002
300mM	0.479±.003	0.487±.002	0.480±.003	0.355±.003	0.165±.002

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DISCUSSION

To maintain the disruption of osmotic and ionic balance caused by salinity stress, tolerance mechanism of plants is comprised of redox, osmotic and ionic homeostasis. (Nahar 2016). The Reactive oxygen species homeostasis is done by creating a balance between quenching and production of ionic molecules through antioxidative defense system. (Caverzan et al. 2016, Aldesuquy et al. 2015). AOS, particularly hydrogen peroxide, is likely to act as critical signals for plant adaptation to biotic and abiotic stresses (Mittler et al. 2002; Karpinski et al. 1999). Therefore, under the stress conditions, AOS may play two very different roles: damaging the cellular components or signaling the activation of defense responses. (Dat et al. 2000; Grant &Loake 2000). Plants may form one or the other species by either accumulating H2O2 by activating superoxide dismutase or by scavenging H_2O_2 with antioxidants.

In our present research higher productivity in the tolerant cultivar may be because of better SOD performance that may protect the plant, by conversion of highly reactive superoxide radical to peroxides thereby preventing lipid peroxidation and weakening of cell membranes resulting in better photosynthetic ability. The SOD activity was found to be upregulated during salt stress in many plants like chickpea (Eyidogan and Oz, 2007) and tomato (Gapinska et al., 2008).

Catalase is responsible for catalyzing the dismutation of H_2O_2 into H_2O.The increased activity of CAT is due to certain stress inducible genes like SOS3 which activates enzymes that help in effluxing excess sodium ion creating ionic homeostasis. (Prajapati and Vadassery 2016). In our study higher activity of catalase in the tolerant cultivar is in accordance with Simova-Stoilova et al., 2010 who reported increase in catalase activity in wheat under drought stress. While catalase scavenges hydrogen peroxide in peroxisomes, in the cytosol and chloroplast peroxidase catalases the reaction. Due to wide distribution and better affinity for H_2O_2, peroxidase is better efficient scavenger of peroxide at the time of stress. (Kaushik and Aryadeep2014).It is supposed that higher activity of peroxidase in KRL1-4 helps in efficient breakdown of hydrogen peroxide generated.

The ability of the resistant genotypes to increase peroxidase activities suggest that genotypes with a higher level of resistance would either have a higher upregulation capacity for defensive enzymes or have a more sensitive upregulation response or both.(Gulsen O et al., 2010)

Proline acts as an osmolyte, and performs three major roles during stress, i.e., as a signaling molecule, metal chelator, and an antioxidative defense molecule. (Shyamul Hayat et al 2012, Sharma A et al. 2019). In current research proline increased in both the cultivars but maximum shoot proline was reported in tolerant cultivar is in accordance with Rayyan Khan et al 2019). The increase in proline may be either due to decrease in breakdown or increased production.

Soluble sugars are a key player in plants under stresss. Acting an osmoprotectant and signaling molecule in gene regulation that may be involved in the upregulation of growth-related genes and downregulation of stress-related genes (Yuanyuan M., et al. 2009). At high salinity levels, more accumulation of sugar was recorded in tolerant cultivar in comparison to

susceptible one. More accumulation of sugar decreases the osmotic potential of the cytoplasm and increases the ability of the cytoplasm to retain water under reduced water supply in tolerant genotypes. (Abede et al., 2003).Other studies also suggest that sugar is an important osmoprotectant. (Wu G.Q et al.2016)

At higher salinity both the cultivars showed reduction in total photosynthetic pigment. The reduction in chlorophyll might be due to enhancement of chlorophyllase activity at higher salinity levels or due to reduction in de novo chlorophyll synthesis. (Sudhakar etal., 1997, Desingh and Kaenagaraj, 2007) presumed that the decreased activity of photosystems is due to loss of integrity of chloroplast by damaging the chloroplast lamellar system due to saline condition. However in KRL1-4 the reduction was less indicating better membrane stability due to efficient antioxidant system.

Carotenoids protect the photosynthetic machinery byscavenging oxygen free radical and producing heat as a by-product. Higher content of carotenoid in tolerant is in accordance with Weiwei He et al.,(2020) they suggested that accumulation of carotenoid due to increased expression of related carotenogenic genes and increased antioxidant capacity in germinated yellow maize kernels under NaCl stress.

This study suggests that the relative salinity tolerance in KRL1-4 may occur by a) reducing osmotic stress due to more accumulation of osmolyte like proline and sugars and b) by reducing oxidative stress due to efficient antioxidant enzyme system. This led to better photosynthetic ability of KRL1-4 compared to UP2338. Presented study can contribute in understanding tolerance mechanism of wheat that can be further use in breeding abiotic stress resistant crops.

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