NATIONAL CONFERENCE

ON

ENVIRONMENT AND WATER RESOURCES MANAGEMENT

CHALLENGES & SOLUTIONS

ON WEDNESDAY, 27TH JULY, 2022

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NATIONAL CONFERENCE ON

ENVIRONMENT AND

WATER RESOURCES MANAGEMENT

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WEDNESDAY, 27TH JULY, 2022

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From the desk of Patron of conference

Karmyogi Dr. Vinod D. Tibrewala
Honorable Chairman
Shri J. J. T. University Rajasthan

It gives me immense happiness that National Conference on

"ENVIRONMENT AND WATER RESOURCES' MANAGEMENT-CHALLENGES & SOLUTIONS"

Which has been organized jointly by Govt Sri Pratap College – Cluster University Srinagar & Shri J J T University, on July 27, at Srinagar. It was great elegance to get The AICTE as an "Associate Partner" with the conference.

I congratulate the organisers from both the Universities for executing the idea and making it a grand success. The theme of the conference is so selected, to address the burning environmental issues and the consequences of the same on standard of living. The water crisis is so severe in several areas of the country and the world, that a common man is not able to get pure water, which is a basic fundamental need. I am confident to get a viable outcome from the research papers presented by the researchers. I appreciate the positive response from Govt Sri Pratap College Cluster University and their arrangements at their well equipped venue.

The selected research papers are being put forth in the form of "Proceedings". The credit is to both the organizers for the success of the conference. I wish every success to researchers who have contributed papers/articles with innovative ideas and suggestions.

Dr. Vinod Tibrewala
President
Shri JJT University

From the desk of Vice Chancellor Cluster University Srinagar

Prof. (Dr.) Qayyum Hussain
Vice Chancellor
Cluster University Srinagar

I am glad to know that Sri Pratap College, Srinagar (Constituent College of Cluster University Srinagar) and Shri J.J.T. University Jhunjhunu (Rajasthan) are jointly organizing the National Conference on 'Environment & Water Resources Management—Challenges & Solutions'.

The theme of the conference is quite relevant in contemporary times as we grapple with myriad challenges in safeguarding the environment and managing the water resources. The conference provides a very good opportunity for delegates coming from different corners of India to interact with people having wide-ranging knowledge on the larger issue of environment protection.

Given the magnitude of the environmental crisis, there is a pressing need to address the underlying causes and explore various solutions. Water is crucial for our environment being a key resource for sustainable development. It can pave way for a just and peaceful world. Safe and sufficient water and sanitation are basic human needs. When the poor don't have proper access to water, it denies

them the decent standard of living to which they are entitled as a basic human right.

I hope this conference offers a valuable platform for the academicians, researchers and students to deliberate on the various dimensions of environment and water management. I also hope we come up with suggestions and solutions to make it a result-oriented conference. I extend best wishes to the organizers in this regard.

Prof. (Dr.) Qayyum Hussain
Vice Chancellor
Cluster University Srinagar

From the desk of Registrar

Registrar
Dr. Madhu Gupta
Shri JJT University

It gives me immense joy to pen down, on behalf of SJJT University, the overwhelming appreciation to all the organisers of conference from the two participating universities. It is extremely important to cover the alarming issue of the " Water Crisis" across the globe. Being a basic rightful commodity on earth, when in several countries, people are deprived of pure water, the issue needs to be addressed at the core, by the researchers. The plausible ideas put forth there are highly appreciated. I am sure, the suggestions put forth by researchers, shall be of immense importance and will prove to be extremely helpful to bring solutions to water management on earth.

I, sincerely thank Prof. (Dr.) Khurshid Ahmad Khan, the Principal of Govt. Sri Pratap College *and Dr. Sayed Javid Ahmed*– Andrabi for welcoming the idea of this conference and planning the same. Dr. Anju Singh from Shri JJT University played an important role to conceive and execute the event successfully. Our Chairperson *Dr. Vinod Tibrewala's* wonderful support gave us strength to achieve our goal. The Chief Guest Prof. *Dr. Qayyum Haussain*, VC of Cluster University an amazing and enthusiastic personality, his presence made the event graceful and memorable culminating in an MOU between Shri JJT University and the Cluster University to enhance the relationship in future.

We hope that the papers published in proceedings will provide a broad array of suggestions to policymakers, educational organizations, and other researchers.

I am indeed very thankful to all the contributors, team of Sri Pratap College & Shri JJT University for making this conference a great success.

Registrar
Dr. Madhu Gupta
Shri JJT University

From the desk of Principal S. P. College Srinagar

Patron
Prof. (Dr.) Khurshid A. Khan
Principal S. P. College Srinagar

In consonance to its rich academic traditions, Government Sri Pratap College, Srinagar is once again providing a platform to researchers and students for putting their heads together to ponder over a very crucial issue. Academicians particularly the scientists and inventors are confronted with an enormous challenge of integrating invention and sustainability. Reason and logic would have demanded the science, invention and research and the whole knowledge pursuits science inventions seems to have over-powered its seekers, runners and lovers. Maybe to this entire phenomenon the human greed disproportionate emphasis on material well-being might have served as the impetus. We need to, in our interests, sort out the crucial questioning of maintaining a balance between invention and safety, the research and its meaningful utility and application and I believe, if this remains in focus, the science shall sustain itself as well as the human development in general

I would like to congratulate the organizing team for their commitment and superb drive in organizing this conference. I am very certain that this occasion will be able to provide a platform towards strengthening our relationships in knowledge sharing while at the same time provide the necessary thrust in joint research collaborations and product commercialization within the research society. It is my aspiration that this conference will be a foundation for the growth of new ideas towards a better tomorrow.

Patron
Prof. (Dr.) Khurshid A. Khan
Principal S. P. College Srinagar

From the desk of Editor - in - Chief

Dr. Jayshree Parikh
Prof. Dept. of Chemistry
Shri JJT University

The Global Environment, its problems and their management, is emerging as a prime area of concern. I am pleased to present the proceedings of conference on,

"*ENVIRONMENT AND WATER RESOURCES' MANAGEMENT-CHALLENGES & SOLUTIONS*"

Which has been organized jointly by Govt Sri Pratap College – cluster University Srinagar & Shri J J T University, on July 27, at Srinagar. The AICTE being Associate Partner, the conference achieved an exclusive eminence.

The theme of the conference has evoked the researchers to present their innovative ideas and put forth feasible solutions to overcome the environmental crisis and their effect on the basic resources, their availability to the population and to control the crisis efficiently for the future years. Pure water is a basic fundamental need and hence efficient water management becomes an integral, vital, and extremely important requirement to develop healthy nations across the globe. I appreciate the gesture of both the institutions to consume the idea of organising the conference and give us a platform to voice the issue in global interest.

The thrust is given on quality of "Water resources" which is an integral part of the environment. Research is the foundation stone for new innovative and socially and environmentally relevant ideas and solutions to solve the issues. The research papers presented by the delegates proved to be highly value adding. The selected research papers / articles are presented through this volume of "Proceedings" of the conference. The research included here shall be of great use in respective field. Wish success to all the stake holders of this endeauver.

Dr. Jayshree Parikh
Professor
Shri JJT University

From the desk of Associate Editors

Dr. Syed Javid Ahmad Andrabi
Head Department of water Management,
S. P. College, Srinagar

We on behalf of organizing committee welcome you all in one day National Conference on **Environment & Water Resources Management—Challenges & Solutions'** which is being organized by Govt S. P. College, Srinagar and Shri JJT University Jhunjhunu, Rajasthan. Growing pressure on water resources due to population growth, economic expansion, urbanization, pollution, and other challenges has major impact on our social, economic, and environmental well- being. Creeping effects of climate change are likely to aggravate the position by causing higher frequency & magnitude of extreme weather events as well as by changing the quantum & pattern of precipitation

It is in this backdrop national conference on **Environment & Water Resources Management-Challenges & Solutions'** being organized by Govt S. P. College, Srinagar and Shri JJT University Jhunjhunu, Rajasthan. The Conference would see convergence of renowned water resources experts & environmental experts in academia, industry, utilities & research institutions and in other related disciplines from across the different states to brainstorm and deliberate on various aspects of environment and sustainable water management. The Conference would provide an interactive platform for eclectic brainstorming and sharing path breaking ideas & case studies in respect of environment and water management and importantly to address pressing issues regarding sustainable management of water resources.

We are grateful to the JJT University & College administration and the college staff for providing full support in making this conference possible and success.

We wish all the scientists, academicians, Scholars, students and other participant's fruitful deliberations and hope that this conference will fetch them with great opportunities to make meaningful contributions in their respective fields

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Contents

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Statistical Analysis of Jal Jivan Mission schemes with special reference to Jammu &Kashmir, Maharashtra, and Rajasthan states.

Dr. Swati Subhash Desai

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Abstract:

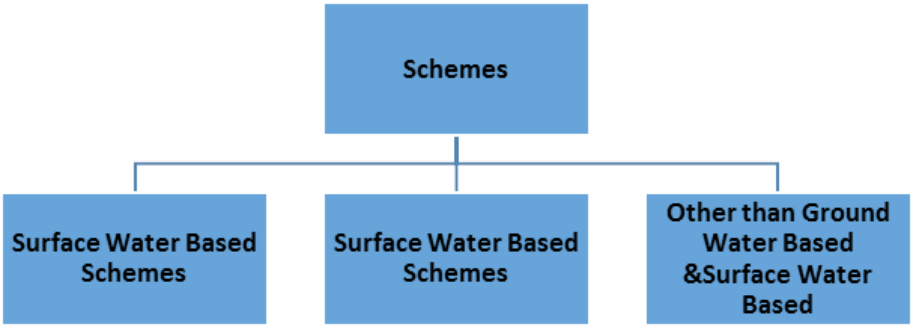
Jal Jeevan Mission the national level project with objective Har Ghar Nal Se Jal was launched in 2019 and expected to complete by 2024. This paper aims to study schemes and sub schemes state wise and district wise. Out of total 33 states three states Jammu & Kashmir, Maharashtra, and Rajasthan were selected for study. Secondary data was compiled through official websites. The statistical tools Classification Tabulation, Measures of Central Tendency, Measures of Dispersion, Percentage, ANOVA, F-test were used for study. Advance Excel was used for Data Analysis.50.88% rural households received Tap connections. Highest number of schemes /sub schemes within the type was observed three times in Karnataka state. While in Dadra & Nagar Haveli and Daman & Diu not a single scheme /sub scheme was implemented. Null hypotheses were made about Beneficiaries in terms of number of Habitants in States under Main schemes and Sub schemes as Piped Water Supply Programs. (PWS), H.P / Bore well / Tube well & other spot sources, and Other than PWS, Spot programs. Both Null hypotheses were accepted at 5 percent level of significance.

Keywords: JJM, FHTC, PWS, NRDWP

Introduction: the National project Jal Jeevan Mission was launched in 2019. The purpose of the mission was to assist, empower and facilitate States as well as Union Territories in planning of participatory rural water supply strategy for ensuring portable drinking water security on long-term basis to every rural household and public institution such as Building, School, Anganwadi Centre, Health Centre, Wellness Centre etc. By 2024 it is expected that every rural household has Functional Tap Connection (FHTC) and quality water in adequate quantity on regular basis. As on 4th July 2022 the total number of rural households is 19,21,75,074 Out of which 9,77,44,536 means 50.86% Rural households were benefitted with Tap connection

The Government of India has restructured and subsumed the ongoing National Rural Drinking Water Programme(NRDWP) into Jal Jeevan Mission (JJM) to provide Functional Household Tap Connection (FHTC) to every rural household i.e., *Har Ghar Nal Se Jal* (HGNSJ) by 2024.

Classification of Schemes

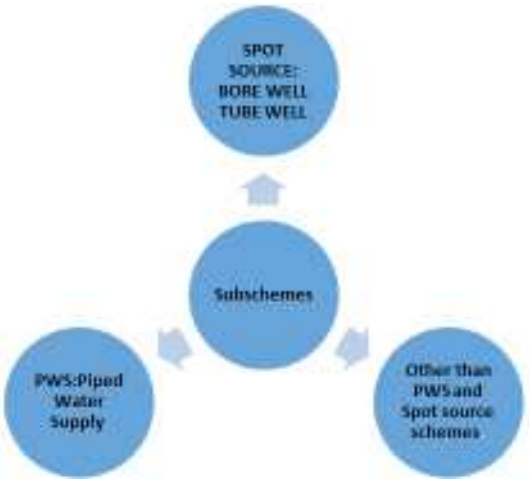


Each of above scheme/Programme was classified into

Piped Water Supply (PWS) programs

H.P / Bore well / Tube well & other spot sources

Other than Piped Water Supply and H.P / Bore well / Tube well



Piped Water supply (PWS) programs across India is based on the principle to provide the Jal Jeevan Mission with important feedback on community participation as well as strengthened role of institutions in better management of PWS schemes.

Bore well: A deep, narrow well for water that is drilled into the ground and has a pipe fitted as a casing in the upper part of the borehole, typically equipped with a pump to draw the water to the surface.

Tube well: A tube well is a type of water well in which a long, 100–200 millimeters (3.9–7.9 in)-wide, stainless steel tube or pipe is bored underground. The lower end is fitted with a strainer, and a pump lifts water for irrigation. The required depth of the well depends on the depth of the water table. Bore wells & Tube wells, are very similar. Both are basically vertical drilled wells, bored into an underground aquifer in the earth's surface, to extract water for various purposes. The difference in the two lies in the type of casing used the depth of this casing and the type of soil where they are drilled.

Objectives of study

1. To study the schemes related to JJM
2. To analyze the data Statewide wise , District wise and Scheme wise
3. To compare three states Jammu & Kashmir, Maharashtra, and Rajasthan for number of habitants benefitted by various schemes.

Hypothesis:

1. States do not differ significantly with respect to number of habitants Under Piped Water Supply Programs. (PWS), H.P / Bore well / Tube well & other spot sources, and other programs.
2. Ground Water Based Schemes, Surface Water Based Schemes and other schemes do not differ significantly with respect to number of habitants.

Research Methodology

Secondary data from official websites were compiled. Three states Jammu & Kashmir Maharashtra, and Rajasthan were selected purposively for comparison. Total number of schemes as well as Number of habitants under Piped Water Supply Programs. (PWS), H.P / Bore well / Tube well & other spot sources, and other programs were taken, tabulated and analyzed .Averages as measure of central tendency and ANOVA technique was used for Data Analysis. Excel Add In feature Data Analysis was applied for results.

DATAANALYSIS

Table No. 1: State wise number of Districts

S.No.	State	Number of Districts	S.No.	State	Number of Districts
1	Andaman & Nicobar Islands	3	18	Maharashtra	34
2	Andhra Pradesh	13	19	Manipur	16
3	Arunachal Pradesh	20	20	Meghalaya	11
4	Assam	27	21	Mizoram	8
5	Bihar	38	22	Nagaland	11
6	Chhattisgarh	27	23	Odisha	30
7	Dadra & Nagar Haveli and Daman & Diu	1	24	Puducherry	4
8	Goa	2	25	Punjab	22
9	Gujarat	33	26	Rajasthan	33
10	Haryana	22	27	Sikkim	4
11	Himachal Pradesh	12	28	Tamil Nadu	31
12	Jammu & Kashmir	22	29	Telangana	30
13	Jharkhand	24	30	Tripura	8
14	Karnataka	30	31	Uttar Pradesh	75
15	Kerala	14	32	Uttarakhand	13
16	Ladakh	14	33	West Bengal	19
17	Madhya Pradesh	51	TOTAL	702	

Table No. 2

Category	Total Number as on 4/7/2022
Districts	702
Rural Household tap connections	9,77,21,900
Rural Households	19,20,56,252

The Jal Jeevan Misson schemes and sub schemes were implemented in 702 districts of the country. Out of total rural households only 50.88% rural households received Tap connections.

Table No.3

States with Minimum and Maximum number of Schemes/Sub schemes

Sr. No.	Name of the State(s) with **ZERO** schemes	Scheme: Sub scheme	Name of the State with **HIGHEST** number of schemes	Number of Schemes
1	Dadra & Nagar Haveli and Daman & Diu (D&NH;D&D)	Ground Water Based Schemes: **Piped Water Supply** (PWS) programs	Karnataka	2,60,878
2	D&NH;D&D, Goa	Ground Water Based Schemes: H.P / Borewell / Tubewell & other Spot sources	Uttar Pradesh	22,66,411

3	D&NH;D&D, Andaman & Nicobar Islands(A&N)	Ground Water Based Schemes: other than PWS and Spot source schemes	Karnataka	51,496
4	D&NH;D&D ;Puducherry	Surface Water Based Schemes: PWS	Uttarakhand	16,819
5	D&NH;D&D, A&N Islands Goa, Nagaland, Puducherry	Surface Water Based Schemes: H.P / Borewell / Tubewell & other Spot sources	Telangana	2,489
6	D&NH;D&D, Bihar , Chhattisgarh , Puducherry, Tripura	Surface Water Based Schemes: other than PWS and Spot source schemes	Karnataka	1,099
7	D&NH;D&D, A&N Islands, Goa Puducherry, Sikkim, Uttar Pradesh	Other than Ground Water and Surface Water source schemes.: PWS	Andhra Pradesh	5,933
8	D&NH;D&D, Goa, Haryana, SikkimJammu & Kashmir, Manipur; Puducherry,	Other than Ground Water and Surface Water source schemes.: H.P / Borewell / Tubewell & other Spot sources	Tamil Nadu	5,098
9	D&NH;D&D, A&N Islands, Arunachal Pradesh, Bihar; Goa, Gujrat, J&K; Jharkhand, Manipur Meghalaya; Nagaland; Tripura Uttarakhand, Sikkim Tamilnadu;Puducherry;	Other than Ground Water and Surface Water source schemes.: other than PWS and Spot source schemes	Andhra Pradesh	501

Footnote:

D&NH;D&D :Dadra & Nagar Haveli and Daman & Diu

A&N: Andaman & Nicobar J&K: Jammu & Kashmir

Out of 9 types of schemes and subschemes highest number of schemes /subschemes within the type was observed three times in Karnataka state. While in Dadra & Nagar Haveli and Daman & Diu not a single scheme /subscheme was implemented.

Table No. 4 Aggregate (Total) number of schemes of states in India.

	PWS	H.P / Borewell / Tubewell & other spot sources	Other than PWS and SPOT source schemes*	Total
Ground Water Based Schemes	426892	308312	112646	847850
Surface Water Based Schemes	120303	9531	5091	134925
Other than ground water and surface water source schemes.	19858	16846	1259	37963
Total	567053	334689	118996	1020738

Out of total 1020738 schemes/ sub schemes, highest number was of Ground Water Based Schemes: Piped Water Supply (PWS) programs. 55.55%were of the type Piped Water Supply. 32.79% were of the type H.P / Bore well / Tube well & other spot

sources and 11.66% were of other than these. Also 83.06% were Groundwater based, 13.22% were surface water based and rest 3.72% were other than GWBS and SWBS

Table No. 5 Aggregate (Total) number of Habitants of states in India.

	PWS	H.P / Borewell / Tubewell & other spot sources	Other than PWS and SPOT source schemes*	Total
Ground Water Based Schemes	565597	534525	74002	1174124
Surface Water Based Schemes	316360	7194	6684	330238
Other than ground water and surface water source schemes.	25462	8802	1180	35444
Total	907419	550521	81866	1539806

Out of total 1539806 Habitants, highest number was benefitted with Ground Water Based Schemes: Piped Water Supply (PWS) programs. 58.93%were with the type Piped Water Supply. 35.75% were with the type H.P / Bore well / Tube well & other spot sources and 5.32% were with other than these. Also 76.25% were Groundwater based, 21.45% were surface water based and rest 2.30% were other than GWBS and SWBS.

For Objective number (3) and Hypothesis testing researcher has compiled number of habitants for three states Jammu &Kashmir, Maharashtra and Rajasthan under the three schemes/programs Ground Water based, Surface Water based and Other than these. Such type of data was obtained for three subschemes Piped Water Supply**(** PWS), H.P / Borewell / Tubewell & other Spot sources, and Other than PWS and Spot source schemes. The Cross Tabulation tables were as given below.

[1] Piped Water Supply**(** PWS)

Table No.6 Number of Piped Water Supply(PWS) beneficiaries Habitants Scheme wise and State wise.

Scheme\State	Jammu &Kashmir	Maharashtra	Rajasthan
Ground Water Based Schemes GWBS	5607	57361	16585
Surface Water Based Schemes SWBS	11826	17395	34809
Others than GWBS,SWBS	37	499	2006

[2] H.P / Bore well / Tube well & Other Spot Sources

Table No. 7 Number of H.P / Bore well / Tube well & Other Spot Sources beneficiaries Habitants Scheme wise and State wise.

Scheme\State	Jammu &Kashmir	Maharashtra	Rajasthan
Ground Water Based Schemes GWBS	3732	2	0
Surface Water Based Schemes SWBS	48820	281	54
Others than GWBS,SWBS	67103	1921	3012

[3] Other than PWS and Spot Source schemes

Table No.8 Number of 'Other than PWS and Spot Source schemes' beneficiaries Habitants Scheme wise and State wise.

Scheme\State	Jammu &Kashmir	Maharashtra	Rajasthan
Ground Water Based Schemes GWBS	43	29	0
Surface Water Based Schemes SWBS	188	59	22
Others than GWBS,SWBS	1558	37	42

Hypothesis:

(1) States do not differ significantly with respect to number of habitants Under Piped Water Supply Programs. (PWS), H.P / Bore well / Tube well & other spot sources, and other programs.

(2)Ground Water Based Schemes, Surface Water Based Schemes and other schemes do not differ significantly with respect to number of habitants.

These hypotheses were tested by TWO WAY ANOVA technique.

For three sub schemes (i) Piped Water Supply**(** PWS), (ii)H.P / Bore well / Tube well &

Other Spot Sources, (iii) Other than PWS and Spot Source schemes above two

Hypotheses were tested. The ANOVA tables and summary of the result was as given Below.

[I] **Piped Water Supply(** PWS)

Table No. 6 was taken into consideration for ANOVA

Null Hypothesis (1)

Ho: States do not differ significantly with respect to number of habitants Under Piped Water Supply Programs. (PWS) i.e. there is no significant difference between average numbers of habitants' beneficiaries under Piped Water Supply Programs. (PWS) of Jammu &Kashmir, Maharashtra and Rajasthan

H_1: States differ significantly with respect to number of habitants Under Piped Water Supply Programs. (PWS) i.e. there is significant difference between average numbers of habitants' beneficiaries under Piped Water Supply Programs. (PWS) of Jammu &Kashmir, Maharashtra and Rajasthan

Symbolically Ho : $\mu_{J\&K} = \mu_{Mah} = \mu_{Raj}$ Vs H_1 : $\mu_{J\&K} \neq \mu_{Mah} \neq \mu_{Raj}$

Where $\mu_{J\&K}$, μ_{Mah}, μ_{Raj} denote average number of habitants beneficiaries under Piped Water Supply Programs. (PWS) of Jammu &Kashmir, Maharashtra and Rajasthan respectively.

Null Hypothesis (2)

Ho : Ground Water Based Schemes, Surface Water Based Schemes and other schemes do not differ significantly with respect to number of habitants under Piped Water Supply Programs. (PWS).

i.e. There is no significant difference between average number of habitants beneficiaries under Piped Water Supply Programs. (PWS) of Ground Water Based Schemes, Surface Water Based Schemes and other schemes.

H_1: Schemes differ significantly with respect to number of habitants Under Piped Water Supply Programs. (PWS) i.e. There is significant difference between average number of habitants beneficiaries under Piped Water Supply Programs. (PWS) of Ground Water Based Schemes, Surface Water Based Schemes and other schemes.

Symbolically Ho : $\mu'_{gwbs} = \mu'_{swbs} = \mu'_{others}$ Vs H_1 : $\mu'_{gwbs} \neq \mu'_{swbs} \neq \mu'_{others}$

Where μ'_{gwbs}, μ'_{swbs}, μ'_{others} denote average number of habitants beneficiaries under Piped Water Supply Programs. (PWS) of Ground Water Based Schemes, Surface Water Based Schemes and other schemes respectively.

Table No. 9 Summary Table

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Ground Water Based Schemes GWBS	3	79553	26517.67	7.44E+08
Surface Water Based Schemes SWBS	3	64030	21343.33	1.44E+08
Others than GWBS,SWBS	3	2542	847.3333	1060242
Jammu &Kashmir	3	17470	5823.333	34780230
Maharashtra	3	75255	25085	8.53E+08
Rajasthan	3	53400	17800	2.7E+08

Table No. 10 Analysis of Variance Table

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Schemes	1.11E+09	2	5.53E+08	1.828846	0.27285	6.944272
States	5.68E+08	2	2.84E+08	0.938587	0.463215	6.944272
Error	1.21E+09	4	3.02E+08			
Total	2.88E+09	8				

Decision: Since both p-values are > 0.05 (Level of Significance) also both F-values are less than F-critical values it implies that Null Hypotheses (1) and (2) were accepted

Conclusion: States do not differ significantly with respect to number of habitants under Piped Water Supply Programs. (PWS) i.e. there is no significant difference between averages Number of habitants beneficiaries under Piped Water Supply Programs. (PWS) of Jammu &Kashmir, Maharashtra and Rajasthan.

Ground Water Based Schemes, Surface Water Based Schemes and other schemes do not differ significantly with respect to number of habitants Under Piped Water Supply Programs. (PWS) i.e. there is no significant difference between average numbers of habitants' beneficiaries under Piped Water Supply Programs. (PWS) of Ground Water Based Schemes, Surface Water Based Schemes and other schemes.

Similar Hypotheses were tested for H.P / Bore well / Tube well & Other Spot Sources [Table No. 7] and Other than PWS and Spot Source schemes [Table No.8]

The Summary Tables and ANOVA tables are given below

H.P / Bore well / Tube well & Other Spot Sources

Table No. 11 Summary Table Ref. Table No. 7

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Jammu &Kashmir	3	3734	1244.667	4640121
Maharashtra	3	49155	16385	7.89E+08
Rajasthan	3	72036	24012	1.39E+09
Ground Water Based Schemes GWBS	3	119655	39885	1.06E+09
Surface Water Based Schemes SWBS	3	2204	734.6667	1075000
Others than GWBS,SWBS	3	3066	1022	2970804

Table No. 12Analysis of Variance Table

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
States	8.06E+08	2	4.03E+08	1.211628	0.387802	6.944272
Schemes	3.04E+09	2	1.52E+09	4.576075	0.092497	6.944272
Error	1.33E+09	4	3.33E+08			
Total	5.18E+09	8				

Decision: Since both p-values are > 0.05 (Level of Significance) also both F-values are less than F-critical values it implies that Null Hypotheses (1) and (2) were accepted

Conclusion: States do not differ significantly with respect to number of habitants under

H.P / Bore well / Tube well & Other Spot Sources. i.e. There is no significant difference between average number of habitants beneficiaries under H.P / Bore well / Tube well & Other Spot Sources of Jammu &Kashmir, Maharashtra and Rajasthan.

Ground Water Based Schemes, Surface Water Based Schemes and other schemes do not

differ significantly with respect to number of habitants under H.P / Bore well / Tube well & Other Spot Sources. Schemes do not differ significantly with respect to number of habitants under H.P / Bore well / Tube well & Other Spot Sources i.e. There is no significant difference between average number of habitants beneficiaries of Ground Water Based Schemes, Surface Water Based Schemes and other schemes under H.P / Bore well / Tube well & Other Spot Sources

Other than PWS and Spot Source schemes

Table No. 13 Summary Table Ref. Table No. 8

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
Jammu &Kashmir	3	72	24	481
Maharashtra	3	269	89.66667	7594.333
Rajasthan	3	1637	545.6667	768620.3
Ground Water Based Schemes GWBS	3	1789	596.3333	698858.3
Surface Water Based Schemes SWBS	3	125	41.66667	241.3333
Others than GWBS,SWBS	3	64	21.33333	441.3333

Table No. 14 Analysis of Variance Table

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
States	484384.2	2	242192.1	1.059113	0.427434	6.944272
Schemes	638693.6	2	319346.8	1.396513	0.346732	6.944272
Error	914697.8	4	228674.4			
Total	2037776	8				

Decision: Since both p-values are > 0.05 (Level of Significance) also both F-values are less than F-critical values it implies that Null Hypotheses (1) and (2) were accepted

Conclusion: States do not differ significantly with respect to number of habitants under

Other than PWS and Spot Source schemes. i.e. There is no significant difference between

average number of habitants beneficiaries under Other than PWS and Spot Source schemes of Jammu &Kashmir, Maharashtra and Rajasthan.

Also Ground Water Based Schemes, Surface Water Based Schemes and other schemes do not differ significantly with respect to number of habitants Other than PWS and Spot Source schemes Schemes do not differ significantly with respect to number of habitants Under Other than PWS and Spot Source schemes i.e. There is no significant difference between average number of habitants beneficiaries under Other than PWS and Spot Source schemes of Ground Water Based Schemes, Surface Water Based Schemes and other schemes .

Limitations : The research study was limited to only 3 States for comparison.

Future Scope: Similar study can be done for other more states and more characteristics.

Utility: The findings of the study may be useful for implementing the schemes to solve much needed water problem in the states where it is not fully implemented.

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Fluorosis - a cause of pollution and its preventive measures

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Abstract :

Water is the nature's gift and is an important source to transport nutrients to all parts of body. Water contamination disturbs the mechanism of body resulting in some kind of diseases. Fluorosis is mainly a waterborne disease. Vegetables contains some fluoride, which is due to absorption from soil pollutes ground water. The review puts light on the probable contamination that leads to fluorosis and their preventive measures. Fluoride, lead, arsenic are considered as toxins. However fluoride is more harmful than other toxinous elements, specially through the ground water. In India the dependency on groundwater is very high, specially in rural areas, and such water shows the presence of fluoride in unhealthy percentage. It is of great worry that in growing infants, just 2 milligram (mg) of fluoride if absorbed / consumed daily, can result in crippling skeletal fluorosis after the age of 40 years. Several diseases, like Alzheimer's disease, osteoporosis, brittle bones, infertility in women, cancer of different organs, brain damage, arthritis and thyroid disorders are caused to humans affecting the health of society at large. Fluoride is an acute toxin, and harms teeth and bones largely. 1milligram per liter fluorides helps teeth to be strong, but if intake increases to 1.5 milligram per liter, causes disorder of mottled teeth. In several states in North India, "Yellow Teeth" problem is seen commonly.[7]

Keywords: Fluorosis, pollution, ground water, prevention, teeth diseases.

I. *Introduction :*

Adequate supply of fresh water is necessary for good health. It is a well-known fact that world population is suffering from availability of fresh water. Contaminated water causes waterborne diseases. These health problems can be prevented by taking measures at the household level. Water contamination may be geological or anthropogenic.

Groundwater can be a source of natural contamination as it picks up compounds like magnesium, calcium, arsenate, fluoride, chloride, nitrate, and iron present on sedimentary rocks and soil. Agricultural and industrial contaminants are manmade. Agricultural contaminants include fertilizers, pesticides and insecticides while industrial contaminants includes heavy metals like mercury, lead, copper, chromium along with dyes and hazardous chemicals. Ground water contamination can also be a cause of improper disposal of medicines, disinfectants, paints, synthetic detergents.

In 1937, it was observed that high consumption of fluoride is harmful for humans and animals. It has been observed that fluorosis is caused due to consumption of fluoride from water, consumption of food, inhalation of toxic fumes. The main source being water.

There are four types of contaminants associated with water pollution:

- Organic contaminants,
- Inorganic contaminants,
- Biological contaminants,
- Radiological contaminants.

Fluorosis is in category of an inorganic contaminant. Fluorosis is caused due to high consumption of fluoride from water. The presence of contaminants can be measured by its chemical constituent value. Guideline values are derived for chemical constituents of drinking-water. These parameters represents the concentration of a constituent that does not result in any significant risk to health over a lifetime of consumption.

II. Fluoride and fluorosis

Fluoride can get into drinking water from natural sources or manmade. Fluorine exist in Earth's crust in the form of fluorides as fluorite, fluorspar, cryolite and Fluorapatite. [5] Excessive fluoride concentration have been reported in ground waters. Traces of fluoride is present in all vegetables, which is absorbed from ground water. Tea has high fluoride concentrations. Manmade sources of fluorides are pharmaceutical products, disinfectants, dental preparations in the form of mouthwash, toothpaste or gels. The fluoride in water is present in the form of fluoride ions.

High level of fluoride in water is harmful to developing children as it can cause dental and skeletal fluorosis. In skeletal fluorosis bones get twisted, deformed and people cripple at early age.

III. Monitoring fluoride and fluorosis and applying standard limit that is safe in drinking water

The chemical with significant international concern is considered for inclusion in the WHO Pesticide Evaluation Scheme (WHOPES). The criteria for chemicals to be included in WHO includes chemicals which is present in drinking-water with potential toxicity.

A guideline value determine the concentration of a chemical constituent in drinking water that are not harmful to health over a lifetime of consumption.Chemical contaminants needs to be prioritized based on their risk to be included in monitoring programs and national standards.

Fluoride is one of the chemicals with health concern. Daily fluoride exposure varies from region to region. This depends on the level of fluoride in drinking-water, food, the use of fluorine based dental paste and many other factors.Concentrations above the guideline value carry a risk of dental fluorosis and high concentrations lead to skeletal fluorosis.

Concentrations of fluoride in wastewaters can range from 100 mg/l to 10,000 mg/l. Fluoride limit should be less than 20 mg/l in the wastewater discharged into a sewer system, and should be less than 5 mg/l if the wastewater is discharged into an aquatic environment.

The fluoride limit in drinking water as mentioned in national standards is 1.5 mg/l. [2]

In some countries fluoride is added to drinking water with concentration of 0.5 mg/l because it is considered to prevent dental cavities.

Concentration above 1.5 mg/ml value has a risk of dental fluorosis and higher concentration causes skeletal fluorosis. This value is higher than the fluoride in water supplies, which is usually 0.5–1.0 mg/l.

IV. Analysis and Treatment

Analysis is carried out to identify risk and to verify the water safety plan for chemical contaminants. Guideline value is set at the concentration that is achieved through treatment. [1]

Field kit act as valuable tool to provide quick check of various water contaminants. Many kinds of field kits to test the concentrations of various chemicals in water are available at low cost compared to laboratory tests. These are generally used for monitoring and compliance of drinking-water quality. [3]

Standard methods for water analysis can be achieved provided that all laboratories use the same standard methods. Although various factors affect the accuracy of results which includes apparatus type, reagent purity, analyst skills and many more.

The process of collection, treatment, storage and distribution of drinking-water involve deliberate addition of various chemicals to provide safe and clean drinking-water.

Analytical methods used for treating fluoride are

1) calcium fluoride precipitation and coagulation,
2) adsorption,
3) ion-exchange, and
4) membrane-based processes such as reverse osmosis.
5) Adsorption, ion-exchange and reverse osmosis are used to treat drinking water.

Water with high level of fluoride can be treated on activated alumina or advanced treatment like reverse osmosis. Treatment of low level of fluoride in water are treated using bone charcoal, contact precipitation, activated alumina and clay.

Calcium fluoride precipitation and coagulation is suited for high fluoride concentrations from industrial wastewater to meet discharge requirements. [6]

V. One example of Fluoride and fluorosis in India

Anganwadi workers, fluorosis and moringa leaves:

In some of the anganwadi schools, contaminated water was used to prepare meals. The result was around 85% of school students had dental fluorosis. Moringa leaves, high in nutrition were added during afternoon meal preparation. Moringa leaves are good source of calcium, iron, magnesium, vitamin C and help resist fluorosis. Need for clean and safe water requires rainwater harvesting, dug wells, protection of safe water limits, gardening nutritious plants.

VI. Conclusions

The world is facing problems due to waterborne disease like fluorosis. For sustainable environment, priority should be given to both the quality and quantity of water. Clean and plenty of drinking water should be the main motto of all nations of the world. Even though there are instruments to test water quality in laboratories, people should be aware of low cost household kit to test the water quality at local level. There are limitations derived for each chemical component level. These vary with many factors. To improve the quality of the drinking-water, the process of collection, treatment, storage and distribution of drinking water involve deliberate additions of many chemicals.

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21st Century Leadership

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Abstract

Already widespread consensus that managing Businesses in the 21st century is altogether different from how we managed in the last century since the advent of Industrialization. Conventional management methodology formulated by Taylor's theory depends heavily on the close supervision of the workers within the context Command and Control. Now it's the time to reach to some understanding what constitute the new approach for effectively manage and the requisite leadership style of the 21st century or how we can improve. The purpose of the paper is provide some insights to the Leadership style through high-level frameworks to manage 21st century businesses and stay competitive and sustainable in the long run. Businesses in the 21st century has to navigate greatly thru' uncertainty due to the VUCA (Volatile, Uncertain, Complex & Ambiguous) nature of the economic landscape. Thus, the businesses who can strategize their vision based on the current signals of changes can only survive.

This paper covers the qualities the 21st century leadership to imbibe in order to effectively run their businesses. This is a conceptual paper builds upon the existing literatures that present 21st Century Leadership frameworks in the context of the onslaught of Automation and digital transformation.

Frame works presented in this paper contributes towards operationalization of the 21st century leadership styles.

Key Words: Dynamic Capabilities, Industry 4.0, Transactional/transformational leadership, Value driven management.

1.0. Introduction

We are living in a VUCA world, a business landscape characterized by high degree of Volatility, Uncertainty, Complexity and Ambiguity. All economic activities of the 21st century including the Businesses & Projects are impacted by such turbulence. One of the key trigger for the turbulence is the technological revolution shaping the world and that is going to alter the way we work and live. Opposition to large-scale automation and development of Artificial intelligence is a futile exercise and similar to that would have been in the 20th century to oppose electricity. Hence the best approach for the businesses is embrace it and exploit the opportunities for the growth. Since the application will have a massive resistance among the employees of the Organizations, leaders has to act as a change agent to unleash confidence among the employees. In the said context Organizational leadership's , main role is to make the employees across the organization is informed , trained and prepared for embracing the changes .

2.0. 21st Century - Technologies and Future Trends

Artificial intelligence (AI) is going to be the biggest technological shift of the 21st century and in our lifetime. AI will augment business capabilities allowing to do more and with much greater accuracy. Leadership has to re asses how the AI can be embraced for the business advantage and allow coexisting with machines and humans, which will become invaluable partners in solving the real problems.

Smart Cities & the Circular Economy

Emerging technological revolution is driving the Cities for adopting smart city by which City's Water resources, health systems, transportation, smart building technologies, energy, sanitation, waste collection and security technologies and services are integrated by leveraging digital technologies with an intention to reduce costs , resource consumption , enhance performance and quality of services and to engage more effectively with the citizens.

Energy

Electricity will follow circular energy infrastructure cycle and will be far more decentralized by 2030. Large scale introduction of bio solar technology with integrated bio batteries will generate energy in the day time and store it until its required in the night.

Financial Technology & Block Chain

Mushrooming of Fintech companies disrupting the conventional financial system by leveraging technological innovations such as block chain. Fintech is charting the unserved areas and is a threat to the brick & mortar banking industry. Advent of block chain technology is accelerating the online transactions (a distributed data base of digital assets and transactions) paving the ways to a decentralized authority.

Transportation

Self-driving vehicles will disrupt completely how we organize our cities, roads and our lives. Cars will go a transition similar to the mobile phones, apart from a mode of transportation from point A to point B , it will act as an extension of cyberspace with advanced digital assistant.

Hence, for Organization to be sustainable in the long run as to keep abreast of the trends, monitor and proactively reacts to the shifts in the market place. Failure to do so will lead to extensive risks and even extinction similar to what happened to Kodak.

3.0. 21st Century Organization

21st century leadership faces the dilemma since the future cannot be extrapolated from the past. 21st century leadership style and success methodology is measured and defined within the context of Industry 4.0(fourth industrial revolution) & within the context of VUCA environment (fig 1).

Fig: 1. Components of the VUCA Environment

Whole business landscape is disrupted with Volatility, Uncertainty, and Complexity & Ambiguity. Onset of VUCA Business land scape & advent of 4th Industrial revolution accelerated the evolution of the 21st century business landscape a transition from the mechanistic to a dynamic work place.

Table 1 illustrates a comparison of the characteristics of a Mechanistic & Dynamic work place.

Characteristics	The Mechanistic Workplace	The Dynamic Work Place
Technology	Mechanical	Digital
Nature of Work	Structured, Localized	Flexible , Virtual
Work force	Loyal Employees, Homogeneous	Empowered, Diverse
Management	Narrow spans of Control	Wide Spans of Control
Culture	High formalization	Low Formalization
Communication	Clear Chain of Command	Free flow of Information
Structure	Rigid departmentalization	Cross hierarchical Teams
Decision Making	Centralization	Decentralization

Hence, for effective management of 21st century Businesses, Leaders has to embrace the characteristics of a dynamic works place which is nothing but convergence to Agility and Value driven Management. The critical competencies to lead in disruptive environments while evolving from Mechanistic to Organic organizations is as shown in the fig 2.

Fig: 2 Evolution to an Adaptive Working Culture

Gary Hamel in his book titled Humanocracy blame bureaucracy within the Organization as culprit for less resilience, creativity and lack of Agility within the Organization. Bureaucratic organization are risk averse and dispiriting. Success in the current business landscape requires creativity, initiative and daring to take risk. We can deduce the 21st century as the Leadership century whereas year 1911 to year 2011 as the management century .The radical shift of accelerating change is due to the tremendous growth of computational power, network capacity.

Fuel for the renewal of 21st century business is innovation .For business to sustain human beings to be put at the center of the Organizations and not structures, process or methods. Bureaucracy to be replaced with humanocracy.

Our present organization works heavily on the concept of standardization propounded by Federich Taylor i.e Scientific Management in the year 1911. 21st century business work within an ecosystem characterized by VUCA factors and thus the environment is too complex. Manager's role in 21st century businesses will diminish when teams can seamlessly coordinate their efforts thru digital transformation. For success of the business, hierarchy of layers to be discarded and employers to be encouraged with creative problem solving capabilities.

4.0 Focus on the Human Dimension

Speaking at an Entrepreneur conference, Alibaba Group CEO warned that AI will likely be on time magazine as the best CEO within 30 years and further qualified that AI & robotics should augment humans in the workplace and not as a replacement. Mckinsey global institute study finds that 25% of the work undertaken by CEO now can be automated. Bottom line is most of the jobs can be automated and in turn will boost productivity. However the 21st century leadership should be mindful of how such automation will impact employees. Focus while steering the business should be on the human dimension. Business need to invest in their employees with an objective to raise the digital literacy to facilitate to function effectively in the new workplace. For the 21st century business success/thrive , we need a new paradigm one in which employees are no longer viewed as resources or capital & need to unleash a human centric principles in every structure, systems , process & practice. Every structure and all business should be human centric.

5.0 Theories of leadership

When we analyses the historical evolution of leadership, we can conclude four main periods of evolution namely: trait theory, behavioral theories, contingency theories and modern theories. In traits theory, the paramount factor that determines the effectiveness of the leadership is guided by the traits of the leader. While the behavioral theory, the leaders effectiveness is in the behaviors that the leadership exhibits in the leadership process. As per Fiedler's contingency approach, three different variables determines the effectiveness of leaders: Leader – member relations, task structure and the positional power. However for Industry 4.0 to flourish and reap advantage requires a superior creative ability and participative management, flexibility across the organization. The leadership form of 21st century should be based on the needs of the employees, supporting the employees, those who can emphasize merits and ethical behavior, focusing on innovation and putting science and technological advances into practice. 21st century employees are Knowledge worker and they needs

opportunity, needs achievements & fulfilment, and needs to comply with values. Wharton study shows that Leadership styles needs a change due to shift in business models, new source of values, and new type of relationship with suppliers; customers that has digitally enabled leaders need to be collaborator and co-creator in 21st century.

Transactional Leader

Bass (1985) defines the transactional leadership as a leadership style where the leader informs his /her employees quite clearly about the leader's expectations and also explains what reward they can receive in return for their expected performance and efforts.

5.2 **Transformational Leader**

Focus on emotions and values rather than logical processes. This type motivate the employees using economic, political or similar forces and values to achieve the goals .

5.3. **Technological Leadership**

Leaders those who produce strategy and vision leveraging by the use of modern technologies to meet the needs of the Organization. In this case the leaders will facilitate others to use , manage , evaluate and understand the technologies and put it in use effectively for meeting the vision of the Organization.

5.4. **Strategic leadership**

21st century businesses need leaders who can think strategically, create a vision , predict the future by exploiting the present market signals and guide their employees in navigating the uncertain world. Strategic leaders possess four leadership characteristics such as managerial (ensuring the organizational order), political (ability to understand employees, manage and direct the employees to reach specified goals and objectives), transformational (paying attention to employees opinion and motivating them) and ethical (expressing commitment to corporate values).

5.5. **Visionary leadership**

Visionary leaders are those who can dream and design the future of the Organization and strive for a purpose. In an uncertain world, the leadership to be farsighted, to set vision and goals for the Organization future and achieve goals. Studies shows that importance of visionary leadership concept has increased multifold after 2011. Unleashing visionary capacity among the business leaders mitigate the uncertainties of the organizations regarding the future and facilitate to take necessary steps for possible crisis periods and ensure survival and sustainability of the organization. Three main roles of the Visionary leadership are showing the way, walking on the way and being the way.

5.6. **Agile Leadership**

For business success in the 21st century, agile skills across the organization are of absolute necessity. Agile leadership can be defined as those who can find solutions for the problems encountered in the organization, who is creative, can adapt quickly to changes and developments, and cooperate with employees, trusting the employees and turn crisis into performance. Agile leadership traits can be of four types namely : Context setting agility which is need for change and desired results , stakeholder agility is nothing but understands and adapt to stakeholders, creative agility is about providing analytical and creative thinking to solve problems and self-leadership agility reflects itself and tries new behaviors.

6.0 21st Century leadership Frame Works

In a turbulent business landscape, Leaders has to challenge the assumptions, simulate the assumptions and act based on the evidences for the successes. Instead of relying on the experiences, rely on the wisdom of experiences and resort to a scientific approach while making decisions. Management has to take a scientific approach while making decisions .Challenge the age-old assumptions and carryout due diligence of the scientific facts by articulating the testable hypothesis in order to arrive at concrete evidences. In the normal case the positions in the business hierarchy is based on the result of experience and his /her records of accomplishment of successful moves in their career ladder. Further, the top leadership is in a feedback loop of continuous positive reinforcement with their decisions unlikely to be questioned. Nevertheless, if one act scientifically, we are steadfastly probing our assumptions and appropriately changing them based on the evidences and facts. Hence resorting a scientific approach to decisions is critical in today's business success. The pandemic due to the onslaught of Covid 19 has filled the business landscape with lot of uncertainty and perils. Assumptions what we had about work and live was no more applicable. We came to know that the supply chains were no longer functioning and resilient to such disturbances. Organizational culture undergone a redefinition since most of the employees started working from

distances; employees are no longer physically co located. However, this greater volatility has brought lot of opportunities also to the business leaders. The pandemic has proved to the business leaders that relying fully on the experiences, past judgements and assumptions will not help the businesses to wade through the uncertain business landscape.

7.0 Conclusion

Classic leadership style will be less efficient in the 21st century where Industry 4.0 unleashes the business landscape. 21st century businesses are transformed with new Organizational values being created in the most effective ways by way of producing, using, sharing and disseminating the information's. In the said context, Organization requires leaders who can make quick decisions, give importance to innovations and creativity and analyses the disruptive environmental conditions and reap advantage out of it. 21st century leaders should have strategic and visionary leadership behaviors in order to navigate the uncertainties by visualizing the future, by inculcating flexibility and thinking strategically and thereafter formulate necessary changes that will create values for the businesses. Visionary leadership is an existential requirement for leaders to navigate in the 21st century businesses and beyond. Further, since learning and innovation are more specific, transformational leadership also required. Business process need to be redesigned in order to adapt to the global trends and changing customer demands. Leaders should be agile, constantly adapt to the changes, and keep their businesses to stay put in the competitive environment.

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Cool roof installation on a laboratory building in Bikaner, Rajasthan to increase albedo and emissivity

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Abstract

Cool roof installation is a technique used to increase albedo and emissivity of the roof surface. Albedo is the proportion of ultraviolet solar radiation reflected back into the sky and emissivity is the property of passing out infra-red solar radiations, also known as thermal emittance. Both the properties are necessary to be fulfilled by cool roof coating material. It is the best technique to mitigate the rising atmospheric temperature in urban areas, known as Urban Heat Island Effect (UHI). Since, the climate of India is hot, it needs a lot of electric energy for cooling. This research is based on experimental observation and monitoring of a laboratory building situated at Bikaner, Rajasthan (India), where the maximum temperature varies from maximum 108 °F (42.2 °C) to 86 °F (30 °C) that results in increasing demand for cooling energy and usage of air conditioners and gas chillers which further escalate the global warming. The grey cemented roof of the laboratory chosen for experiment is layered with a white coloured cool roof paint material, which in turn resulted in reduction in temperature underneath the roof up to 4.92 °C and electric energy saving up to 3 kWh/ day with 16.67% saving of cooling energy per month. It is found that the albedo and emissivity increased from 60 % to 85 % by application of white cool roof coating material. Installing cool roofs is not very expensive. This technique not only saves money but also saves electric energy and fossil fuels.

Keywords: Albedo, Cool roof installation, Emissivity, Coating material

1. Introduction

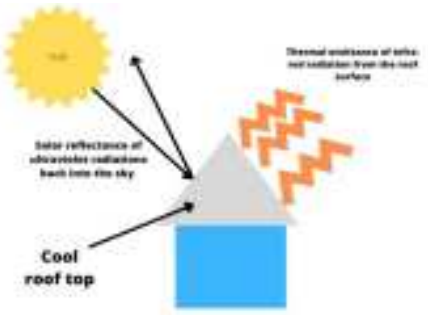

Figure 1.1: Solar Reflectance and thermal emittance

The cool roof is defined as the roof that absorbs a lesser amount of sun energy. A cool roof is designed in such a way that it reflects back more sunlight in the sky as compared to the conventional grey cemented roof. This property of a cool roof is known as solar reflectance or also named as “albedo”. The other property is thermal emittance which is also a necessity of cool roof. Thermal emittance is the proportion of Infra-Red radiation passed out of the surface of the roof shown in *Figure 1.1*. This research is basically an experimental confirmation of the working of cool roof technology by installing a cool roof on a laboratory building situated at Bikaner, Rajasthan. The average daytime temperature in Bikaner, Rajasthan (India), in the month of May varies from maximum 108 °F (42.2 °C) to minimum 86 °F (30 °C). It could be described as really the hottest month in Bikaner, Rajasthan. The graph shown in *Figure.1.2*, shows the variation of Temperature from May 15, 2022, to June 10, 2022. Rising mercury is increasing the demand for electricity to reduce the temperature by using air conditioners, gas chillers etc. in office buildings, laboratories, schools as a result of which the refrigerant of air-conditioners and gas filled chillers give rise to global warming. Now, the question is how to dwindle this rising temperature without using

electric energy and fossil fuels. It is possible to reduce the temperature to some degrees by using cool roof technology. There are various methods to convert the conventional roof into cool roof like application of asphalt shingles, tiles, inverted

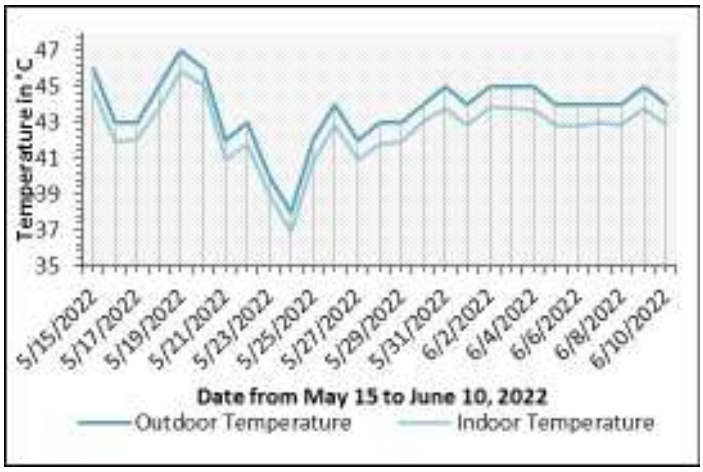

Figure 1.2: The maximum outdoor and indoor temperature fluctuationd from 15 May, 2022 to 10 June, 2022.

pots, bitumen sheets etc., but in the present experiment cool roof white coating material is applied on the laboratory roof (with dimensions 30 ft. long and 10 ft. 6 in. wide i.e., about 165 sq. ft. space per head), located in Bikaner, Rajasthan. White color is chosen since it is the best reflector. Application of the cool roof coating on the roof reduced the indoor temperature of the laboratory in Bikaner, Rajasthan to 4.92 °C and 3 kWh/ day saving of electric energy. The rising temperature of an urban area is called Urban Heat Island Effect (UHI) as a result of which there is an increase in cooling load of the building and peak demand for electricity due to which the efficiency of air conditioners is decreasing day by day. Ultimately there is thermal discomfort. Many techniques are used to mitigate Urban Heat Island effect (UHI) but the most reliable is cool roof coating, also grown the interest worldwide (Dionysia Kolokotsa, Christina Diakaki, Sotiris Papantoniou, Andreas Vlissidis et al., 2011). The aim of this paper is to confirm experimentally the effect of cool roof installation in the laboratory located in Bikaner, Rajasthan (India) by the use of monitored data and reliable development of laboratory roof model with installation of required testing equipment and sensors for measurements.

2. Research Methodology

2.1 Installation and modelling of cool roof

For the experiment on a laboratory roof in Bikaner, Rajasthan, a weather station with sensor technology has been installed in the year 2021, and measured the following parameters with the given equipment (Dionysia Kolokotsa, Christina Diakaki, Sotiris Papantoniou, Andreas Vlissidis et al., 2011).

- Pyranometer and digital thermometer to measure the outdoor and indoor temperature
- Solar reflectance
- Thermal emittance
- Concentration of CO_2
- Wind velocity and pressure using anemometer
- Air temperature

Anemometer at a height of 12 m with additional wireless sensors and hygrometer are installed the lab to measure the indoor and outdoor temperature as well as humidity. The surface temperature of the roof was also measured before and after coating of the roof. Mini transducers and transformers are installed to measure the electric energy consumption before and after the cool roof coating.

2.2 Data acquisition and interpretation

The type of the roof chosen for observation is flat with a grey-colored cemented roof. The monitoring system is installed in the laboratory on 2 April, 2021 and cool roof coating was completed on 15 June, 2021. After measurements data was collected for both of the conditions before coating and after coating the cool roof material. Steps followed are as below:

- Hourly data for temperature reduction measurements interpreted per day.
- Hourly data for energy consumption and saving per hour is interpreted.
- Final step was to normalize the monitored average daily data for temperature based on slope found from regressions so as to make constant temperature month-to-month and pre- period to post period comparisons.
- Extrapolation of whole data was done by analyzing the regressions.
- Regressions calculated by the following formula (Akbari, Hashem Levinson, Ronnen Konopaki, Steve et al., 2004).

$$\text{“}T=T_{out}-T_{in}$$

Here,

T_{out} is the outer surface roof temperature

T_{in} is the temperature underneath the roof

3. Results and Discussion

The meteorological modelling of the cool roof on the laboratory building situated at Bikaner, Rajasthan (India), was run first in a summer period (from June to September) in 2021. The laboratory building was taken into consideration (with dimensions 30 ft. long and 10 ft. 6 in. wide i.e., about 165 sq. ft. space per head) is well equipped with the temperature, humidity, wind velocity and direction sensors to collect the data. Data loggers are used to interpret the collected data. The hourly data is converted into daily and monthly data. Daytime hours were considered from 7:00 a.m. to 8:00 p.m. and night time hours were from 8:00 p.m. to 7:00 a.m. (H.L. Macintyre; C. Heaviside et al., 2019). In first period the mean outdoor temperature from 16 June, 2021 to 30 September, 2021 was 38.50 ÚC.

The temperature differences with daily evaluated fluctuations (shown in *Figure 4.1*), were found to be maximum 5.2 ÚC during the daytime hours when the outdoor temperature was 44 ÚC and minimum during the night time hours since it depends upon high solar reflectance and thermal emittance of cool roof paint material which takes place in the daytime hours i.e., in the presence of Sun. In the middle of the first period, sometimes the temperature difference between the outer and inner surface of the roof was not so high because of the bad weather and lack of sunlight incident on the roof surface (C.E. Bozonnet, M. Doya, et al., 2011). Total Average reduction resulted by cool roof installation in first period from June2 2021 to September, 2021 is:

$$\text{“}T=T_{out}-T_{in}=38.50\text{ÚC}-33.81\text{ÚC}=4.69\text{ÚC} \quad \ldots\ldots (1)$$

In the second period of data logging in laboratory from 15 March, 2022 to 25 June, 2022, the readings of maximum outdoor and indoor temperature shown fluctuations resulted in average temperature reduction up to 5.15 C as shown in *Figure 4.2*.

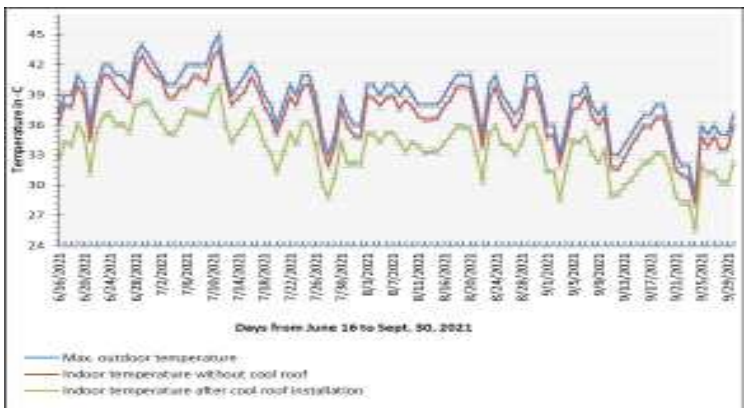

Figure 4.1 Reduction in indoor temperature by cool roof installation on laboratory building in Bikaner, Rajasthan (India) in first summer period (from June 16 to September 30, 2021).

Average reduction in indoor temperature after cool roof installation is calculated as below:

$$\text{“}T=T_{out}-T_{in} = 42.34 - 37.19 = 5.15 \text{ ÚC} \quad \ldots\ldots. (2)$$

From equation (1) and (2), Mean average reduction in indoor temperature is calculated to be 4.92ÚC. By cool roof installation it became possible to reduce the indoor temperature up to 4.92 ÚC. A case study by E. Bozonnet, M. Doya, F. Allard et al., 2011, on performance of cool roof coating in central part of France, resulted in 10 °C reduction in outside roof surface temperature but the mean effect of cool roof coating for the studied building appeared to be very low and the difference between the highest and the lowest temperature was not negligible.

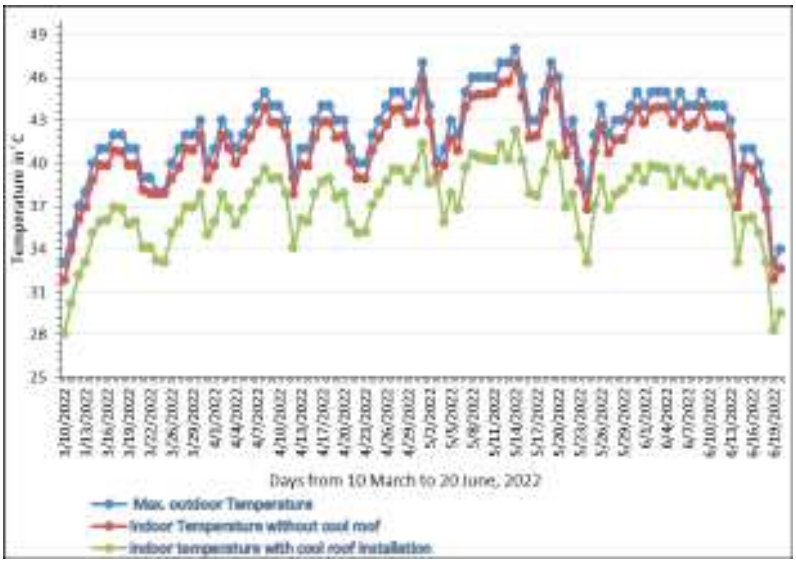

Figure 4.2 Reduction in indoor temperature by cool roof installation in the second period from 10 March, 2022 to 20 June, 2022

By increasing the albedo from 10-20% to about 60%, it is possible to reduce the cooling energy used in buildings up to 20% with reduction in indoor temperature which further decreases the need for air conditioning, diminish the global warming and retards the formation of smog as studied by Hashem Akbari, Paul Berdahl, Ronnen Levinson et al., 2006. With average reduction of the indoor roof surface temperature from 1.4 °C to 4.7 °C, by the effect of cool roof installation the energy savings also increased from 15% to 35.7% in different states with different climate zones for example hot, warm-humid, composite, temperate, tropical, etc. as per recent survey by Mohit Rawal, R.N. Singh et al., 2022. Earlier the total cooling energy consumption per month was 540 kWh per month which reduced to 450 kWh per month after installation of cool roof i.e., 3 kWh per day which in turn results in total 16.67% saving cooling energy per month

4. Conclusion

In this research for simulation of ambient temperatures and estimating the effect of cool roof installation in Bikaner, Rajasthan (India), a detailed meteorological modelling underneath the roof of a laboratory building is done to reduce the indoor temperature to desired degrees. By this experiment I reached up to 4.92 ÚC reduction indoor temperature with total cooling energy saving up to 3 kWh/day and 16.67% per month by installing a cool roof. The maximum reduction in indoor temperature offered by cool roofs is during the daytime hours as compared to night time hours. Since cool roofs effects the local conditions by reflecting more solar radiations and emitting more Infra-Red radiations back into the sky in the presence of Sun during the daytime, when the maximum outdoor temperature is at its peak which in turns also effect the cooling loads during summers expected to reach higher in the future.

5. Acknowldegement

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Biochemical Alteration In Tomato Seedling Infected By Pythium Sp.

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Abstract

There has been increasing interest in development and measurement procedures to understand the cause of the disease and its control. For it experiment was conducted in field and laboratory condition. It was observed that biochemical changes in infected seeding of tomato is an important cause of poor nursery. Activity of oxidative enzyme, nitrite reeducates, ascorbic acid oxidase and polyphenol oxidase get changed in infected stock. Total phenol and O.D. phenols also found increase. However, no change in organic acid, decrease in photosynthesis rate and increase in respiration in infected seeding is also a criteria of poor nursery

Key Words: Biochemical Changes, Phenols, Biological Control.

Most popular vegetables the tomato belongs to the *Solanaceae* family. Tomatoes are the primary sources of income for many low-income tropical farmers (Prior et al, 1994). Vegetables such as broccoli, cauliflower and Brussels sprouts may be found in a wide range of raw, processed and cooked dishes. Depending on the variety, the tomato fruit's red hue and antioxidant benefits might very in size, shape, and color, which is significant to the tomato industry. Tomatoes come in a wide range of colors, as well. Fruits which have a high concentration of carotenoids, contain significant amounts of lycopene. In 2007, global production hit 133. million metric tons, requiring a total of 4.7 million hectares (FAO, 2007). Damping–off is the most serious productivity limitation, a disease that kills seedlings and sprouting seed in nurseries and on the farm. When compared to other biotic pressures, conventional fungicides are often employed to treat this disease, but they have two keys drawbacks. The first reason is that they are hazardous to both people and animals. It is also dangerous to apply fungicides in the wrong way, since it poses a danger to human health and the natural environment.

Damping – off is caused by soil–borne fungus, including oomycetes (*Pythium* and *Phytophthora*), as well as seed–borne fungi, on a wide variety of crop types, according to recent studies. Both non–anthropogenic and agronomic methods may spread agriculture soil pathogens, such as rainwater runoff, soil contamination from improperly sanitized tools, infected plants (most often due to seed – borne pathogens), infected greenhouse facilities and irrigation with contaminated water. Due to their extensive usage, fungicides have substantial environmental and health impacts because of the frequent occurrence of fungal infections.

Plant extracts are known to control many plant pathogens including *P. aphanidermatum in vitro*. The effectiveness of extracts against *P. aphanidermatum* may be due to the presence of phenolic substance and resins, gummy and non – volatile substance of unknown nature (F.R. Skinner, 1955).

Numerous soil – borne micro – organisms are reported to cause heavy losses to most agricultural crops. Therefore, soil disinfestation techniques are developed to control these harmful organisms. Soil temperature is one of the important environments factor, which controls the outcomes of all host pathogens interaction in soil – borne disease (G.W. Bruchle, 1987).

At initial stages of tomato seedling disease, water soaked, discolored spots appear at the infection sites on the stem (near ground level) occasionally lesions on root may also appear. The plants finally collapse and the stems readily get detached from the root. The main characteristic symptom of the disease is pre – emergence damping – off, i.e. ratting of the seeds and seedlings before actual emergence from the soil and post–emergence damping off which is severe when the seedlings are in cotyledonous stage. The infected tissues become soft and water soaked resulting in topping over of the entire plant on the soil surface. (R.S. Singh (1990).

Frequent and indiscriminate use of chemical is associated with all effects such as environment at pollution and development of resistance. Hence bio – control has been advocated as the most promising alternate strategy to overcome these problems. However, bio control agents (Bc As) have been successfully used to control soil – borne disease (J.M. Whipps, D.R. Lumsden (1991).

Soil solarisation for the vegetable nursery management was investigated in relation to polythene thickness, moisture of nursery beds, temperature etc. Reported that 32.4 to 95.6% reduction of damping off over treatment control was possible by soil solarisation (K.K. Pandey, P.K. Pandey (2004).

As systemic fungicides are chemicals, they act to control disease in many ways. When we use chemical to inhibit or kill fungi, it is possible that these chemicals affect plants and enhance its nutritional value (Y.K. Sharma, BBL Thakore (2004).

Bio – fumigation, Bio – agents and fungicides against damping – off caused by *Pythium* Spp help in integrated management of the disease (Dhanbir Singh (2007).

Because of the high expense of damping – off and the severe environmental consequences of current fungicides – based management tactics, an alternative and sustainable approach is necessary. As a last resort, pesticides are used in integrated pest management (1PM), which stresses the use of agronomic and cultural best practices, together with preventative measure (Such as boosting seed health), to achieve this goal in a sustainable manner.

It is bets to minimize or restrict the spread of illness by utilizing seeds that are free of pathogens; nevertheless, seed that are not free of pathogens might still benefit from treatment although seed treatments may not promote seeding emergence, they may assist seed with reduced vigor and damaged seed coats that are not at risk of infection by pathogens often found in seed sources.

Chemical seed treatment are still used in agriculture to combat damping – off infections pathogen inoculum may be removed from seed coats using fungicides and other chemicals, such as bleach, hydrogen peroxide, ethanol, and fungicides. There are severe substance that may harm seed germination as well as human health and the environment, as well as having a detrimental effect on phytotoxicity. (Axelrood and colleagues 1995; due Toti 2004). In addition to chemical treatments, sterilization and disinfection of seeds may be accomplished by the use of hot water, air, and electrons. In recent years, biological seed treatment technologies have also been demonstrated to be beneficial in reducing disease outbreaks.

Biological Control

Because of the negative impact that conventional pesticides, such as fungicides, have on both human health and the environment, a growing number of countries, most notably those in the European Union, are becoming more skeptical of the use of such pesticides. Fungicides are especially problematic. A larger number of cases of pesticides resistance development have also been documented, which raises the danger of unsuccessful pest control as well as the possibility of financial losses for farmers as a consequence of the situation. Chemical fungicides have a number of drawbacks, one of which is that they have that the potential to produced phytotoxicity in crops and folial plant, which is undesirable (Dias 2012).

CHANGES IN PIGMENT CONTENT, PHOTOSYNTESIS AND RESPIRATION RATE IN SEEDING DISEASE OF TOMATO

It is quite evident from table that changes in pigment content, photosynthetic and respiratory rates in infected tomato was brought about by the seedling disease. Chlorophyll content was reduced substantially by the infection. It also reduced the carotene and xanthophyll contents of the seedling. Together with decrease in photosynthesis pigments, the rate of photosynthesis decreased but increased respiration was noticed.

CHANGE IN MINERALS CONTENT OF SEEDLING DISEASE INFECTED TOMATO:

Regarding minerals, all except calcium and magnesium, showed a decrease in comparison to healthy counter parts while the calcium and magnesium contents increased as observed in table.

Table 1 : Changes in Pigment Contents, Photosynthesis and Respiration Rates in Seedling Tomato.

S. No	Particulars	Tomato	
		Healthy	inoculated
1.	Pigment (Mg/g fresh wt)		
	(a) Chlorophyll a	1.903	1.617
	(b) Chlorophyll b	1.350	0.901
	Total chlorophyll	3.253	2.518
	(c) Xanthophyll	2.06	0.95
	(d) Carotene	3.51	1.20
2.	Photosynthetic rate (1 of oxygen evolved per g/hr)	2018	1507
3.	Respiratory rate (1 of oxygen up – take /hr	3.49	4.64

Table – 2 Changes in Minerals Content of Seedling Infected Tomato

Particulars	Tomato	
	Healthy	Diseased
Minerals (in mg/g fresh wat)		
Phosphorus	0.15	00.05
Potassium	6.61	7.90
Calcium	2.45	2.36
Magnesium	1.45	1.60
Sodium	0.40	0.21
Iron	0.09	0.03
Manganese	0.62	0.28
Copper	0.07	0.04

CHANGES IN CARBOHYDRATES, NITROGEN CONSTITUENTS AND TRANSPIRATION RATE OF SEEDLING INFECTED TOMATO

Although, the Photosynthetic activity in the infected plant was decreased, the carbohydrate metabolism was not much affected except a slight decrease in glucose and increase in strarch contents in infected plants was observed.

It is evident from Table that soluble sugars appreciably accumulated in the infected seedling. It was 65.0 mg/g fresh wit in seedling of tomato as compared to 44.0 fresh weight of healthy. Counterparts. The starch content was 1.67% in infected Seedling of Tomato.

The loss of water per g fresh seedling as 17.0 mg in healthy and 11.5 mg in diseased one of Tomato arua for Tomato, mg in In case of per square cm of seedling area for tomato. It was 9.6 mg and 6.2 mg in healthy and diseased cases respectively.

Table-3 Change in carbohydrates, nitrogen constituents and transpiration rate seedling infected tomato.

S. No	Particulars	Tomato	
		Healthy	Inoculated (Diseased)
1-	Soluble Sugars (mg/g fresh wt	44.0	65.0
2-	Starch (mg/g fresh wt)	1.35	1.67
3-	Nitrogen content	1.350	0.901
	Nitrate N	0.0 95	0.087
	Nitrate N	0.078	0.069
	Ammonical N	0.067	0.052
	Protein N	1.098	1.00
4-	Transpiration rate : my water loss in5 min per g leaf	17	11.5
	Mg water loss in 5 min per square cm leaf area	9.6	6.2

Observation based on 3 experiments.

As indicated in table remarkable changes in the nitrogen contents of the infected seedling was observed

Table: 4 Changes in Amino Acid Content of Seedling Disease Tomato

S. No	Particulars	Tomato	
		Healthy	Diseased
1.	Organic acids (mg/g fresh tissue)		
	Tartaric acid	0	255
	Malic acid	350	350
	Succinic acid	220	220
	Citri acid	410	410
2.	Ascorbic acid (mg/g fresh tissue)	380	100
3.	Total phenolics (mg/g fresh tissue)	430	520
4.	O.D. phenolics (mg/g fresh tissue)	235	275

CHANGE IN ORGANIC ACID AND PHENOLIC CONTENT SEEDLING INFECTED TOMATO:

Change in organic acids and phenolic contents of Tomato Seedling infected Pythium has been shown in Table.

As indicated in Table, there was no change in the organic acid in healthy and infected samples except the tartaric acid which was NIL in healthy Tomato. It increased upto 255 4g/g fresh wt of Tomato. The ascorbic acid content decreased from 380 to 190 mg/g in tomato.

Similar trend of increment was observed in the value to total phenolics and O.D. phenolics. Total phenolics contents increased from 430 to 520 and O.D. phenolics from 235 to 275 mg/g fresh wt. of tomato.

Table 5. Changes in Amino Acid Content of Seedling Disease Tomato

Particulars	Tomato	
	Healthy	Diseased
Amino acids (mg/g fresh tissue)		
Cysteine	65	110
Glycine	23	51
Asparagine	400	400
Glutamine	1800	2000
Serine	0	112
Glutamine acid	650	650
Alamine	150	320
Proline	0	95
Trrosine	25	37
Tryptophane	450	450
Methionine	0	123
Isoleucine	280	300
Total Amino acids	3843	4347

CHANGE IN AMINO ACIDS CONTENT OF SEEDLING TOMATO

Regarding amino acid, as indicated in Table, the presence of serine. Proline and methionine which were nil healthy Tomato Seedling was noticed. Amino acids like cysteine, glycine, glutamine alanine, tyrosine and isoleucine increased while asparagine, glutamic acid and tryptophan showed no change as compared to healthy one.

Table: 6 Changes in Enzymes Activity in Seedling Infected Tomato

S. No	Particulars	Tomato	
		Healthy	Diseased
1.	Catalase (1 unit = changes in absorbance of 0.001 per min/ml of enzyme).	31.6	67.6
2.	Peroxidase (1 unit = changes in absorbance of 0.001 per min/ml of enzyme).	30	51
3.	Nitrile reductase (% nitrite released /ml of enzymes).	0.195	0.340
4.	Ascorbic acid oxidase (1 unit = changes in absorbance of 0.001 per min/ml of enzyme).	78	95
5.	Polyphenol Oxidase (1 unit = changes in absorbance of 0.001 per min/ml of enzyme).	40	72

CHANGE IN ENZYMES ACTIVITY IN SEEDLING INFECTED TOMATO

It is quite evident from table that changes in activity of oxidative enzymes, nitrite re-educates, ascorbic acid oxidase and polyphenol oxidase in tomato appears seedling. It was observed that both Catalase and peroxidase activities increased in the infected Seedling as compared to healthy Counterparts. The nitrite re-educates activity increased in infected tissue in Comparison to healthy one.

The ascorbic acid oxidase increased from 78 to 95 in diseased Tomato seedling samples.

Similar trend of incensement was observed in the value to polyphenol oxidase contents which increased from 40 to 72 mg/ g fresh wt in Tomato seedling.

CONCLUSION

During investigation, Tomato crop was sown on three different dates viz, 8th October and 26th October. The disease prevalence and intensity were recorded on two different dates viz, 8th November and 26th November 2020.

The data regarding the effect of date of sowing on the prevalence and intensity of the disease are presented in Table. The data are recorded on 30th day of of the 1st date of Sowing and then on 30th day last date of sowing.

It is evident from the table that the plots sown on first date had maximum (100%) disease as compared to other plots on both dates of recording. The maximum disease in other plots was recorded only in those plots which were in the vicinity of Ist date of sowing. Though the disease starts appearing when the plants are 10-15 days old, it becomes severe when the plants are 30 day old.

Individual effect of time, temperature and RH on disease progress and predicted values are indicated in Table. The disease which appeared in late october, gradually increased with time at the decreasing rate of 0.342 and 0.316 per unit per day in 2020 and 2021 respectively and in pooled date, it was 0.329. The minimum and maximum disease was recorded in 10 days and 20 days old plants respectively in both the years. The optimum favourable period was observed between the 2nd week of November to last of November in both years.

The efficacy of different five fungicides against seedling disease of tomato, caused by *Pythium* species was tested. The data recorded regarding the disease index and yield of the crop has been presented in Table.

As indicated in Table out of all the five fungicides tested, NF-44 and Bavistin was found most effective showing lower disease index of 2.56 and 2.00 per cent as against 62.53 percent in control, even at 0.1 per cent doses. It is quite evident form table that changes in activity of oxidative enzyme, nitrite reductase, ascorbic acid, oxidase and polyphenol oxidase in tomato appear seedling.

It was observed that both catalase and peroxidase activities increased in the infected seedling as compared to healthy counterparts. The nitrite reductase activity increased in infected tissue in comparison to healthy one. The ascorbic acid oxidase increased from 78 to 95 in disease tomato seedling samples.

Although, the photosynthetic activity in infected plant was decreased, the carbohydrate metabolism was not much affected except a slight decrease in glucose and increase in starch contents in infected plants was observed.

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Regarding amino acids, as indicated in Table, the Presence of serine, Proline and methionine which were NIL in healthy Tomato seedlings was noticed. Amino acids like cysteine, glycine, glutamine, alanine, tyrosine and isoleucine increased while asparagine, glutamic acid and tryptophan showed no change as Compared to healthy one.

Similar trend of increment was observed in the Value to total phenolic and O.D. phenolic. Total Phenolic contents increased from 430 to 520 and 0.D Phenolic from 235 to 275 mg/g fresh weight of tomato. There was no change in the organic acid in healthy and infected samples except the tartaric acid which was NIL in healthy Tomato. It increased up to 255 mg/g fresh weight of Tomato.

It is quite evident from Table that changes in Pigment content, photosynthetic and respiratory rates. in infection infected Tomato was brought about by the seedling disease. Chlorophyll content was reduced substantially by the infection. It also reduced the carotene and xanthophyll contents of the seedling Together with decrease in photosynthetic pigments, the rate of Photosynthesis decreased but increased respiration was noticed.

Raftoyannis and Dick (2002), Satheesh (2004), and Loganathan et al. (2004) discovered that the incidence of damping off increased as the amount of *P. aphanidermatum* in the soil increased. According to Bhuvaneshwari, there was a 100 percent damping-off incidence in tomatoes when the inoculum level was 15 percent and 20 percent.

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A Study On The User's Perception Towards Ott Platform During The Pandemic With Reference To The Mumbai City

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Abstract

The Indian people have never experienced a lockdown period as lengthy as the one we are experiencing right now. Anyone enjoys spending their leisure time in front of a digital screen, where they have a wide range of possibilities to see, in this circumstance, in the age of this technology and the Internet. Justification for this is provided by the major star's preference for this platform and the steadily growing audience of OTT video streaming services. The amount of time we spend staring at devices has greatly grown in modern society. This technological development by the internet has produced a new kind of viewing experience as the movie theatres have closed and the release of new movies has been suspended nationwide. This could change how people watch movies collectively in movie theatres and reduce the number of people who visit them when the screens reopen. Owners of movie theatres are most concerned about this alteration in the watching experience brought on by OTT. It concludes with a proposal that contextualizes the dramatically rising OTT viewership during lock down and its implications on the overall viewing experience.

Keywords: OTT, viewership, lock down.

Introduction

With major players like Voot, Alt Balaji, Zee5, and MX Player, India has one of the largest and fastest-growing streaming markets in the world, according to the Global Web Index survey. The nation's video market, which is currently worth over $700 million, is anticipated to increase to $2.4 billion by 2023, with the OTT sector experiencing the fastest growth. The need for fresher and more exclusive material will compel high budget producers and filmmakers to distribute their films directly into the OTT channels rather than in movie theatres due to a trend of consumers watching numerous content channels at once. On OTT services, high-quality programming is in high demand during the shutdown. These research questions form the basis of this study.

The term "OTT," which stands for "Over-The-Top," describes the commercial practice of streaming material to users directly over the internet. It symbolises the entertainment industry's impending future. It can refer to phone calling via the internet, audio streaming, messaging services, and platforms for on-demand video as well. Although there are few exceptions, most OTT services are monetized through paid subscriptions. For instance, certain OTT platforms could include advertising or in-app purchases. People may use OTT applications not just through subscriptions but also through freemium features and the Jio influence on the streaming culture. OTT certainly symbolises the future of media and the finest form of entertainment in the present.

To meet the needs of each individual customer, OTT (Over-The-Top) is a method of delivering television and movie content online. OTT does not necessarily equal free because it includes services like Netflix and Amazon Prime Video. Websites on PCs and applications on mobile devices are both used to access over-the-top services.

SIGNIFICANCE OF THE STUDY

- This study aims to shed insight on the reach of OTT platforms and the degree to which Mumbai residents use them.
- This study will make it easier to comprehend how OTT platforms have dominated the digital entertainment industry in Mumbai amid a pandemic.
- It will make it easier for us to comprehend how OTT is inorganically outpacing other forms of entertainment in Mumbai.

OBJECTIVES OF STUDY

- To examine how Mumbai viewers perceive OTT platforms.
- To research the Mumbai market's preferences for OTT platforms.

LITERATURE REVIEW

"What is OTT- Understanding the Modern Media Streaming Landscape," Meghan McAdams, 2019. The survey showed that OTT applications unmistakably reflect India's future. Her study's key finding was that 50% of OTT users were suffering from "subscription fatigue" as a result of using so many different platforms. The development of expansive platforms like Disney Plus was also cited as having the potential to harm the chances for more specialized, smaller services.

Sharma, 2020: The multiplexes were forced to close due to the ongoing COVID-19 issue. The upshot is that the production companies are now immediately releasing the onto OTT platforms. Multiplexes are worried about this since users could ship the conventional windowing layout. Both INOX and PVR responded to this situation with public statements. Experts claim that this is a short-term fix for a problem the film business is having with money. Both the filmmakers who had their production ready but were unable to distribute it and the OTT players who need new material benefit from this predicament. Once things get back to normal, though, this won't represent a paradigm change in the long run.

COMPANY PROFILE

NETFLIX

India welcomed Netflix in January 2016. The large selection of original films and television series they provide is their USP. Netflix has made its largest investment in India to date in order to generate more original content because they previously lacked enough India-focused or localised titles. Three distinct subscription options with varying features are offered by Netflix. The entry-level Basic membership costs Rs. 500 but does not allow for HD streaming. HD streaming is supported with the Standard membership, which costs Rs. 650 per month.

Up to four devices may stream concurrently with the Premium membership, which offers ultra-HD streaming and costs Rs. 800 per month. In comparison to all of its rivals, Netflix is far more expensive. They also introduced a low-cost, mobile-only version of their service that was available only in India.

AMAZON PRIME VIDEO

Amazon Inc., a company with American roots, owns Amazon Prime Video. In addition to hosting material from other sources, content add-ons, live sporting events, and video rental and purchase services, it also distributes movies and television shows made by Amazon Studios or licenced to Amazon as Prime Originals (or Amazon Originals) or Exclusives.

DISNEY+ HOTSTAR

The best place to watch movies, daily operas, live sports, and news channels is on Disney+ Hotstar. Users can register for free and access the material with interstitial adverts. While a Hotstar Premium subscription costs Rs. 299 per month or Rs. 1,499 per year and provides ad-free access to premium foreign films and TV series. Disney Plus Hotstar has amassed over 28 million paying customers since its official launch in India. With more than 300 million active users per month, Hotstar is India's largest streaming service. Over 94 million people worldwide subscribe to Disney Plus alone, or nearly 29%.

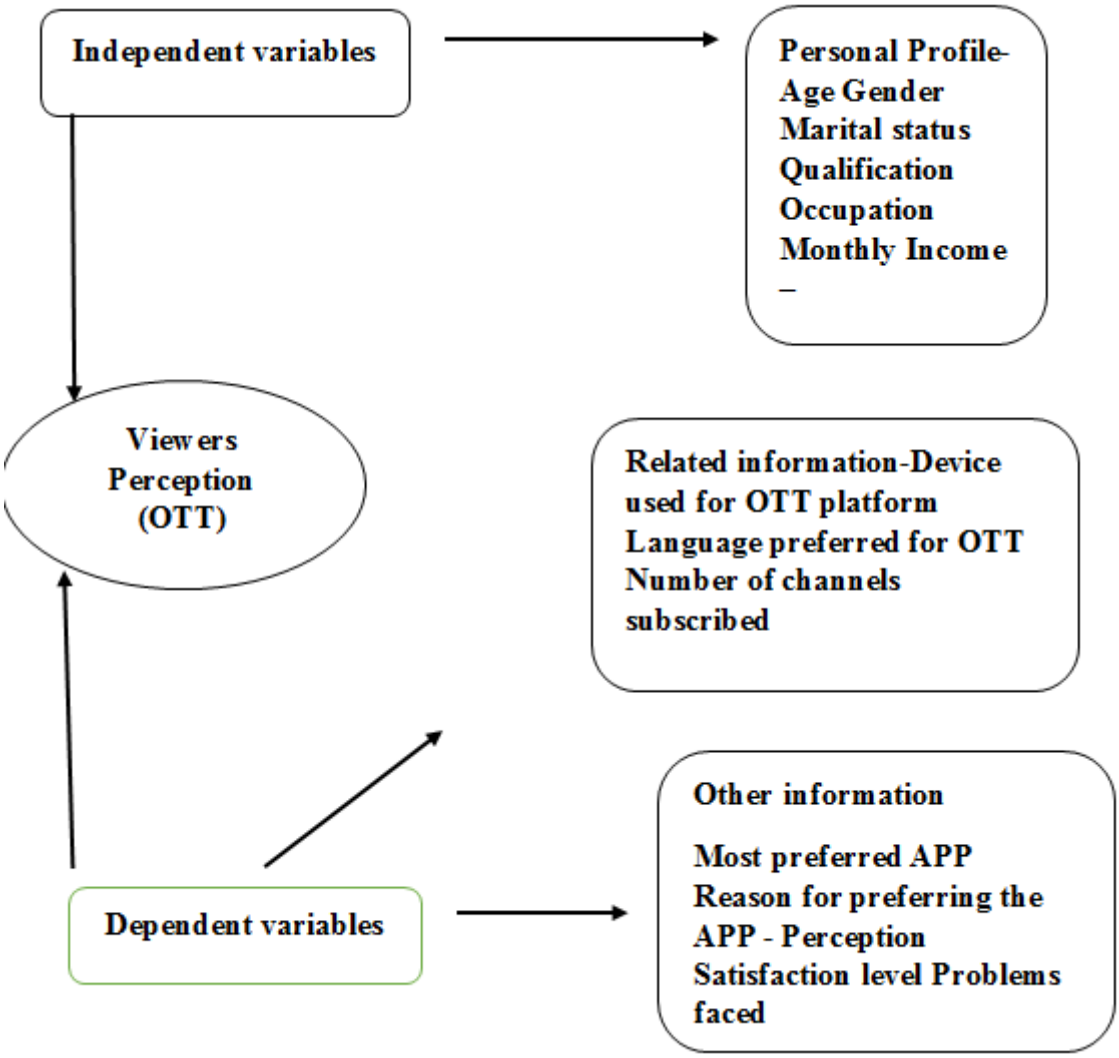
SONYLIV

Sony Pictures Networks runs the OTT platform and streaming service known as SonyLiv. Its material spans more than 40,000 hours and several genres. service that offers material that users may access without registering or paying a subscription. The The base SonyLiv Special plan is Rs 199. the premium SonyLiv package, It starts at and includes live sports, original TV series, and movies, among other things at Rs 299.

ZEE5

The Essel Group operates ZEE5, an OTT platform, through its subsidiary Zee Entertainment Enterprises. On February 14, 2018, it made its debut in India with material in 12 different languages. Available platforms for the ZEE5 mobile app include the Web, Android, iOS, and Smart TVs devices. In December 2019, ZEE5 reported having 56 million monthly active users. The ZEE5 was despite being a latecomer to the group of OTT platforms, it has had an influence.

FRAMEWORK OF THE STUDY

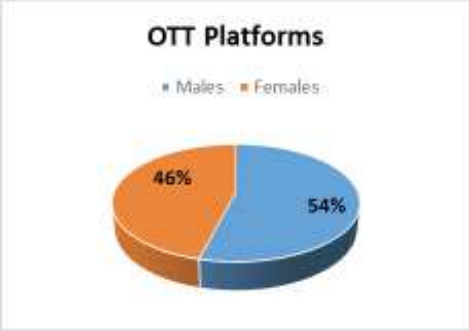


DATA ANALYSIS

This is an important chapter on the study because it deals with the interpretation and analysis of the topic. The tool used for the analysis is percentage analysis.

Q1- What percentage of males versus females like OTT?

GENDER	% of respondents
Female	46%
Male	54%
Total	100%

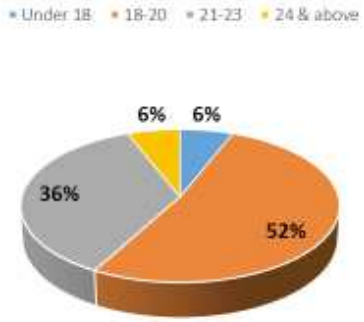


INTERPRETATION

- % 46% of the respondents are female who like OTT platforms
- % 54% of the respondents are male who like OTT platforms

Q2- What percentage of people with different age group use OTT platforms?

AGE GROUPS	% of respondents
Under 18	6%
18-20	52%
21-23	36%
24 & above	6%
Total	100%

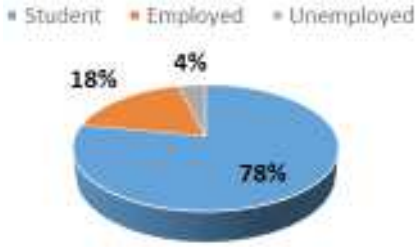


INTERPRETATION

- % 52% of the respondents are in age group of 18-20 years
- % 36% of the respondents are in age group of 21-23 years
- % 6% of the respondents are aged below 18 years
- % 6% of the respondents are aged 24 years & above

Q3- What percentage of people with different occupation use OTT platforms?

OCCUPATIONAL STATUS	% of respondents
Student	78%
Employed	18%
Unemployed	4%
Total	100%



INTERPRETATION

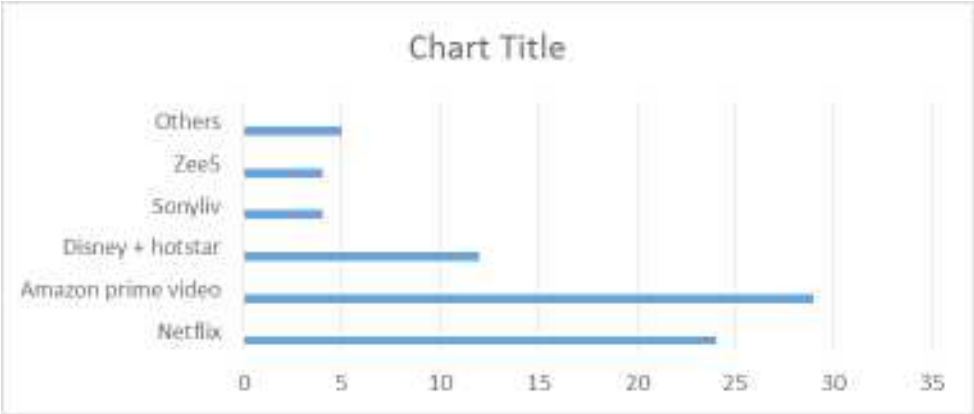
- % The majority of the respondents are students which consists of 78%
- % 18% of the respondents are employed
- % A small margin of 4% of respondents are unemployed

Q4- What percentage of people use different OTT platforms?

INTERPRETATION

Out of the 50 respondents, Amazon Prime Video is the most popular OTT platform being used followed by Netflix. Disney+hotstar is used by 24% of the respondents. Sonyliv and zee5 are each used by 8% of respondents. The other OTT platforms used include Voot, Neestream, ErosNow, SunNXT etc.

OTT PLATFORMS USUALLY USED	No. of responses
Netflix	24
Amazon prime video	29
Disney + hotstar	12
Sonyliv	4
Zee5	4
Others	5
Total	78



CONCLUSION

In the current technological world, OTT has developed into a vital tool. Despite the fact that it offers several advantages and aids users in periodically updating information, it also has certain disadvantages. Adults, particularly students, spend the bulk of their time on OTT platforms to browse the web. It has been established that there has been a considerable increase in OTT platform usage throughout the epidemic.

The future of OTT platforms is quite promising, and video consumption will rise along with the proliferation of the internet and mobile devices.

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Aspect-Based Sentiment Analysis Using Bert-Model for Hidden Vectors Relationship Establishment

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Abstract:

Aspect-based sentiment analysis is a text analysis tool, which takes in customer data that helps companies automatically sort the analysis of data given by the customer. To automate customer support processes and analyze the insights of business operations. Sentiment classification refers to analyzing people's feelings and emotions towards a specific scenario with the pre-trained Bert model using NLP for sentiment classification. In our proposed algorithm, we use the Bert model for word-level classification. The proposed Bert model is fine-tuned with particular domain-related information. Fine-tuning a particular model to enhance the performance for downstream classification. Predict the sentiment orientation of long- short term memory networks and attention mechanism. Analyze the semantic values to correlate word level and feature level. A co-attention mechanism is used to capture 1 hop and interactive mechanisms. One single context consists of many aspects of all the words in a given scenario. After extensive comparative analysis, the proposed method achieves better results in comparison with remaining state-of-art techniques.

Keywords: sentiment analysis, LSTM, NLP.

1. Introduction

Aspect-level sentiment classification is a highly focused stream of sentiment classification. This aims [1] to identify the sentiment that can be positive, negative, or neutral. Overall, there may be two aspects of sentiment analysis one is positive and the other is negative. If we could ignore the aspect-based sentiment analysis, we cannot distinguish between sentiments of different aspects. Classification of sentiments when considering multiple sentiments in a sentence. A manually tested sentiment classification states that the error usually occurs for not considering the specific targets. Many methods are proposed here to deal with aspect- based sentiment classification to deal with machine-learning classifiers using the supervised training method. The machine learning classifier builds a model using supervised learning to build a classifier to manually create features. The other one is based on neural networks giving end-to-end training without any prior knowledge. As neural networks [2] have many advantages, this aspect-level sentiment classification is focused on LSTM neural networks. LSTM methods focus on LSTM neural networks. LSTM-based methods primarily focus on modeling the texts differently with each model. The target representation of an error specifically exists in the general sentiment classification scenario, the LSTM modeling texts focus separately on using LSTM. The target and text representation is carried out using LSTM based approach that interacts with each other using the AOA mechanism. This can be concluded by the focus on mutual attention in scenarios of aspect–to-text and text-to- aspect.

Sentiment analysis [3] is practiced on a wide area of topics that involves sentiment lexicons. There exist a few approaches that are proposed based on sentiment lexicon buildingThe sentiment words are dependent on the domain and refer to different polarities or different areas. The methods used here include point mutual information, dependency relation analysis, and bootstrapping. These techniques manually are capable of manually annotating the texts, to select the root words and the patterns in a specific area, which tend to be expensive and complex. Unsupervised vector-based methods [4] to semantics that model rich lexical definitions, and similarities between the words like the distance between angle and vectors in a dimensional space. In the vector space, the degree of similarity is stated by words that are needed to be calculated by measuring the distance between the vectors.

2. Literature Review

Text-based content on sentiment analysis [5] text judges the tendency expresses by the sentiment. The user's interaction with a certain event proposed a work on sentiment analysis major development in this field has been obtained. Sentiment analysis technology is broadly classified into two categories rule-based and statistics-based methods. The methods that

are based on a sentiment dictionary are known as naïve Bayes, support vector machines, and maximum entropy model based on the classification methods as text classification, natural language processing and to attain good results in movie reviews.

Using the semantic polarity algorithm in analyzing the emotional text, the accuracy rate of finding general concepts resulted in 74% accuracy. In [6] a proposed method in matching the emotional text in a specific field that determines the emotional polarity. The word vectors are trained here with a massive amount of data in obtaining good results through a generalized domain set. By employing the naïve Bayes algorithm and the k- NN algorithm [7] that performs sentiment analysis on all the reviews collected from a set of movie reviews, and hotel reviews. We can conclude that after analysis the accuracy of the two models is quite similar. With the successful application of deep learning models which are applied to the direction of natural language processing.

Various algorithms are used here like Naïve Bayes, and support vector machine (SVM). The majority of these approaches either rely on n-gram features, and neural network-based approaches focus on feature representation without intensive feature engineering. The LSTM-based networks model the left and right targets for sentiment- aspect. The hidden state is responsible for detecting the aspect of the sentiments. To capture the important aspects in different parts of the sentence. The hidden states generate the sentences to calculate the accurate attention to a specific target. The pooling operation ignores the interaction among word pairs between sentences and targets.

TopicBert-TA fine-tunes BERT [8] with the addition of different representations for topic augmentation. A powerful tool for sentiment-enhanced conception by using BERT-model called TopicBERT for sentiment classification tasks.

Taking into account the neural network technique [9] used the Bag of Words model, which inputs text to CNN and further extracts the sequential characteristics of words to produce the word vector representation, this is then given as input to multiple level convolution as well as pooling to classify. [10] investigated the many stages involved in sentiment analysis for Twitter data; in this case, data is gathered, tweets are first pre- processed using NLP, and then feature extraction is carried out to export the sentiment-relevant features. Additionally, classifiers like SVM, decision trees, and nave Bayes classifiers, although they reach the highest levels of precision and recall, were only successful with a single dataset and utterly failed with additional datasets.

3. Research Methodology

BERT model is a trained massive model; it is massive with consequent knowledge from pre-training to adequately complete a specific task. However fine-tuning is necessary which is domain-specific. In this case, two models are developed which are fine-tuned in different ways for testing the efficacy and determining the advantages of various fine-tuning methods. The core of these two models is similar to cultivating the model's capability in understanding the semantics to establish a relationship between local words and global topics. Various topic models can reveal semantic connections between the words. Hidden vector relations establishment is the probabilistic model that is responsible to assign words to topics that are learned from documents by utilizing Dirichlet in a topic distribution space that is focused on the remaining section like the different components of the TopicBERT framework.

3.1 Fine Tuning- BERT:

The main objective here is to predict the polarity of the sentiments that are expressed in terms of sentences towards an aspect. The input provided here consists of two segments, one is the sentence the other is the token. Each token of the input in the embedding layer is encoded in the form of three different forms of embeddings.

As shown below figure the words have been embedded into token embeddings denoted by X_{fi} . There exist two segmentation-based embeddings. One denoted for X_{AT} for aspect terms and the other for sentences stated as X_{sen} . For embedding position denoted as X_{EP} that determines the position of the token in each input. By summing up the embeddings that are given as the input is given by W, which serves as an input to the encoding layer. The hidden representation of the BERT model is determined as BERT(Ø).

$$a = softmax\ (F1\ BRs + c1)$$

BR is the representation of the entire sequence. In determining the polarity of the sentiment representation given, the Aspect-based (S) representation is denoted as $5ØJÜ_{5ØFÜ}$. This is then transferred to a dense layer that is deal with a softmax function.

Here F_1 and C_1 are the parameters, which are fine-tuned, the objective here is trained to reduce the entropy value, stated by the equation below as:

$$PEFS = -\sum_{x=1}^{E} a_x \log (a)$$

Here, *E* indicates the polarity labels *ax* depicted as one-vector.

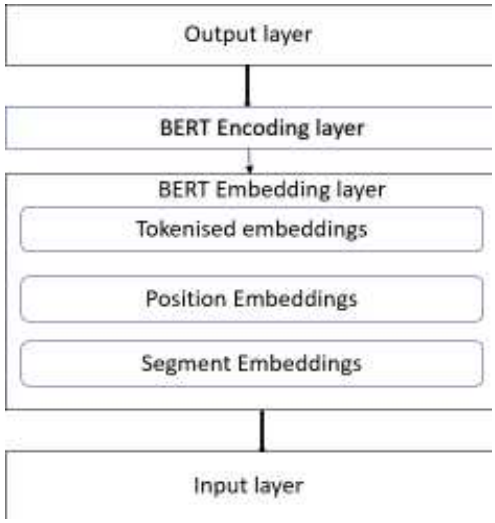

Figure 2 : BERT Model Architecture for Aspect-level sentiment classification

3.2 Hidden vector relations establishment framework:

As shown below hidden vectors relations establishment determines a sequence of words observed as 5ØbÜ$_{5ØeÜ}$. A distribution of topic ö is extracted from each of these documents and topic-specific words are extracted from this form of distribution. A topic is indicated by 5ØSÜ$_{5ØNÜ5ØOÜ}$ which is sampled on each specific word accordingly to the specific words generated from this distribution. The simultaneous topic-relevant distribution 5ØóÞ$_{5ØWÜ}$ necessarily to draw a word. The specific multinomial distribution parameter ö for each 5ØbÜ is generated by deploying the Dirichlet distribution. A conjugate before tractable computation of posterior distribution over a set of values of latent variables.

The basic idea here is to adapt Multiview learning. This method trains the model to understand

representations. The representation here is used to train the input auxiliary task training.

4. Results and Discussion

In this section, a thorough analysis is performed on this ABSA classification task, hence in accordance to evaluate and consider a system parameter, the framework of a window by incorporating an i7 processor backed up with 8 GB of RAM, 1Tb of Hard disk, and 2 GB of NVidia graphics. The evaluation is carried out based on python language.

Dataset Details:

The dataset evaluated here uses two real-world datasets known as samEval 2014 task 4; The task we have considered laptop dataset over here, and the dataset details are evaluated using table 1[11]. In the table the dataset is split into three distinctive categories i.e. positive, negative, and neutral;

Comparison Method:

LSTM [13] makes use of the neural network that learns the hidden states and determines a vector that is averaged through pooling in predicting the division of the sentiment.

- The left and right contexts of the target are modeled to employ two TD-LSTM [12] that perform prediction based on concatenated text.

- A LSTM model that understands attention embedding and then combines them with the hidden state in predicting the polarity known as ATAE-LSTM[13].
- The fine-tuned attention mechanism in between the aspects and sentences. These concatenate vectors for the final prediction of sentiment are known as IAN[14].
- MemNet [15] adopts a multi-hop attention on word embedding context vector word in coordination with average query vector.
- TNet [14] This mechanism deploys a CNN-based layer to source the essential features and exhibit a component while generating a particular depiction of words in a sentence.
- BERT-PT [16] is a language model along with a training approach that is particularly designed based on aspect-level sentiment analysis tasks.

Accuracy and F-1 Score:

Accuracy considered is one of the aspects of measuring the performance metrics in the aspect of classification approach. Accuracy represents the efficient predicted model, defined as the sampling ratio following the total number of samples while predicting the total number of samples. The accuracy is determined using the equation given below.

$$Accurecy = \frac{P}{S}$$

Here P indicates the prediction and S indicates the summation of the samples. The classification task, the F1 score is to measure the accuracy of the test. F1 measure is computed by precision and recall. F1 measure is determined as the harmony mean of precision and recall.

Table 1 Dataset Description

Dataset	Positive		Neutral		Negative	
Twitter	Train	Test	Train	Test	Train	Test
	1561	173	1560	173	3127	346

Table 2 Comparative Analysis for Accuracy

Sentiment AnalysisMethodologies	Accuracy
LSTM	0.5626
TD-LSTM	0.5769
ATAE	0.5652
IAN	0.6371
MemNet	0.6217
AOA	0.6508
MGNet	0.6631
Tnet	0.6711
BERT-PT	0.68209
SFA	0.6693
HATN	0.6887
IATN	0.6953
PS	0.8123

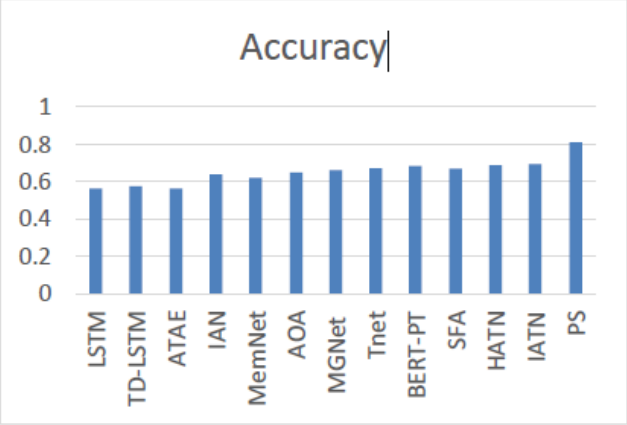

Figure 3: Accuracy of various Aspect-level sentiment analysis methodologies

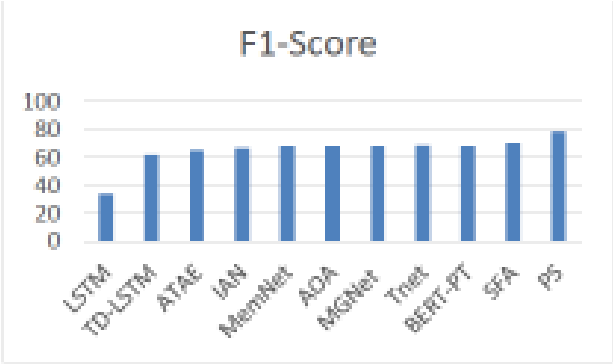

Figure 4: F1-Score of various Aspect-level sentiment analysis methodologies

6. Conclusion

In this paper, we propose a unique approach known as aspect-level sentiment analysis. The existing system that matches similar approaches incorporates features extracted from the labelled source domain. The proposed system here exploits the semantic relationship across multiple domains responsible to transfer knowledge. An aspect-based oriented multi-head language is determined by an aspect-oriented attention-based mechanism that is responsible to transfer the features embedded in deep neural networks. An aspect-oriented mechanism is designed while extracting semantic relationships for enhancing the performance of aspect-level sentiment analysis.

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Dealing with Hunger and Malnutrition and eradicating Poverty (Perspective of Christian Community in India- Rural Vs Urban)

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Abstract :-

This Research Paper is based on sub-theme of the National Conference titled "Environment and Water Management: Challenges and Issues". This Paper deals with the issues of the Christian Community, as the Research Topic is "Social determinants and Impact of Information Technology (Perspective of Christian Community in India). Primary Data has been collected to perceive the Social Status of the Christian Community in India through Normative Survey whereby Questions were asked about the awareness of the Government Schemes for the upliftment of the Community. The Research has revealed that there is statical and significant evidences that the Christian Community is not in the main stream of the Country and the Community needs an urgent upliftment so that these people who are also facing issues of Hunger, Malnutrition and Poverty besides other issues should become beneficiaries of the Government Schemes and Programmes and so that they are also benefitted through other initiatives of various NGOs.

Introduction:

The population of Christian Community in India is about 2.3% (Census 2011). There are few states where a good number of Christian population fall below the Poverty line. The rural and remote areas of states like Jharkhand, Chhattisgarh, Odisha and Bihar have a large number of Christian people and in other parts of the Country as well.

The material basis of survival includes livelihood, Housing and Health. Hunger, malnutrition and poverty are the outcome of large disparities in income slabs and also due to discrimination in income opportunities etc. The people of the Christian Community in India living in rural and remote areas have to fight hard to come out of the situation for which they have to move to Megapolis/ Metropolitan Cities in the search of food, better living and better health facilities, eg. Girls working as Housemaids in Megapolis/Metropolitan Cities where they get complimentary food, shelter and health facilities along with their salary. The Christian people of urban areas are generations of educated Christian people who migrated to cities after independence for a better life.

CHRISTIAN RELIGION CENSUS 2011 where Christian Population is at a higher percentage

States	Total Population	Christian Population	% of the total Population
Nagaland	**1,978.502**	**1,739,651**	**87.93**
Mizoram	**1,097,206**	**9563,331**	**87.16**
Meghalaya	**2,966,889**	**2,213,027**	**74.59**
Manipur	**2,855,794**	**1,179,043**	**41.29**
Arunachal Pradesh	**1,383,727**	**418,732**	**30.26 %**
Goa	**1,458,545**	**366,130**	**25.10 %**
Andaman Nicobar Islands	**380,581**	**80,984**	**21.28 %**
Kerela	**33,406,061**	**6,141,269**	**18.38 %**
Sikkim	**610,577**	**60,522**	**9.91 %**
Pudducherry	**1,247,953**	**78,550**	**6.29 %**
Tamil Nadu	**72,147,030**	**4,418,331**	**6.12 %**
Tripura	**3,673,917**	**159,882**	**4.35 %**

Jharkhand	**32,988,134**	**1,418,608**	**4.30 %**
Assam	31,205,576	1,165,867	3.74 %
Orissa	**41,974,218**	**1,161,708**	**2.77 %**
Chhattisgarh	**25,545,198**	**490,542**	**1.92 %**
Karnataka	61,095,297	1,142,647	1.87 %
Dadra and Nagar Haveli	343,709	5,113	1.49 %
Andhra Pradesh	84,580,777	1,129,784	1.34 %
Punjab	27,743,338	348,230	1.26 %
Daman and Diu	243,247	243,247	1.16 %

Hunger, Malnutrition and Poverty ?

Hunger and Malnutrition are situations in which a person is not able to become satisfied with the daily need of food required for survival. The undernutrition indicators speak about the health of the people. The most nutrition-deprived communities are the people who are living in the rural parts of the Country. Mostly, it harms the health of Women and as a result thereof, low level of nutrition converts into anaemia, low birth weight of the Children and many other related diseases. It is an urgent need to accelerate the level of nutrition among the rural people.

In March 2021, National Nutrition Mission was launched to accelerate improvements in nutrition levels in India, for which annual targets have been set up, for a reduction in levels of stunting, undernutrition, anaemia and low birth weight, targeted to be achieved by the year 2022. (Srivastava.S 2021).

Poverty is defined as an inability to express the feeling of 'Power' and 'Resources'. One who has 'Resources', has the 'Power' to express or to show. It is a critical situation for Policies and Politics which leads to several debates. "How we define Poverty is critical to Political, Policy and academic debates about the concept. It is bound up with explanations and has implications of solutions" (Holborn and Haralambos, 2008:214)

In Pre- Independence India, Dadabhai Naoroji, (4 September 1825 – 30 June 1917) was the first person to discuss Poverty in India. Post-Independence, Alagh Committee was a task force constituted by the Planning Commission under the Chairmanship of YK Alagh. It recommended and constructed a poverty line for rural and urban areas based on nutritional requirements and related consumption expenditure.

There are several percepts which are defined to explain the dimensions of Poverty.

i. Psychological Needs: The amount of money which is required for a person to survive. When a person is unable to satisfy the daily needs of self, the family is known to be as Below Poverty Line. The minimum requirement for fulfilling the daily needs is Nutritional Food, Safe Shelter, Protective and Preventive healthcare. At that time, the cost of food required a person to earn a minimum income and source of income.

ii. Lack of Resources: Hunger, Malnutrition and poverty, affects people living in rural areas as well as people who are living in coastal areas of the Country because they lack resources. In forest areas, there remain loss of resources. People are agriculturists and non-agriculturists both. In coastal areas, living conditions deteriorates because of natural calamity/disasters, environmental degradation and depletion of stock for resources.

iii. Frustrations: People are frustrated if they are agriculturists because they do not have resources for industrial uses. In such a situation, their source of income does not improvise and they are not able to come out of the situation of Poverty.

iv. Feeling of Insecurity: Being poor, people feel neglected and a feeling of insecurity develops in them.

v. No social relations: If people are poor, they do not have social relations because it is a natural phenomenon that if a person is poor, he will cut off from the Society and he will have fewer social connections.

vi. No Materialistic Possessions: Poor people do not have any materialistic possessions such as their own pucca house, cattle, agricultural field etc.

vii. Falling below the minimum standard of living: It is a fact that poverty brings down the bear minimum standard of living of any person.

The first Poverty line drawn in India in 1978 was based on a per capita daily intake of 2400 calories for the Rural and 2100 for

the Urban areas. At that time, the cost of food grain to fulfil the regulating standard was Rs. 368 for the rural areas and Rs. 559 for the urban areas to buy 650 grams of food grains required for the day. The current poverty line is 1,059.42 Indian Rupees per month in rural areas and 1,286 Indian rupees per month in urban areas.

There are two types of Poverty :

I. Rural Poverty

II. Urban Poverty

Causes for Rural Poverty:

i. Lack of awareness, inadequate and ineffective implementation of the anti-poverty program

ii. A large number of people are engaged in agricultural and fishery

iii. Non- availability of resources for farming and other agricultural activities

iv. Low level of education

v. V ery less Women cooperate in developmental activities

vi. Inter caste rivalries and conflicts

vii. Rural people are bound with customs, mores and traditions

viii. Absence of Community help

Causes of Urban Poverty:

i. Rapidly rising Population

ii. Under-utilized resources

iii. Low economic development

iv. High Prices

v. Unemployment

vi. Shortage of Capital for start-up of business

vii. Social factors: caste, traditions, customs, the law of inheritance

Impact on Christian Community:

All the above causes equally apply to the Christian Community in India as well. In Rural Areas as well as in Urban areas, where Christian people are living, the described causes of poverty affect them badly. Most of these people do not want to leave their native places and are forced to live in Poverty or with whatever resources they have. They do not have nutritious food to eat. They have kaccha houses and before the arrival of the Monsoon every year they repair their huts so that the rainwater does not enter their shelters. Some people from Central India such as Jharkhand, Odisha and Chhattisgarh are engaged in lower-grade employment in Urban Areas.

The men folk are forced to work in industrial units and women and girls are forced to work mostly as housemaids in Urban Areas. In this process of earning a livelihood and coming out from the situation of Hunger, Malnutrition and Poverty, sometimes, they fall prey to the exploiters, wrongdoers and criminals in the Cities, who mislead them to unlawful means and wrong doings.

In the new generational changes in India of the 21st Century, when everyone speaks much about women empowerment, there are pieces of evidence that mostly the Christian girls from rural belt have been targeted and lured on the pretext of getting a good job in cities; sometimes straight away from their villages and sometimes, when they reach big cities like Delhi and Mumbai.

The Christian People living in Rural Areas are not educated enough to understand the Schemes of the Government and the initiatives run by the NGOs, on their own. They are engaged in various forms of labour with naturalistic orientations.

Concerning the development of the more naturalistic viewpoint of the city people, they are also engaged in various forms of work but they are mostly service class people. Most of the migrant families are the family of older generations who had migrated to the Metropolitan Cities long back in search of better opportunities for education of their children and better livelihood opportunities. These Christian families have settled families who have better resources and yet, the lack of awareness among the Christian People living in Urban Areas about the Schemes and Initiatives run by the Government and

NGOs pull them back from advancement and progression.

Strategies to eradicate Poverty

For eradicating and alleviating poverty, following plan of action should be taken:

i. There are several Government Schemes eg., Pradhan Mantri Awas Yojna, Rozgar Yojna, Swarozgar Yojna, Self-Help Groups, MNREGA /NREGA / MNREGS, Food Security Schemes, Elimination of Black Money. These schemes should reach the social groups for creating awareness of the Community.

ii. Agriculture and Industrial use items should be available at a lower cost

iii. Household Industries and initiatives for more new startups should be activated

iv. More and more Awareness Programmes should be organized in the Rural and Urban Areas as an active initiative from the Government and NGOs etc

v. More and more focus should be laid on education

vi. More and more 'Praudh Shiksha Abhiyan' and 'Evening Schools' should be started to give education to the Older People and Women of the Households

vii. Evaluation of the successful implementation of the Government Schemes should also be done on regular basis and remedial measures be taken promptly

viii. Safeguards carrying transparency in the implementation of the Schemes should be implemented and ensured

ix. It should be assured that the ultimate benefit of whole of the Welfare Schemes have reached the beneficiaries and proper monitoring system should be in place

x. The Work Plan and its relating Guidelines should be informed to the beneficiaries in effective manner and on regular basis

Conclusion: The Christian Community living in the Rural and Urban Areas of the Country is facing several problems, hardships and social setback because these people are not much aware of the Progressive Schemes around them and they are not in the mainstream yet. Moreso, they do not have active participation in the Social and Political Arena of the Indian Society. They are a peace-loving, soft and a conducive Community living aloof and in a secluded way though they are the third largest population of the Country. There is an urgent need for their upliftment so that the people of the Christian Community who are farmers, fishermen and other very low earning people also who are facing the issue of Poverty should also become beneficiaries of the Government Schemes and Programmes. It is also evident from few other related studies on issues of the Christian Community in India which have found that being a Minority Community, the Christian Community still remain marginalized on many fronts though it is the 21st Century.

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A Brief Survey on The Usage And Knowledge of Green Energy in Rural Areas of India

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Abstract

Sustainable improvement is a strategy producers' never-ending challenge which targets adjusting financial, cultural and natural requests in present setting without compromising the future prerequisites. The ecological difficulties have expanded complex with the rising speed of monetary venture and social requests. Wood as fuel energy utilized by a huge plenty of populace is considered as a significant supporter of consumption of timberland cover in provincial India. The apparent effect of involving wood as fuel energy goes from making of wellbeing risks because of smoky kitchens in short hurried to climatic changes because of deforestation in the more drawn out time frame. Public Policy of Bio Fuels of India targets expanding its market accessibility for expanded utilization. The current paper makes an endeavor to return to one of the ideas of green upset to be specific green energy.

The current paper is an exact review which targets examining (I) the country house hold utilization of fuel (ii) Reasons for utilizing a Particular fuel (iii) Factors impacting the reception of green energy in Rural regions. The information was gathered from 500 respondents from various areas and was examined utilizing SEM to reach significant determinations.

It was found that medical advantages, upgraded pay, simplicity of activity were the significant justification for reception of green energy.

Keywords: Sustainable development, Bio Fuels, Fuel Energy, Green energy, Adoption of Green Energy.

Introduction :

Energy utilization is a significant feature of human daily schedule. It assumes a significant part in finishing the fundamental exercises related with everyday tasks. In ongoing many years strategy producers in India have made an endeavor to comprehend and deal with the effect of energy utilization utilizing sustainable practices. It was clearly seen by strategy creators that larger part of the rustic family alongside individuals underneath destitution lines in metropolitan and semi metropolitan regions in India are as yet subject to customary wellsprings of fuel like kindling, coal, excrement - cakes and so forth to meet their day to day fuel necessity. Service of Petroleum and Natural Gas (2018) featured the earnest endeavors made by government to India to give admittance to the monetarily underestimated gatherings to green energy. The Pradhan Mantri ujjwala yojana as of now covers 712 area and has given LPG associations with 3, 26, 14,226 recipients since its commencement.As of late a large group of explores have been led by scientists to comprehend the components which will guarantee the improvement of a sufficient strategy for utilization of green energy in country regions. Magilindane (2003) believed that sustainable green energy strategy should envelop following boundary like (I) expanded admittance to reasonable green energy, (ii) further developed energy area administration (iii) empowering monetary turn of events (iv) Management of Energy related ecological effects and (v) obtaining energy supply through grater broadening.

RESEARCH METHODOLOGY:

Authors have gathered information from 500 respondents living in rural areas of different region from Maharashtra . The information was gathered with the assistance of a timetable and was dissected with the assistance of SPSS. The scientists formed following speculations to test respondents demeanor and reception aim utilizing underlying condition displaying:

H1: There is huge connection between full of feeling factors (FF) and the respondents mentality towards green fuel (MTGF).

H2: There is huge connection between mental elements (ME) and the respondents demeanor towards green fuel (DTGF).

H3: There is critical connection between conduct factors (CF) and the respondents disposition towards green fuel (DTGF).

H4: There is critical connection between respondents disposition towards green fuel (DTGF) and reception of green fuel (RGF).

Table 1: Fuel Wood Usages in India

State/UT	No of Persons using Fuel Wood (millions)	No of Persons using Fuel Wood from Forest (million)	Quantity of Fuel Wood used (million tonnes)	Quantity of Fuel Wood used from Forest (million tonnes)
Andhra Pradesh	64.992	7.573	24.293	2.966
Arunachal Pradesh	0.882	0.698	0.402	0.325
Assam	23.373	5.812	11.421	2.494
Bihar	65.816	3.115	11.475	0.465
Chhattisgarh	20.078	7.818	4.366	1.378
Gujarat	40.092	7.497	9.731	2.225
Haryana	8.092	0.012	1.494	0.003
Himachal Pradesh	5.912	5.646	1.214	1.163
Jammu and Kashmir	8.375	4.540	1.394	1.015
Jharkhand	21.733	9.984	4.844	2.849
Karnataka	44.681	9.584	20.967	5.776
Kerala	29.504	4.429	14.543	2.183
Madhya Pradesh	51.007	24.839	13.665	7.191
Maharashtra	68.904	31.845	9.508	4.527
Orissa	33.029	11.110	8.894	2.971
Punjab	13.628	0.136	3.348	0.029
Rajasthan	57.992	11.414	18.782	3.698
Tamil Nadu	42.405	7.429	12.387	2.601
Uttar Pradesh	175.096	10.495	19.063	1.294
Uttarakhand	7.289	6.060	2.566	2.139
West Bengal	51.202	18.574	14.158	6.361
North Eastern States	9.383	6.588	5.274	3.822
UTs	10.412	4.432	2.633	1.272
Grand Total	**853.879**	**199.631**	**216.421**	**58.747**

Source: India State of Forest Report, 2011, available at https://data.gov.in/catalog/annual-fuel-wood-consumption

DATA ANALYSIS AND INTERPRETATION:

Multiple Response Analysis:

Table 2.1: Case Summary

Cases						
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
$Q1[a]	500	100.0%	0	0.0%	500	100.0%
a. Dichotomy group tabulated at value 1.						

It is found from the Table No. 2.1 that 500 respondents offered their responses concerning fuel utilized for cooking. Those 500 individuals, who replied, ticked 1516 reactions altogether as displayed in table 2.2. That is a normal of somewhat more than 3 for each respondent. Every one of the respondents said that they use "firewood" for cooking which has most elevated score of 100 percent and portion of 32.98% among all reactions, trailed by "kerosene" (score 82% and share 27.04%), "animal waste" (score 48.4% and share 15.96%), "charcoal" (score 47.2% and share 15.56%), "Yield leftover" (score 9.6% and share 3.16%), "LPG" (score 9.2% and share 3.03%), "electricity" (score 6.8% and share 2.24%), individually

Table 2.2: Major Fuel Used by Villagers

		Responses		Percent of Cases
		N	Percent	
	Firewood	500	32.98%	100.0%
	Kerosene	410	27.04%	82%
	Animal waste	242	15.96%	48.4%
Which fuel you use for cooking ?[a]	Charcoal	236	15.56%	47.2%
	Crop residual	48	3.16%	9.6%
	LPG	46	3.03%	9.2%
	Electricity	34	2.24%	6.8%
Total		**1516**	**100.0%**	**303.2%**
a. Dichotomy group tabulated at value 1.				

It is originate from the Table No. 2.3 that 500 respondents gave their response to use current fuel they are using. Those 500 people, who answered, ticked 1780 responses in total. That is an average of slightly more than 3 per respondent. All the respondents are answered that due to "convenience" and "affordability" they are using current fuel which has highest score of 100% and share of 28.08% among all responses, followed by "accessibility" (score 96% and share 26.96%), "ritual" (score 60% and share 16.85%) respectively.

Table 2.3: Reason for usage of current fuel

		Responses		Percent of Cases
		N	Percent	
	Convenience	500	28.08%	100.0%
Why you use current fuel? [a]	Affordability	500	28.08%	100.0%
	Accessibility	480	26.96%	96%
	Ritual	300	16.85%	60%
Total	**1780**	**100.0%**	**356.0%**	
a. Dichotomy group tabulated at value 1.				

It is found from the Table No. 2.4 that 500 respondents gave their explanation that why they might want to utilize bio gas or sun based power in future. Those 500 individuals, who replied, ticked 1238 reactions altogether. That is a normal of somewhat more than 2 for every respondent. Respondents who addressed that they might want to utilize bio gas or sun based power in future to "save wood" which has most noteworthy score of 76% and portion of 30.69% among all reactions, trailed by "save season of gathering forest wood" (score 42% and share 16.96%), "lessens smoke" (score 38.8% and share 15.67%), "save time in cooking" (score 32% and share 12.92%), "government appropriation" (score 30.2% and share 12.19%), "age of extra pay because of saved time" (score 28.6% and share 11.55%), separately.

Table 2.4: Intention to use bio gas or solar power in future

		Responses		Percent of Cases
		N	Percent	
Why you would use bio	Save forest wood	380	30.69%	76%
gas or solar power in future? [a]	Save time of collecting forest wood	210	16.96%	42%
	Reduces smoke	194	15.67%	38.8%
	Save time in cooking	160	12.92%	32%
	Government subsidy	151	12.19%	30.2%
	Generation of additional income	143	11.55%	28.6%
	due to saved time			
Total		**1238**	**100.0%**	**366.0%**
a. Dichotomy group tabulated at value 1.				

It is found from the Table No. 2.5 that 500 respondents offered their responses that why they don't utilize bio gas or sunlight based power. Those 500 individuals, who replied, ticked 1830 reactions altogether. That is a normal of somewhat more than 3 for each respondent. Every one of the respondents responded to that due to „additional cost of procurement and establishment" they are not utilizing bio gas or sun based power which has most elevated score of 100 percent and portion of 27.3% among all reactions, trailed by "absence of mindfulness" (score 96% and share 26.2%), "absence of data about government plans" (score 80% and share 21.9%), "apprehension about specialized skill" (score 60% and share 16.4%), "strain of family" (score 22% and share 6%), "social and social hindrances" (score 8% and share2.2%) individually.

2.5: Reason for not using Bio Gas or Solar Power

		Responses		Percent of Cases
		N	Percent	
	Additional cost of purchase and			
	installation	500	27.3%	100.0%
	Lack of awareness	480	26.2%	96.0%
Why you do not use bio	Lack of information about	400	21.9%	80.0%
gas or solar power? [a]	government schemes			
	Fear of technical expertise	300	16.4%	60.0%
	Pressure of family	110	6.0%	22.0%
	Cultural and social barriers	40	2.2%	8.0%
Total		**1830**	**100.0%**	**366.0%**
a. Dichotomy group tabulated at value 1.				

Structural Equation Modelling:

As proposed by Andreson and Gerbing (1992) the analysts originally directed corroborative component examination (CFA) and distinguished decency of-fit records than research model was tried by scientists through underlying condition displaying (SEM) utilizing AMOS 21 programming to recognize the connection between builds. All means were over the midpoint of 3.00. The standard deviations range from .68 to .83 which demonstrates limited spread around the mean. The skewness (goes from - .42 to .16) and kurtosis (- .61to .19) lists were found ordinary according to the proposal of Kline (2005). The primary model was found solid and substantial as composite unwavering quality of all build factors were above 0.70 which is demonstrative of good scale dependability according to the guideline proposed Hair et al., (2010); Nounally and Bernstein (1994). Discriminant legitimacy of the multitude of builds were over .82 and normal change removed were between .66 to .89 which were seen as great as indicated by the rules of Hair et al., (1998).

Table 3: Hypothesis Testing Results and Structural Model estimates

Path Coefficient			Estimates	S.E.	C.R.	P	Standardised	Result
ATGF	<—	AFF	.317	.104	-.468	.749	..21	Not Supported
ATGF	<—	COGF	.946	.831	2.193	***	.62	Supported
ATGF	<—	BEF	.825	.947	2.014	***	.49	Supported
ADOP	<—	ATGF	.964	.512	2.317	***	.79	Supported

Keeping in view the rules of Hair et al., (2010) and basic proportions the speculations were tried. It was found that emotional elements assume no part in line of respondent's disposition towards green fuel. It was additionally gathered that mental variables and conduct factors assume huge part in line of respondent's disposition towards green fuel and further this demeanor expect them to take on green fuel.

IMPLICATIONS OF THE STUDY:

The consistent exhaustion of backwoods cover as opposed to its recoupment has arisen as a central issue lately. The strategy producers are informing choices for a different nation like India to limit the dangers presented by shortage and impacts of non-renewable energy sources made by its widespread utilization. The current review features the elements which can impact an ideal mentality of provincial Indian populace towards green energizes in contrast with the customary fills utilized by them. The disposition investigation of the respondents featured that the reception and dissemination of green powers faces following obstructions in rural India

Economic barriers:

The utilization of green powers is expensive in contrast with fuel wood, creature waste and harvest buildup in rustic India. Accordingly, the reception of green fuel troublesome in country populace who are cost delicate because of restricted discretionary cashflow in their grasp to address their issues.

Technical barriers:

The reception of green powers will require making of new adjusted foundation and obtainment of types of gear for utilization by the adopters in provincial India. The education levels and financial interest in innovation is a region for grave worry for strategy producers

Social barriers:

The social gatherings of women while collecting fuel wood or making cow dung cakes is part of rural life. It is difficult for rural women to change their social way of life and find alternative time for their discussions

CONCLUSION

The current review has featured that the mental and conduct parts of disposition model were answerable for arrangement of uplifting perspective towards the reception of green powers. The mental variables like: solid being used, upgraded pay, simple to work; conduct factors like worry for family, alliance to gathering, enthusiasm for government plans were factors impacting the reception of green energizes in the towns of different locale in Maharashtra. The discoveries can be utilized as speculations to form arrangements by strategy producers for legitimate reception and dispersion of green energizes. The

legislative offices should go to lengths to impact the residents both at unequivocal and verifiable levels. The arrangement creators should guarantee that reluctance is created in the personalities of locals to defend the climate and they lessen the utilization of customary powers willfully. The unequivocal proportion of self-revealing among locals will cut down the utilization of customary energizes and increment the use of green fills. Further certain elements like consideration for family and endeavors for a superior life can be deciphered as variables like medical advantages, improved pay and simplicity of activity for reception of green energy. Further the extent of the review can be additionally upgraded for speculation of the discoveries of the examination. The review gives an overall viewpoint towards green fuel. The future specialists can direct a specialty study for individual conventional and green energizes which will give a superior range to strategy making. The review is restricted to its examination goals yet the scientists throughout concentrate on comprehended that the fuel necessity is different for provincial and metropolitan region in this manner a comparable remedy can't be accommodated the issue of reception of green energizes. The grave test of reception and dispersion of green energizes should be provided food at various levels as per needs. The improvement of explicit bio fuel strategy and its functional execution will unquestionably turn into a significant stage to put forth a sustainable climate by cognizant attempts and change in way of life and practices

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Importance of Play Needs- Journal Publication

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Abstract:

Play has many benefits for children, families and the wider community, as well as improving health and quality of life. Play provision can increase their self-awareness, self - esteem, self - respect and improve their physical and mental health. Objectives: To assess the knowledge and attitude on the importance of play needs among mothers of under five years children. Methodology: A Quasi experimental one group pretest post test research design and Convenient Sampling Technique was used. The data collection included three parts. Part A: Demographic variables, Part B: A Structured questionnaire to assess the knowledge, Part C: Attitude scale used to elicit attitude regarding Importance of play needs among mothers of under five children. The study was conducted in Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, Punjab and 50 mothers of under five year children were recruited for this study. Conclusion: The study concluded that the Structured Teaching Programme on knowledge and Attitude regarding Importance of Play needs among mothers of under five year children, was found to be effective in improving the knowledge and attitude of mothers as evidenced by significant change between pretest and post test knowledge scores.

Keywords: Assess, Importance of play needs, Structured Teaching Programme, Knowledge, Attitude, Mothers of under five children.

Introduction: Play has many benefits for children, families and the wider community, as well as improving health and quality of life. Play provision can increase their self-awareness, self - esteem, self - respect and improve their physical and mental health.

Aims and objectives: To assess the pretest regarding knowledge and attitude on the importance of play needs among mothers of under five years children in experimental and control group. To develop and administer self-structured teaching program regarding importance of play needs among mothers of under five years children in experimental group. To assess the post test regarding knowledge and attitude on the importance of play needs among mothers of under five years children in experimental and control group. To associate the finding of post test of experimental and control group with selected socio demographic variables.

Design: A Quasi experimental one group pretest post test research design was employed to assess the effectiveness of Structured Teaching Program on knowledge and attitude regarding importance of play needs among mothers of under five children, were recruited by Convenient Sampling Technique. Necessary permission was obtained from the concerned authority. Structured interview Schedule was used to elicit the baseline data, and self- structured knowledge questionnaires were used to elicit the knowledge and five point likert scale used to elicit attitude regarding Importance of play needs among mothers of under five children. The study was conducted in Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, Punjab and 50 mothers of under five year children were recruited for this study.

Results: The mean knowledge score in experimental group 16.8, standard deviation 2.53 and mean knowledge score in control group 15.48, standard deviation 3.32. The tabulated value was 2.069 and calculated value is 1.2316 which is less than table value hence there is no significance difference between level of knowledge in control group and experimental group before administering of structured teaching program.

The mean pretest attitude score 12.34, standard deviation 5.96 and mean post test attitude score 2022, standard deviation 3.10. The tabulated value was 2.069 and calculated t-test value was 15.93 greater than tabulated value. Hence, there is significant difference between pretest attitude score and post test attitude score.

Conclusion: The study concluded that the Structured Teaching Programme on knowledge and Attitude regarding Importance of Play needs among mothers of under five year children, was found to be effective in improving the knowledge of mothers as evidenced by significant change between pretest and post test knowledge scores.

Key words: Assess, Importance of play needs, Structured Teaching Programme, Knowledge, Attitude, Mothers of under five year children.

Introduction:

Play is an important medium for children for several reasons. Play is a natural language from which children express themselves. Developmentally, a play bridges the gap between concrete experience and abstract thought. Play offers children the opportunity to organize their real life experiences that are often complicated and abstract in nature. Child gains a sense of control through play and also learns coping skills. Play therapy utilizes this understanding of children by offering children a therapeutic environment.[1-4]

Play has been called "the work of children" because it is through play that children learn how to interact in their environment, discover their interests, and acquire cognitive, motor, speech, language and social - emotional skills (American Academy of Pediatrics, 2007). Through various types of play, children learn to discover, create, and problem solve in a safe, caring environment. As children grow up and mature, their play skills also change, allowing for the development of new skills that are more varied and complex. It is important to acknowledge that there is variability in play development and these stages often overlap. However, at any stage, parents can play an important role in helping to facilitate growth of language skills that are important for later social and learning experiences.[5]

Need for study:

Play allows children to use their creativity while developing them imagination, dexterity and physical, cognitive and emotional strength. Play is important to healthy brain development. It is through play that children at a very early age engage and interact in the world around them play allows children to create and explore a world they can master, congruity their fears while practicing adult roles, sometimes in conjunction with other children or adult care givers.[6-9]

Play allows children to create and explore a world they can master, conquering their fears while practicing adult roles, sometimes in conjunction with other children or adult caregivers. As they master their world, play helps children develop new competencies that lead to enhanced confidence and the resiliency they will need to face future challenges. Undirected play allows children to learn how to work in groups, to share, to negotiate, to resolve conflicts, and to learn self- advocacy skills. When play is allowed to be child- driven, children practice decision- making skills, move at their own pace, discover their own areas of interest, and ultimately engage fully in the passions they wish to pursue. Ideally, much of play involves adults, but when play is controlled by adults, children acquiesce to adult rules and concerns and lose some of the benefits play offers them, particularly in developing creativity, leadership, and group skills. In contrast to passive entertainment, play builds active, healthy bodies. In fact, it has been suggested that encouraging unstructured play may be exceptional way to increase physical activity levels in children, which is one important strategy in the resolution of the obesity epidemic. Perhaps above all, play is a simple joy that is a cherished part of childhood.[10]

Statement of the problem:

Objectives:

1. To assess the pretest regarding knowledge and attitude on the importance of play needs among mothers of under five years children in experimental and control group.
2. To develop and administer self-structured teaching program regarding importance of play needs among mothers of under five years children in experimental group.
3. To assess the post test regarding knowledge and attitude on the importance of play needs among mothers of under five years children in experimental and control group.
4. To associate the finding of post test of experimental and control group with selected socio demographic variables.

Research Methodology:

Research Approach: Quantitative Research Approach.

Research Design: Quasi experimental one group pretest post test research design.

Research Setting: The setting of the study was conducted at Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, and Punjab.

Target Population: The target population selected for this study was mothers of under five year children were recruited from Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, Punjab.

Sample size: The investigator selected 50 mothers of under five year children were recruited from Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, Punjab.

Sampling Technique: Convenient Sampling Technique was used to select the sample.

Variables

Independent Variable: Structured Teaching Program.

Dependent Variable: Mothers of under five year children.

Selection and Development of Tool:

Part A- Socio - demographic Variables.

Part B- Self -Structured Knowledge Questionnaire.

Part C- Five point likert scale.

Results:-

Table-1

Frequency and percentage distribution of demographic variables among mothers of under five years children in experimental and control group in selected hospital.

Sl. No	Demographic Variables	Experimental group (n=25)		Control group(n=25)	
		Frequency(n)	Percentage(%)	Frequency(n)	Percentage(%)
1	**Age (in years)**				
	21-25	12	48%	09	36%
	26-30	08	32%	12	48%
	31-35	03	12%	02	08%
	36-40	02	08%	02	08%
2	**Religion**				
	Hindu	08	32%	09	36%
	Muslim	04	16%	06	24%
	Christian	08	32%	07	28%
	Others	05	20%	03	12%
3	**Education**				
	Illiterate	04	16%	05	20%
	Primary school education	06	24%	05	20%
	Secondary school education	08	32	07	28%
	Higher secondary education	04	16	05	20%
	Graduate	03	12	03	12%
4	**Occupation**				
	Home maker	12	48%	14	56%
	Government employee	03	12%	02	08%
	Business	0	0%	0	0%
	Self employee	10	40%	09	36%
5	**Monthly income (In Rupees)**				
	Below 3000	02	08%	04	16%
	3001-4000	08	32%	06	24%
	4001-5000	08	32%	06	24%
	Above 5000	07	28%	09	36%
6	**Types of family**				
	Nuclear family	16	64%	18	72%

	Joint family	09	36%	07	28%
7	**Number of children in family**				
	1 child	06	24%	05	20%
	2 children	10	40%	12	48%
	3 children	06	24%	05	20%
	More than 3 children	03	12%	03	12%
8	**Age of child**				
	New born	06	24%	07	56%
	Infant	04	16%	03	24%
	Toddler	08	32%	09	08%
	Pre-scholar	07	28%	06	12%
9	**Place of residence**				
	Rural area	12	48%	14	56%
	Urban area	08	32%	06	24%
	Sub urban	03	12%	02	08%
	Other place/ Slum	02	28%	03	12%
10	**Source of information regarding play needs**				
	Mass media	08	32%	07	28%
	Peer group	07	28%	08	32%
	Family members	06	24%	05	20%
	Health workers	03	12%	04	16%
	None of them	01	04%	01	04%

Table 1 depicted by the above table shows the demographic variables of the participants. In experimental group maximum 48%(12) of the subjects are from age group 21-25 years, 32% (08) of them belongs to Hindu and Christian, 32%(08) of them studied up to secondary school education, 48% (12) of the participants home maker, 32% (08) of them earned up to 3001-4000 & 4001-5000, 64%(16) belongs from nuclear family, 24% (06) of the participants had 01 child & 03 children, 32% (08) of the participant's children are toddlers, 32% (08) of them belongs to rural area and 32% (08) of participants get information from mass media. In control group maximum 48%(12) of the subjects are from age group 26-30 years, 36% (09) of them belongs to Hindu, 28%(07) of them studied up to secondary school education, 56% (14) of the participants home maker, 36% (09) of them earned above 5000, 72%(18) belongs from nuclear family, 48% (12) of the participants had 02 children, 36% (09) of the participant's children are toddlers, 36% (14) of them belongs to rural area and 32% (08) of participants get information from peer group.

Table 2:-

Distribution of statistical value of pretest score on level of knowledge regarding importance of play needs among mothers of under five years children in selected hospital, Garhshankar, Punjab.

Sr.No	Pretest knowledge score (n=25)	Mean	Standard deviation	t-value	Level of significance
1	Experimental group	16.8	2.53	t=1.2326df=23	0.05
2	Control group	15.48	3.32		

Table 2 depicts for 23 df at 0.05 level of significance, the table value was 2.069 and calculated value is 1.2316 which is less than table value hence there is no significance difference existing between level of knowledge in control group and experimental group before administering of structured teaching program.

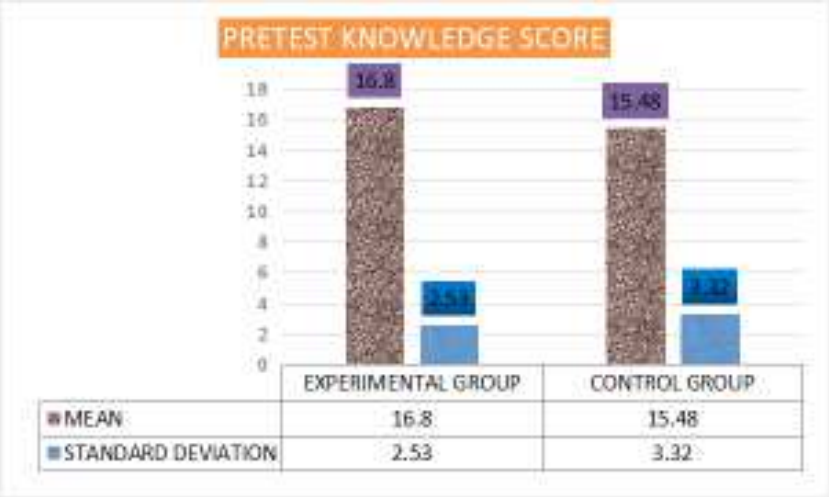

Figure 1 shows pretest level of knowledge in experimental and control group.

Table 3:-

Distribution of statistical value of pretest and post test value of knowledge score among mothers of under five years children among experimental group in selected hospital, Garhshankar, Punjab.

Sr. No	Level of knowledge	Pretest		Post test	
	Frequency	Percentage	Frequency	Percentage	
1	Inadequate	08	32%	0	0%
2	Moderately adequate	17	68%	05	20%
3	Adequate	0	0%	20	80%

Table 3 shows that the distribution of level of knowledge in experimental group before and after administration of structured teaching programme. In the pretest 8(32%) sample were found to have inadequate level of knowledge, 17(68%) sample were found to have moderately adequate level of knowledge. In post test 5(20%) sample was found to have moderate level of knowledge 20(80%) sample was found to have adequate level of knowledge. Hence administration of structured teaching programme had more significantly increased level of knowledge among mothers of under five years' children.

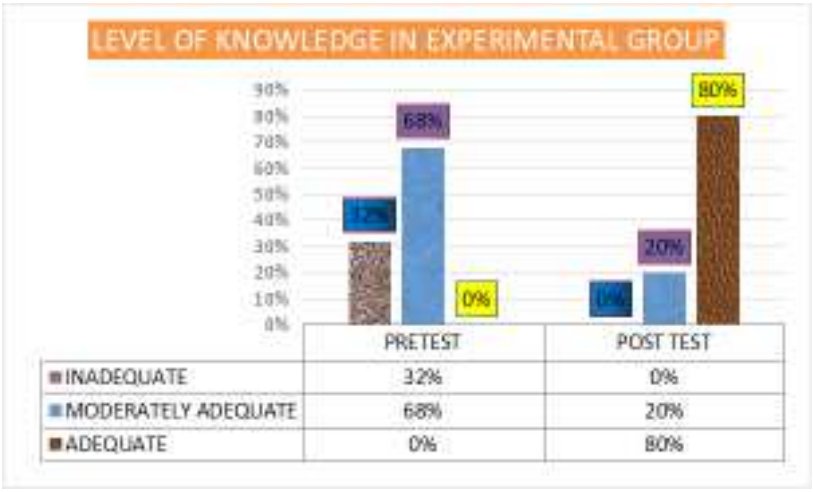

Figure 2 shows pretest and post test level of knowledge in experimental group.

Table 4:-

Distribution of pretest and post test knowledge score among mothers of under five years children among control group in selected hospital, Garhshankar, Punjab.

Sr. No	Level of knowledge	Pretest		Post test	
		Frequency	Percentage	Frequency	Percentage
1	Inadequate	13	52%	0	0%
2	Moderately adequate	12	48%	14	56%
3	Adequate	0	0%	11	44%

Table 4

shows the distribution of level of knowledge in control group before and after administration of structured teaching programme. In the pretest 13(52%) sample were found to have inadequate level of knowledge 12(48%) sample were found to have moderately adequate level of knowledge. In post test 14(56%) sample was found to have moderately level of knowledge 11(44%) sample was found to have adequate level of knowledge.

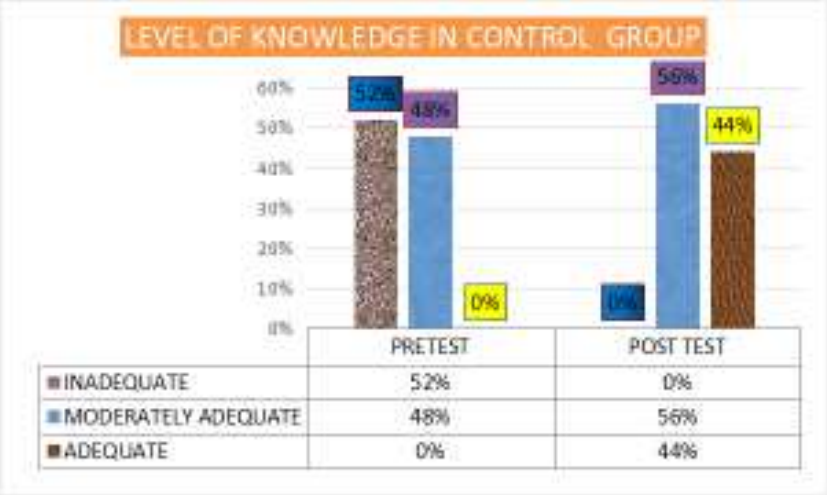

Figure 3 shows pretest and post test level of knowledge in control group.

Table 5:-

Distribution of statistical value of post test score on level of knowledge regarding importance of play needs among mothers of under five years children among experimental and control group in selected hospital, Garhshankar, Punjab.

Sr . No	Post test knowledge score (n=25)	Mean	Standard deviation	t-value	Level of significance
1	Experimental group	24.8	1.89	t=5.19df=23	0.05
2	Control group	22.16	2.11		

Table 5 depicts for 23 df at 0.05 level of significance, the table value was 2.069 and calculated value is 5.19 which is greater than table value hence there is significant difference between level of knowledge in control group and experimental group after administration of structured teaching program.

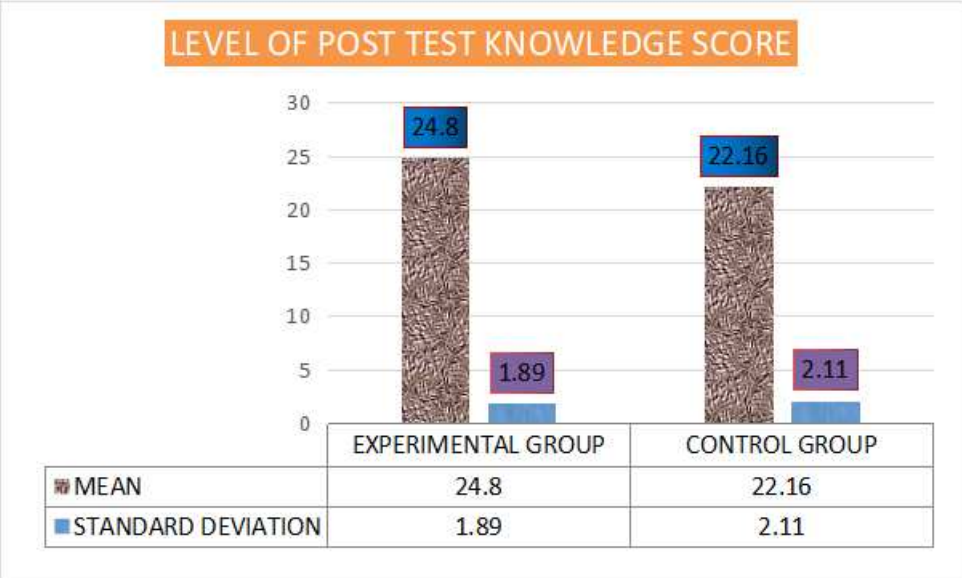

Figure 4 shows post test level of knowledge in experimental and control group.

Table 6:-

Distribution of Pretest attitude score among mothers of under five years children of experimental and control group in selected hospital, Garhshankar, Punjab.

Sr. No	Pretest attitude score	Experimental group		Control group	
		Frequency	Percentage	Frequency	Percentage
1	Unfavourable	12	48%	15	60%
2	Moderately favourable	08	32%	04	16%
3	Favourable	05	20%	06	24%

Table 6 shows comparison of pretest attitude score among mothers of under five years of children of experimental and control group in selected hospital.

In experimental group 12 (48.7%) samples were found to have unfavourable attitude 18 (32%) sample were found to have moderately favourable attitude 5(20%) sample were found to have favourable attitude. In control group 15(60%) sample were found to have unfavourable attitude 4(16%) sample were found to have favourable attitude.

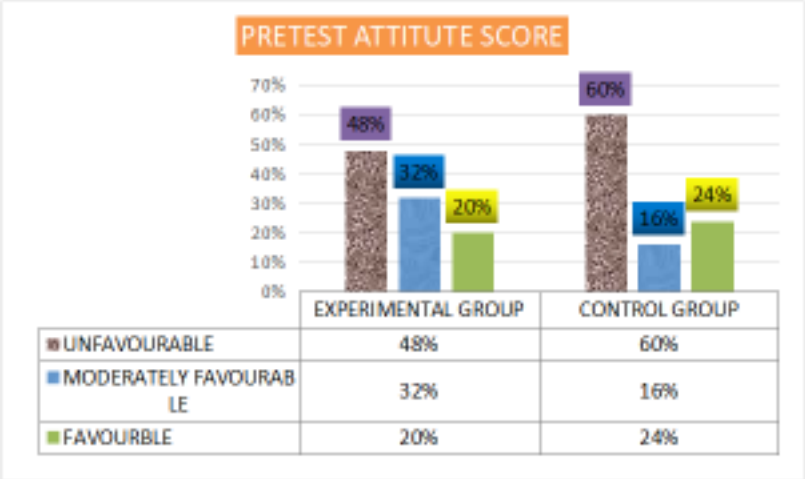

Figure 5 shows pretest level of attitude score in experimental and control group.

Table 7:-

Distribution of Post test attitude score among mothers of under five years children of experimental and control group in selected hospital, Garhshankar, Punjab.

Sr. No	Post test attitude score	Experimental group		Control group	
		Frequency	Percentage	Frequency	Percentage
1	Unfavourable	14	56%	16	64%
2	Moderately favourable	07	28%	04	16%
3	Favourable	04	16%	05	20%

Table 7 shows comparison of post test attitude score among mothers of under five years of children of experimental and control group in selected hospital.

In experimental group 14 (56%) samples were found to have unfavourable attitude 07 (28%) samples were found to have moderately favourable attitude 4(16%) sample were found to have favourable attitude. In control group 16(24%) sample were found to have unfavourable attitude 5(20%) sample were found to have favourable attitude.

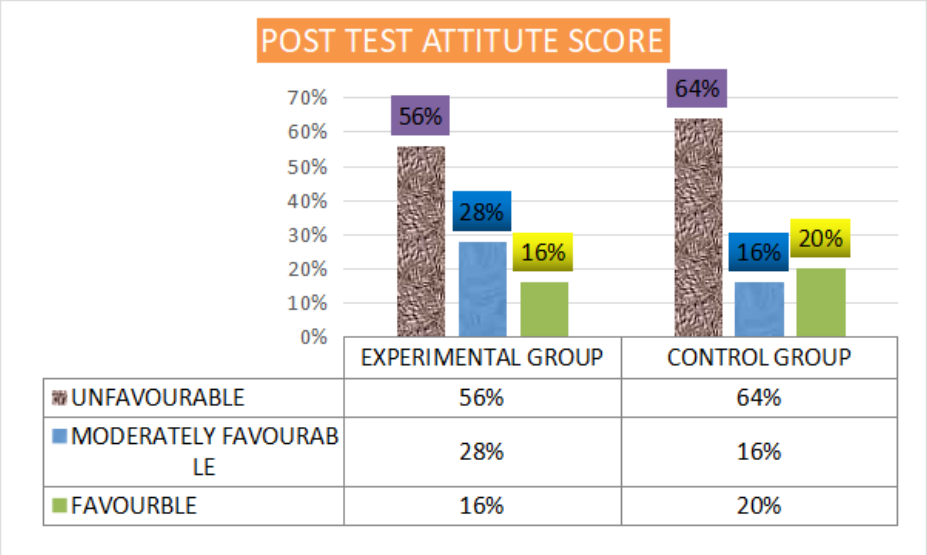

Figure 6 shows post test level of attitude score in experimental and control group.

Discussion:-

The mean knowledge score in experimental group 16.8, standard deviation 2.53 and mean knowledge score in control group 15.48, standard deviation 3.32. The tabulated value was 2.069 and calculated value is 1.2316 which is less than table value hence there is no significance difference between level of knowledge in control group and experimental group before administering of structured teaching program.

The mean pretest attitude score 12.34, standard deviation 5.96 and mean post test attitude score 2022, standard deviation 3.10. The tabulated value was 2.069 and calculated t-test value was 15.93 greater than tabulated value. Hence, there is significant difference between pretest attitude score and post test attitude score.

Manjubala dash 2019 was conducted a study to assess the knowledge of Mother regarding importance of play therapy in a selected village Puducherry, revealed that majority of mother 14(70%) are in the age group between 26-35 years, 15(75%) had education up to high school and 1(15%) was uneducated & 1(15%) had primary education, 19(95%) mothers were nuclear family, majority 11(55%) of the mothers had 2 children, 7(35%) had 1 child and only 2(10%) had children, 12(60%) of the mothers were working mothers, whereas 8(40%) were nonworking.[11]

Sheny Daniel, Fareha Khan 2018 was conducted a descriptive study to assess the knowledge and attitude regarding the play needs of toddlers among parents in a selected hospital of New Delhi, findings related to the assessment of knowledge

of parents 52% of the good knowledge, 48% of them average knowledge & none of the poor knowledge. The study concluded that many of the parents were well aware of the play needs.[12]

Daulat Kauwar Chouhan, keithellakpam Memchoubi 2020 was conducted a study to assess the knowledge & attitude among mothers of under five children regarding play needs during hospitalization in selected hospitals of Pune city, found the attitude of mothers majority 96.5% (193) of have highly favourable attitude, followed by 3.5%(7) mothers with moderate attitude regarding play needs during hospitalization. The mean attitude was found to be 39.22 with SD of 23.15.[13]

Conclusion:

The study concluded that the Structured Teaching Programme on knowledge and Attitude regarding Importance of Play needs among mothers of under five year children, was found to be effective in improving the knowledge of mothers as evidenced by significant change between pretest and post test knowledge scores. There was no statistically significant association found that with the demographic variables of age, religion, education, monthly income, type of family, number of children, age of child, place of residence and source of information with $P<0.05$* level.

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Moringa Oleifera: A Miracle Tree With Virtues.

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Abstract

Entire mankind irrespective of region, continent or race, of the world is suffering from COVID 19 outbreak. In this situation when science or scientist who have very limited knowledge about this totally new outbreak or disaster, persons immunity became the life saver. We know that immunity is the capability of multicellular organisms to resist harmful microorganisms. Since the modern science have very limited resource and means, people started looking towards nature as answer to COVID 19 outbreak to maintain healthy life. The Miracle tree, botanically known as Moringa oleifera is one such gift of nature. This tree has tremendous nutritional and medicinal benefits. It is native to India and grows in tropical and subtropical regions of the world. Commonly known as 'Drumstick tree' or 'Horseradish tree'. Leaves, flowers, seeds, pods and almost entire part of this tree are edible and have immense therapeutic properties. The medicinal properties of this miracle tree includes cardiac and circulatory stimulants, antitumor, antipyretic, antiepileptic, anti-inflammatory, antiulcer, antispasmodic, diuretic, antihypertensive, cholesterol lowering, antioxidants, anti-diabetic, hepatoprotective, antibacterial and antifungal activities, antitrypanosomal, anticancer and hypotensive. Its seed are natural coagulant and is used extensively in water treatment. Recent studies shows that Moringa can be used as a functional ingredient in food. The present paper reviews the geographical distribution, history, cultivation, uses, side effects, synonyms, botanical description, taxonomical classification, phytochemical constituents and pharmacological activities.

Keywords : Moringa oleifera, miracle, antioxidants, anti-diabetic, anticancer.

***Introduction*:-**

Plants serve as a source of food and form the basis of obtaining unlimited nutritional and medicinal products. Moringa oleifera, belongs to family Moringaceae, often called drumstick tree, miracle tree, ben oil tree or horseradish tree. It is a fast growing multipurpose tree indigenous to sub-Himalayan tracts of northern India. There are 13 species of Moringa with forms ranging from small herbaceous plant to massive tree. Moringa oleifera is one of the 13 species of the same genus. It is the most commonly cultivated species. In India it is grown all over the continent for its tender pods and also for its leaves and flower. The pod of the Moringa is very popular vegetable in south Indian cuisine and valued for their distinct flavour. Infact it is considered as one of the world's most useful tree, as almost each and every part of the Moringa tree can be used for food, medication and industrial purposes. This tree has the potential of improving nutrition, boost food security and foster rural development. This is the reason why it is known as the miracle tree.

According to WHO, more than 80% of developing country's population depends on plant based medicines for curing their various ailments. From the time immemorial this plant is used as a traditional medicine.

Moringa oleifera plant with flower, leaves and pods.

Geographical Distribution:-It is widely cultivated in tropical and subtropical regions of the world.

World scenario: North-eastern Pakistan, north- eastern Bangladesh, Sri Lanka, West Asia, Arabian peninsula, east and west Africa, throughout west Indies and southern Florida, central and south America from Mexico to Peru, in brazil and Paraguay.

Indian scenario: It is mainly cultivated in Tamilnadu, Karnataka, Kerala, Andhra Pradesh, Assam and Bengal. It is wild in the Sub-Himalayan tracts from Chenab to Oudh.

Cultivation: - Moringa oleifera is highly drought tolerant and is widely cultivated in hot, arid and semi-arid regions. Altitudes below 600m are best for growth of Moringa, however in some tropical areas it grow up to 1200m and has been recorded growing at 2000m. Optimum temperature range for the growth of this tree is 25-35 degree Celsius. Moringa oleifera tree prefers well drained sandy or loam soil. It can tolerate clay soil but not water logging. It tolerates a soil PH 5.0- 9.0 with an optimum of 6.3- 7.0. It responds well to mulch, water and fertilizer.

Propagation: - Moringa oleifera can easily be propagated either through seeds or cuttings. Seeds are planted 2cm deep it germinates within 1-2 weeks. Usually the germination rates are very good. If it is through cuttings then cuttings should be at least 45- 100 cm long with stems 4- 10 cm wide should be taken from the woody parts of the branches. It should be woods from previous year. For three days cuttings can be cured in the shade and then planted in a nursery or in the field

Benefits/ Uses of Moringa Oleifera:-

1. **Food Uses And Nutritional Value** :- Its leaves are rich in protein, mineral, beta carotene and anti- oxidant compound such as flavonoids, ascorbic acid, carotenoids and phenolic, vitamin C, Calcium and potassium. It have high level of oleic acid making it a great moisturiser. Moringa leaves are eaten as salad and vegetable and as a forage for animal feed. In India Moringa leaves have been processed to make a drink named Zija. Flowers and pods are also taken as food.
2. **Medicinal Uses: -** Moringa is considered as very much rich in medicinal properties as all the parts of the plant is used for treating diverse illnesses and diseases. In traditional medicine the leaves are used for treating malaria, typhoid fever, parasitic diseases, arthritis, swellings, cuts, skin diseases, genito urinary ailments, hypertension and diabetes. It also enhance milk production in nursing mother and boost the immune system as well as cardiac stimulants and contraceptive remedy. The alcoholic extract of the bark of the Moringa oleifera is used in the treatment of various stomach ailments, poor vision, joint pain, diabetes, anaemia and hypertension, toothache, haemorrhoids and uterine disorder. Moringa seeds are used to sediment impurities of water. Root extract is used in treating toothache, as antihelmintic and antiparalytic drugs and as a sex stimulant. Flowers are used to produce aphrodisiac substances and to treat inflammations, muscle diseases, hysteria, tumours and enlargement of the spleen.
3. **Other Uses: -** Moringa is used as an animal fodder. It is a natural coagulant of turbid water. Moringa seed powder can be used for water purification. Moringa seed oil can be used as pure biodiesel, as vegetable food oil, in cosmetic products and as a lubricant for fine machinery.

Side Effects of Moringa: - The studies reported so many nutritional benefits of Moringa because of which it is known as a miracle tree, but it has some risk factors reported by Cadman.

1. In pregnant woman Moringa leaves itself is sufficient to fulfil their daily requirement of calcium and iron but in some cases it has been found that it possess antifertility characteristics.
2. Though Moringa extract showed promising effect against thyroid dysfunction especially hypothyroidism in rats but it may be harmful during the treatment with any other thyroid medication.
3. Studies reported that Moringa leaves effectively reduces blood sugar level so along with diabetic medication it can cause too low blood sugar levels in some cases.
4. Moringa is helpful in reducing blood pressure, but if it is taken along with the drugs that reduce blood pressure then it may result in too low blood pressure.
5. Roasted Moringa seeds contain chemicals which can cause cell mutations.
6. Moringa oleifera leaves have long lasting and mild effect of laxative. It can upset stomach, gas or diarrhoea due to its laxative properties.
7. Moringa extract may interfere with any medications that might be broken down by the liver. It may decrease how quickly this happens, which can cause various side effects or complications

Table 1: International synonyms of Moringa oleifera.

S.NO	Name	Language	Country/region
1	Moringa oleifera	Latin	Italy
2	Sahajan	Unani	Greece
3	Drumstick tree, horseradish tree, ben tree	English	England, USA, New Zealand
4	La ken	Chinese	China
5	Moringa, Moringueiro	Portuguese	Portugal
6	Angela, Ben, Moringa	Spanish	America
7	Moringa a graine ai lee, Morungue	French	France
8	Rawag	Arabian	Saudi Arabia

Table 2: Indian synonyms of Moringa oleifera.

No	Name	Language	State/ region
1	Subhanjana	Sanskrit	mattur
2	Saguna, Sainjna	Hindi	UP, Bihar, MP
3	Suragaro	Gujarati	Gujarat
4	Morigkai	Tamil	Tamilnadu
5	Mulaga, Munaga	Telugu	Andhra
6	Murinna, Sigru	Malayalam	Kerala
7	Sainjna, Soanjna	Punjabi	Punjab
8	Akshiva, Haritashaaka, Tikshnagandhaa	Ayurveda	————————

Table 3: Botanical Description of Moringa oleifera

Plant type	Evergreen/ deciduous tree
root	Tap root
Stem	Erect thick grey bark
Leaves	Composed, tripinnate
Flower	Bisexual, zygomorphic, yellowish white
calyx	Sepals 5 , pale green
Corolla	Spathulate petals,5 unequal yellowish white
Fruits	Dehiscent capsule
Seeds	Winged seeds,3-angled

Table 4: Taxonomical classification of Moringa oleifera

Kingdom	Plantae
Sub kingdom	Tracheobionta
Super division	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Sub class	Dilleniidae

order	Capparales
Family	Moringaceae
Genus	Moringa
Species	oleifera

Table 5: Phytoconstituents of Moringa oleifera

S.NO	Phytoconstituents	Plant part
1	Flavonoids and favanol glycosides	Leaves, pods, stem bark, seeds
2	Glucosinolate and isothiocynate	Leaves, seeds
3	Phenolic acid	leaves
4	Terpene	pods
5	Alkaloid and sterol	Leaves, roots, seeds, stem bark
6	Fatty Acids- Oleic Acid, Linoleic Acid, Myristic Acid, Palmitic Acid, Palmitoleic Acid, Stearic Acid, Arachidic Acid, Linolenic Acid, Behenic Acid, Paullinic Acid	Seeds, root
7	Nitrile glycosides- niazirin, Niazirinin, niaziridin	Leaves and pods
8	volatiles	Seed, leaves
9	Moringyne	seeds

Table 6: pharmacological activities of Moringa oleifera

S.NO	Pharmacological activities	Extract	Plant part	phytoconstituents
1	Antioxidant	Aqueous and alcoholic extract	Leaves, roots	Phenolic content, flavonoid
2	Antiepileptic and anticonvulsant	Methanolic extract	leaves	Alkaloids, flavonoids, tannins
3	Antidiabetic	Aqueous extract	leaves	Quercetin, glucoside, kaemferol
4	Cardiovascular activity/ antihypertensive	Ethanolic extract	leaves	Thiocarbamate, isothiocyanate glycosides
5	Antifertility	Aqueous extract	roots	Alkaloids, flavonoids, saponin,cyanogenic glycosides
6	Antiurolithiatic	Aqueous and alcoholic extract	Bark	Alkaloids- moringinine, moringine
7	Antiasthmatic	Alcoholic extract	Seed kernel	Phenolic, sterol,terpenoids
8	Hepatoprotective	Ethanolic extract	Leaves, seeds	quercetin
9	Anti-cancer	Ethanolic extract	Leaves,seeds	Thiocarbamate,isothiocyanate
10	Anti-inflammatory	Methanolic and aqueous extract	Root, bark, seeds, flowers, leaves, stalks	Phenolic compounds, quercetin
11	Antimicrobial	Aqueous and ethanolic extract	Leaves, root, bark, seed	Flavonoids, phenolic acids
12	CNS activity	Aqueous extract	leaves	Thiocarbamate, isothiocyanate

13	Antiulcer	Aqueous extract	leaves	Bisphenol's, flavonoids
14	Antipyretic and wound healing	Ethanolic extract	leaves	Phenolic compounds
15	Local anaesthetic activity	Methanolic extract	Root	Eugenol
16	Anti-allergic activity	Ethanolic extract	seeds	Flavonoids, polyphenols
17	Anthelmintic activity	Ethanolic and aqueous extract		leaves Glycosides
18	Hypotensive activity	Ethanolic extract	Leaves	Nitrile, mustard oil glycosides, thiocarbamate glycosides
19	Anti-obesity activity	Methanolic extract	Leaves	polyphenols
20	Mutagenic activity	Seed powder	Roasted seed	4 (L. rhamnosyloxy) phenyl acetonitrile
21	Coagulant property	Crude extract	seed	Coagulant proteins

Conclusion :- Miracle tree Moringa oleifera is an aromatic plant with multifaceted medicinal properties such as antioxidant, anti-inflammatory, Antidiabetic, Antimicrobial, CNS activity, antiepileptic, antihypertensive, antifertility, anticancer, Hepatoprotective, antipyretic and wound healing effect and many more. It is also used as a food, Fodder, biodiesel and lubricant. Its seed is used in water purification. There are number of animal studies documenting the effect of Moringa plant especially leaves in protecting against various diseases due to the action of various bioactive components present in the various part of this plant. Further studies in humans including clinical trials are needed to confirm these effects of Moringa oleifera.

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Environment and Water Management

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Introduction:

The environment may be defined as the surrounding, where the plants and animals survive in the earth. It also includes forests, wildness etc. All these living things interact with our natural atmosphere such as soil, rocks, air and water. Apart from these other nature forces like heat and cold also have important effect in our environment. The word environment has been taken from the French language means that everything which is surrounding all living and non-living thing on the surface of the earth. It is the totality of condition's around for living environmentally. The environment may be an area where are people live and survive. Biotic and abiotic components can only be survived when our natural environment is clean pollution free. A healthy natural environment plays an important role in balancing all interactive components of our environment. All human beings on the earth surface very hard to survive without food, pure air to breath and water to drink. As far as India is concerned, it shares around 16% of the total population of the world whereas only 4% water resource to use for drinking. Manmade environment is also on important part of the whole. So it is essential to maintains it healthy and must concentrate our attention on purity of water, air, soil and radiation, forests, wildlife, fauna and flora etc.

Objectives of the Study: The main objectives of the study of natural environment is to conserve natural resources, its protection from being polluting. The environmentalists and government of the country must promote the conservation of abolishing all living things. The people of all areas must be educated and train to conserve biological diversities. The government policy statement on environment 2006 describes the applications and principles of transparency, sincerity and accountability, reduction in time and cost for the management and regulation of use of natural resources.

The environment education may include the following:

(i) To make individual and groups aware about pollution and environment degradation.

(ii) Skill and capacity building of the people.

(iii) Attitude.

(iv) Participation of people.

Meaning and Definition of: (i) Environmental science (ii) Water management

(i) Our whole natural environment including its minor and major components are closely associate and intermingled with water resources. A balance marine environment and protective of ozone layer flourishing coastal areas, a rich diversity of plant and animal life "environment science may be defined as the classification of scientific disciplines concerned with the physical, chemical and biological characteristics of the surroundings in which all living things survive". It is the interdisciplinary study which describes human interaction with the environment. The study emphasies and addresses complex and contemporary issues.

(ii) Grossly speaking water management may be defined as other complex and composite area interconnected with various sectors of Indian economy such as agriculture, industry, domestic and household, power, environmental fisheries and transportation sector.

"The flow of water resources and control to reduce the chances of harm to life and property and also maximizing benefits of using water resources.

The treatment and purification of drinking water is essential. Release wastewater from manufacturing units is very dangerous from the point of view water management in India. Not only this but also the management of flowed water which has always been devastating in various parts of the country life Assam, Bihar and north eastern states. The flooded water many be diverted by connecting all important rivers of southwest and north western parts. If it is done so it would e proved a drastic changes in agriculture production in the country. The project was proposed by Atal Bihari Vajpayee government during 1998 to 2004. I would be a remarkable development in the world history.

Analysis of the Study

Increasing water demand by primary, secondary and tertiary sectors of the Indian economy after 10 to 15 years, it will require vast, efficient and effective water management in the country to meet 25% to 35% demand including use of water households 6%, by industrial sector 5% and around 88% in agriculture. The increasily pressure of increasing population in urban areas creating a more serious problem in the country. Water retreatment plants are brief setup in big and small cities of the countries.

Delhi, Noida, Kanpur, Lucknow, Varanasi, Patna, Vijawara in south, Nagpur Chennai, Kolkata and Dehradun etc. have efficient and effective water treatment plants to meet not only pure drinking water and for irrigation purposes.

The water flowing capacity of river Yamuna, Ghaghra, Ganga, decreasing year after year due to lack of rainfall in the region. Polluted water released from various industries creating problem not only to aquatic animals and the use in agriculture and forests animals are also suffering due to poisonous quality of water.

Though the government of India is issuing order and directions to purify the water falling in rivers and trenches from factories operating in different cities. Inspite of the facts there are legislations which have been passed time to time to overcome the problems people facing in the country. Actually, various projects on water management, water treatment and retreatment are unable to give desirable results. So it requires to moderate and upgradation of capacity utilization of water resources in all forms.

Future Prospects and Implications

As far as the future of water resources and utilization in the country is concerned, the joining and diverting the devastating water resources to the areas having very small amount rainfall, by developing and constructing various types of domestic on important rivers.

The flooded devastating water flowing in the rivers of Northeast region would minimize the loss of life and property of large. If the water from Brahmaputra, Barak, Nambul and Imphal during monsoon may be managed to divert is to the drought affected areas. The project if undertaken will serve a large number of fauna population of Rajasthan, part of Haryana, Maharashtra, Madhya Pradesh and Uttar Pradesh. Mor desirable results are expected as would increase agriculture production in these areas.

Some rivers southwest flooded regions, Tapi, Lumi, Narmada and Godavari may be included to contribute and overcome the problems of drought areas. The research studies may be carried out in the identification of flooded and drought affected areas, an appropriate balance or equilibrium would have desirable effects.

Conclusion

The water management of different sources in India, if implemented in true sense would be proved as a project of international repute. The project will require large and heavy investment. Moreover the project will increase more and more land areas under irrigation and other purposes. Installation and set up of water treatment and running water for drinking purposes. The demand for drinking water increasing day by day and year after year. Undertaking such a high value project not only overcome the problems of irrigation and drinking but also increase the income of farmers and would ensure the prosperity and optimism in the region of Indian subcontinent. The project will have everlasting economic effects in all sectors of the Indian economy.

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Characterizations of Gadolinium Oxide Films Prepared Simple Chemical Method

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Abstract :

The gadolinium oxide (GdO_2) thin film was synthesized by successive ionic layer adsorption reaction (SILAR) method. The gadolinium oxide films were deposited on the stainless steel substrate at room temperature from an acidic solution of gadolinium nitrate hexahydrate. The structural analysis of prepared film was done with the x-ray diffraction (XRD) technique. The morphological evidences were obtained by scanning electron microscopy (SEM). The compositional analysis of the sample was performed by the energy dispersive x-ray analysis (EDAX) study. The experimental results indicated that production of amorphous structures on the stainless steel substrate. The morphology of the as-deposited film was found to be like a cracked mud observed by scanning electron morphology. The EDAX study asserts the formation of gadolinium oxide on the substrate.

Keywords: Chemical methods, Gadolinium oxide, SEM, Thin film

1.*Introduction :*

Most recently, major research efforts are focused on exploring new materials to improve energy density of electrochemical capacitors. Particularly, increasing both capacitance and operating voltage of electrochemical capacitors are of significant importance since energy density is proportional to capacitance and squared voltage. It can be observed that the most widely investigated metal oxide is ruthenium oxide because of its excellent pseudocapacitive behavior, good reversibility and high conductivity. However, the high cost of this precious metal oxide hinders its practical applications. Consequently, relatively low-cost materials such as MnO_2, NiO, Fe_3O_4, ZnO, TiO_2, etc. have been explored as possible composite electrode materials for electrochemical capacitors working in aqueous solution [1].

Initially, in the supercapacitor, carbon nanotube (CNT) was used which is in the form of the utilization of double layer capacitance [4]. After that transition metal oxides and ferrites were utilized to achieve the expected results [4-8]. Again to attain extreme capacitance, these transition metals were again consumed with different sulphides and phosphates [9-11]. As a new material in supercapacitor, the metal oxide based metal organic framework was employed [12].

Gadolinium oxide is an inorganic compound with the formula Gd_2O_3. It is one of the most commonly available forms of the rare-earth element gadolinium. Gadolinium oxide is a rather basic oxide, indicated by its ready reaction with carbon dioxide to give carbonates. Gadolinium oxide can be formed by thermal decomposition of the hydroxide, nitrate, carbonate, or oxalates. Especially, gadolinia (Gd2O3), a versatile rare-earth material/Faradic electrode material because of its most accessible layered structure, redox activity, good electro-chemical properties, high temperature resistant, high photo-catalytic activity/ stability, and self-regeneration. Moreover, gadolinia can exist in two forms (monoclinic and base centred cubic structure) having different inter planner spacing which highly favours electrochemical process.

The present research has been carried out to synthesis the rare earth metal oxide electrode, which is the gadolinium oxide film electrode by means of Successive Ionic Layer Adsorption Reaction (SILAR) method. In this study, the synthesis gadolinium oxide thin films were prepared by SILAR method has been discussed. The structural, morphological and compositional analyses have been studied.

2. Experimental

Initially, the gadolinium nitrate hexahydrate (AR grade) was weighted carefully by using microbalance and then dissolved slowly in double distilled water to from 0.01 M concentration. Similarly, the anionic precursor was 0.01 M NaOH was prepared in double distilled water.

It consists of two beakers containing cationic solution with (Gd^{3+}) and anionic (OH^-) solution along with the two beakers placed in between. The stirrer-heater assembly may be used to maintain the desired temperature of the beaker system. The stainless steel substrate is inserted in the beaker in regular interval of time. The thin film formation is seen after the repetition. In this method, formation of films occurred by sequential ionic reactions under ion-by-ion process.

3. Deposition of gadolinium oxide thin films by SILAR and thickness measurement:-

In the deposition of the composite gadolinium film both anionic and cationic precursors were kept at 300 K temperature. At the time of deposition, the substrate was immersed in cationic precursor solution in which gadolinium ions were present. The ions were get adsorbed on substrate forms very thin layer. Next to that, the substrate was rinsed in double distilled water to remove loosely bonded ions. Further, the reaction occurs with the OH^- ions from anionic precursor and form a composite layer of Gd_2O_3 material on the substrate. Again the adsorption-reaction was varied as 10-20, 20-40, and 30-60 s for the deposition of thin films. In the reaction the substrate was immersed in cationic solution (first beaker) for 30 s and in anionic solution (forth beaker) for 10 s, in between it was rinsed in distilled water for 10 s is a one cycle of deposition. The adherent film was obtained at 50 cycles of the deposition which was then considered for electrochemical study in supercapacitor. The thickness of deposited film was measured by using the weight difference method and found to be 0.0004 g/cm^2 on the stainless steel substrate.

4. Characterizations of gadolinium films

4.1 X-ray diffraction studies:-

The structural information of as-deposited gadolinium oxide material was obtained from the XRD techniques. The sample was scanned in between the range of 20-80^0 diffraction angle with Cu $K_á$ radiation (ë = 1.5418 A°).

The XRD pattern of the gadolinium oxide thin film grown on the stainless steel substrate is as shown in Fig.1. It gives the intensity distribution of thin film samples with respect to scanning angle. The XRD analysis of the material concludes that the observed peaks were not from the particular element of the deposit but from the substrate itself which confirms the formation of amorphous gadolinium oxide composite material.

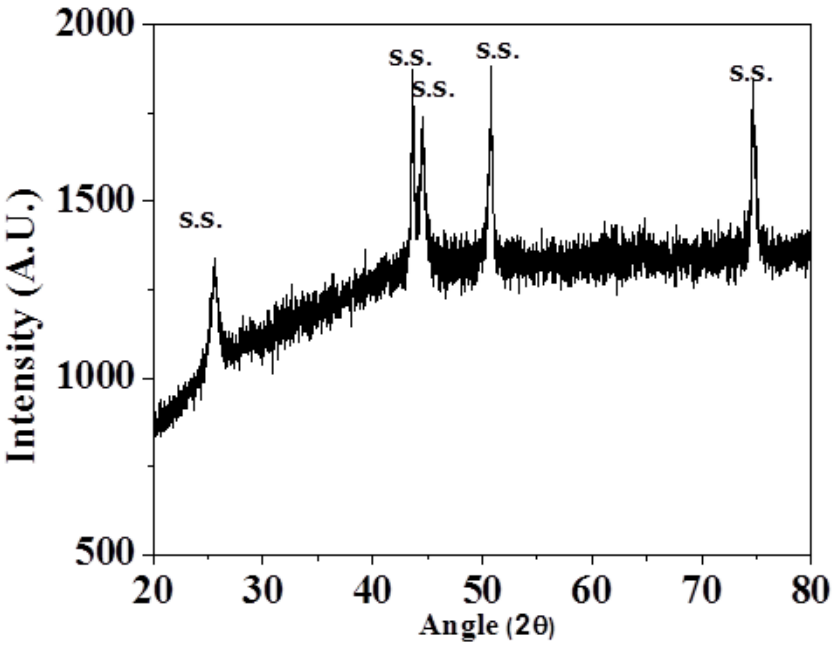

Fig. 1: The XRD pattern of gadolinium oxide thin film

4.2 Surface morphological and EDAX study:-

The morphological study of the composite film was carried out by scanning electron microscopy (SEM) (Model: JEOL JSM-6360) at the same time attached with an energy dispersive x-ray analysis (EDAX) analyzer was used to measure the composition of the existing material.

To know the exact morphology, the sample was scanned at different magnifications in a vacuum condition. The Fig. 2 shows micrographs for as-deposited composite material at 500 X magnifications. It was observed that the surface shows cracked mud type morphology of the material, which was confirmed also at higher magnifications (not shown).

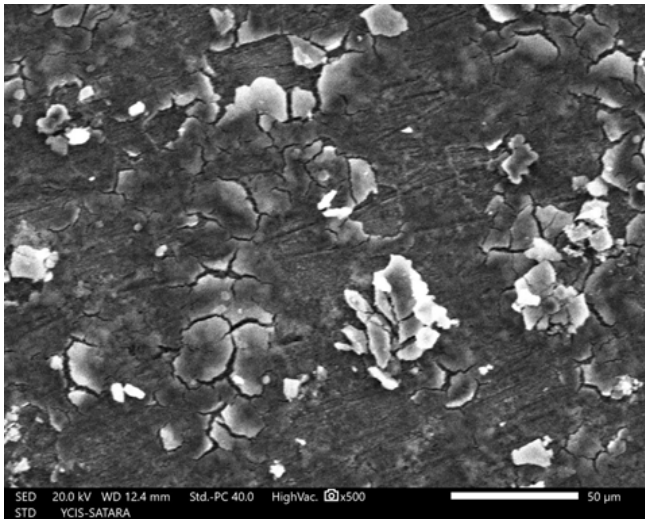

Fig. 2: The Scanning electron micrographs (SEM) of gadolinium oxide thin film

The EDS pattern of the synthesized material is shown in Fig. 3 (a) while its compositional percentage is shown in Fig 3 (b) in tabular form. It concluded the formation gadolinium oxide material formed on the substrate. It showed the elemental percentage of gadolinium is about 65 % while the remaining percentage was covered by oxygen which is about 35 % in whole of the sample.

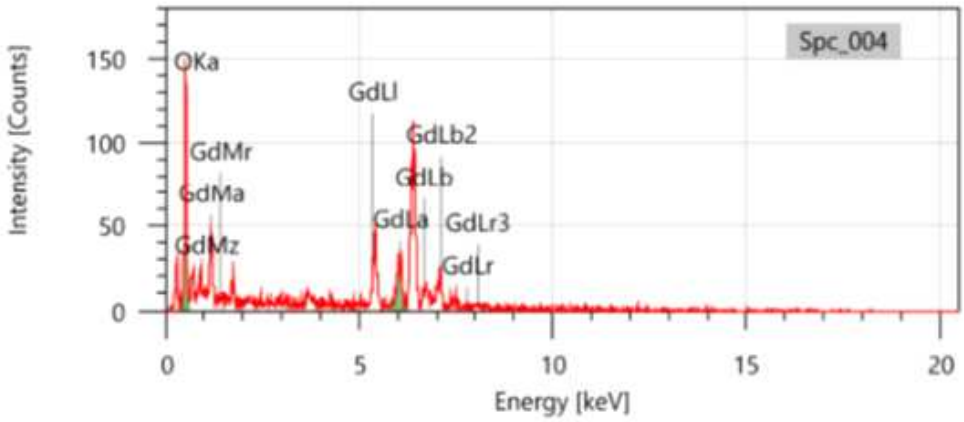

Fig. 3 (a) : The EDS of gadolinium oxide thin film

Element	Line	Mass%	Atom%
O	K	34.35±1.24	83.72±3.02
Gd	L	65.65±3.03	16.28±0.75
Total		100.00	100.00
Spc_004			Fitting ratio 0.6514

Fig. 3 (b): The elemental percentage of gadolinium oxide thin film

5. Conclusions:-

The simple chemical method was used to fabricate the gadolinium oxide thin film on the stainless steel substrate at 300 K. The thickness of the material was found to be 0.0004 g/ cm^2 calculated from the gravimetric weight difference method. The XRD depicted the formation of amorphous material on the stainless steel substrate. The morphological evidences from SEM Showed the cracked mud type morphology of the material formed. The compositional analysis from the EDS showed the formation of gadolinium oxide material on the substrate. Such type amorphous structure and cracked mud type morphology of the material will be useful in the application of supercapacitor.

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Exploration of Climate Change Impacts on the Hydrology of the Vaitarna River Basin Using Statistical Downscaling Techniques Based on Machine Learning

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Abstract :

As a result of its direct connections to agriculture, vegetation, and livelihood, the impact of climate change on hydrology is one of the most pressing issues facing the world today. The purpose of this study is to examine the possibility of future climate change in the Vaitarna river basin. Several temperature extremes and their effects on the environment have been investigated by the Intergovernmental Panel on Climate Change (IPCC). Temperature changes are thought to be caused by changes in the amount of solar energy that the planet receives, changes in biotic processes, and changes in some human activities. Climate models, which include models of the ocean, atmosphere, ice, and land surface, are used to simulate the interplay of the drivers of climate. For the purpose of impact assessment, a large number of climate models are utilised. General Circulation Models (GCMs) and Global Climate Models (GCMs) are used to estimate any increases in global temperature caused by a doubling of carbon dioxide (CO2) concentrations (GCM).

Using a three-dimensional grid, general circulation models (GCMs) simulate the flow of air and water across the globe.

Keywords: Vaitarna River, Hydrology, Downscaling Techniques, Machine Learning

1. *Introduction :*

Physical processes such as those in the atmosphere, land, surface, and ocean are represented by numerical models. Geometrical coordinate models discretize the equations for energy transfer and fluid motion, which are afterwards integrated over time. Scenarios are used by decision makers and planners to examine situations in which the outcome is unknown. The long-term impacts of climate change, as well as the potential climatic pathways, may be predicted with the use of climate models. A coarse output is produced by the GCM described above, which simulates weather in multiple atmospheric layers and produces results in the range of 2 to 5 degrees (200 to 500 kilometres).

Users require climatic data at spatial sizes that are smaller than the GCM grid. This can be achieved by downscaling the generalised coordinate model (GCM). It is possible to get high resolution information from low resolution variables by employing the technique of downscaling. Downscaling approaches are classified into two categories: statistical downscaling and dynamical downscaling. It is not recommended to use dynamic downscaling because of the high computing requirements. This study uses a statistical downscaling approach to reduce the number of variables.

The Statistical Downscaling Model (SDSM) version 4.2, which is a free piece of software, was utilised in this experiment. It is a combination of regression-based and stochastic weather generators, in which the correlation of Predictand (a local scale variable) and Predicttors (large scale atmospheric variables) is done on the Predictand and Predictor data. The Canadian Climate Impacts and Scenario project (CCIS) has recommended that the Statistical Downscaling Model be used as a downscaling method.

Downscaling is a term used to describe a strategy for extracting information from large-scale global climate models (GCMs) in order to anticipate the local scale. Generally speaking, global climate models (GCMs) are atmospheric simulations based on large-scale spatiotemporal models that are quite accurate for global or continent-level climate investigations. GCMs, on the other hand, are unable to provide information on the features of climatic variables at the local and regional level, as well as their severe occurrences. Statistical downscaling takes less computer resources and may be completed in a very short period of time [1]. According to a large number of studies, the performance of dynamic and statistical downscaling was equivalent in regional-scale climate studies compared to historical time-scale climate research. The results of a rigorous study that compared the performance of dynamic and statistical downscaling concluded that the dynamic downscaling did not perform any better than the statistical downscaling. 2

1.1 Conventional Methods

Conventional downscaling is defined as the direct scaling of local historical observed climatological time series with the historical information from a global climate model. The traditional technique is used to correct for discrepancies between the observed statistics and the GCM's performance in terms of result. In order to deal with the issue of geographical variability, several strategies have been employed, and each of these methods has its own set of advantages and disadvantages when it comes to forecasting future situations.

Future situations can be predicted using a variety of ways, including:

With historical data equivalences across various climatic zones and time scales, 2) by simple modification GCM outputs with the assistance of observed data (e.g. delta change factor technique) [3], and 3) by using statistical downscaling and dynamic downscaling [4] are all possibilities.

1.2 Stochastic Methods

Weather generators are stochastic models that give local-scale data to compensate for the shortcomings of global climate models (GCMs). To provide a longer period of daily synthetic atmospheric data using the observed climate statistics, a weather generator is used in conjunction with the observed climate statistics [6]. By calculating the likelihood of a wet or dry day based on observable local data, weather generator models frame the day as "wet" or "dry" from the outset of the simulation. Subsequently, the quantity of precipitation is simulated just for the rainy days, using the observed data and an exponential distribution and a fixed distribution, respectively. The most significant disadvantage of weather generators is that they rely on Markov chains, which appear to be ineffective when it comes to modelling extreme weather occurrences. Statistical and non-parametric weather generators are reported to function better for precipitation than for other factors, although they are less effective for other parameters.

1.3 Statistical Downscaling

It is necessary to employ long-term observed climate data in order to create a mathematical relationship between a GCM's output (at the large-scale) and a weather variable (local-scale). It is intended that these correlations illustrate the influence of local causes on regional climate at a regional level [7]. The results of statistical downscaling are unique to each location, therefore downscaling must be conducted for each individual site as well as at the observed station level. In support of the idea that the statistical relationship between historical observed datasets and historical GCM simulation output would remain constant in future climate forecasts [4], statistical downscaling is being established. When conducting climate change impact studies, there are several atmospheric elements to take into consideration.

1.4 Dynamic Downscaling

Dynamic downscaling approaches, like statistical methods, are intended for collecting local scale information from large-scale global climate models (GCMs). However, the most significant distinction is that not just observable data, but also physical representations of the climate system are included. An initial regional-scale or limited area model is simulated using crude global climate model datasets with spectral boundary conditions, followed by further refinement. Then, using high-resolution Atmospheric Ocean General Circulation Models (AOGCMs) and large-scale General Circulation Models (GCMs), constructing global-scale simulations. Finally, a high-resolution variable-specific global model spanning a specific area is used to solve the problem. Because dynamic downscaling necessitates a large amount of computer power, it is effective but not efficient. As a result of considering climate change information from regional-scale data, the dynamic downscaling approach produces a number of equations that represent spatial augmentation. For this approach to work, there is no need for input from observation data in order to make changes to the model data. A Regional Climate Model is the name given to the data obtained using this approach (RCM).

The output of the GCM simulation is compared to observed station data using a variety of statistical and mathematical methods, which are combined to form a statistical downscaling model. The statistical downscaling model may be further divided into three categories: 1) perfect prognosis (PP), 2) weather generator, and 3) model output statistics (see Figure 1). (MOS). MOS, on the other hand, is a statistical downscaling strategy that is both efficient and effective in that it minimises both model variance and model bias. When compared to actual climate data, a downscaling model has reduced variance and bias, which increases its accuracy. This is because global climate models (GCMs) have systematic flaws [11]. The statistical downscaling approach is primarily concerned with obtaining information from coarse-resolution atmospheric data produced by global climate models. 3

1.5 Composite Methods

A composite technique is defined as the process of constructing numerous scenarios by merging the results of many global climate models. Among the many advantages of this method is that the uncertainties in climate model output often differ from one global climate model to another, as well as from one emission scenario to another, which may be improved. The composite technique may be used to improve the model prediction performance by averaging the climate simulation data statistics from more than one global climate model (GCM). It is necessary to prioritise the contributions of the GCMs according to their location-specific or model-specific balance in climate sensitivity. The local-scale change in climatic variables is forecast by regridding the GCM grid-box resolutions to match the GCM grid-box resolutions. There are a number of different traditional approaches that may be used to extract local data from a composite method.

1.6 Change Assessment

Because of the many floods and droughts that have occurred over the past few decades, the evaluation of changes in global climatic conditions has become increasingly important. The relevance of weather factors such as precipitation and temperature in tracking changes in climatic conditions has prompted the majority of researchers to concentrate on them. The majority of climate studies are conducted on a global scale and are therefore unsuitable for climate assessment at the regional level. As a result, regional-scale climate studies are carried out in order to draw definite conclusions on changes in the local climate. Historical climate data evaluation gives clarity in observed climate statistics and allows for comparison with expected future scenarios for climate change research. Climate studies have benefited from a rise in the number of observation stations and the widespread use of multiple global climate models [12], which are numerical simulations of the world's climate [13]. Several climate institutes created a variety of global climate models (GCMs) based on a variety of beginning and boundary conditions. The outputs of climate models are inherently unreliable, making them unsuitable for use in local-scale climate investigations. The selection of appropriate global climate models (GCMs) that perform effectively in a specific location is thus another difficult challenge in climate change research [13].

A more accurate simulation of the future can be obtained by addressing errors in large-scale global climate model outputs with the assistance of regional-scale observed climatic data. In order to deal with the issue of geographical variability, several strategies have been employed, and each of these methods has its own set of advantages and disadvantages when it comes to forecasting future situations. In various methods, future scenarios can be projected with historical data equivalences between different

2. LITERATURE REVIEW

The current part presents and discusses an overview of previous research activities undertaken on climate change and downscaling of global climate models (GCMs). Climate models, general circulation models, the credibility of GCMs, statistical downscaling, dynamic downscaling, weather parameters, streamflow monitoring and forecasting, and the implications of climate change on hydrology are all discussed in detail. Among the topics covered are a review of statistical downscaling research and climate change effect assessment studies.

It is defined as a long-term shift in the statistics of atmospheric variables across a certain region when discussing climate change. Urbanization and increased industrial activity have resulted in changes in the concentration of Greenhouse Gases (GHGs) in the atmosphere as a result of global warming. Global greenhouse gas emissions, as well as the severity of possible risks and consequences, according to the IPCC's Fifth Assessment Report (AR5) (IPCC 2014), continue to be unmanageable, particularly for poor nations with little capabilities to mitigate climate change (IPCC, 2014). The climate change caused by CO2 has had a significant impact on the world and is expected to grow much more severe in the near future. Furthermore, it is critical to quantify climate change consequences throughout the world in order to provide evidence to decision-makers and other stakeholders. Several climate-related studies have been carried out in recent decades to assess the effects of climate change on hydrological structures [14]. In hydrological regimes, rainfall is an important component that influences how the regime changes [15]. Ground-based numerical models that mimic the atmosphere of Earth based on various boundary conditions are known as global climate models (GCMs).

GCMs are well-known for their superior capacity to accurately describe climatic variability on a wide scale. Climate studies at the regional scale, on the other hand, are essential for the development of local policies and activities. While large-scale projections using GCMs were the focus of the majority of research, the Coupled Model Intercomparison Project Phase 3 (CMIP 3) GCMs were employed in the majority of 4

investigations. In comparison to the current CMIP5 models, these models had revised future scenarios and were far older matched. In recent years, research that employed CMIP 5GCM argued that judgments made using CMIP 3 were superior to those made using CMIP 5GCM. It is not possible to employ GCMs directly for regional level investigations without first going through a downscaling procedure [16]. Many climate institutions have developed many global climate models (GCMs) based on boundary conditions and produced a variety of future scenarios in recent years. The simulation of long-term stable representations in GCMs is a serious challenge since they are extremely sensitive to changes in surface conditions and radiation concentration. While global climate models may be used for climate research, they cannot be utilised directly for local or regional climate studies, which are common in many cases. Previous research has suggested that downscaling strategies can be used to overcome the issues associated with generalised linear models (GCMs) in climate change investigations [7].

There are two basic approaches for downscaling GCM models: dynamic downscaling and statistical downscaling. Dynamic downscaling is the more common method. Dynamic downscaling necessitates the use of powerful computing resources and takes a significant amount of time. As a result of considering climate change information from regional-scale data, the dynamic downscaling approach produces a number of equations that represent spatial augmentation. For this approach to work, there is no need for input from observation data in order to make changes to the model data.

A regional climate model is the name given to the data obtained using this approach (RCM). If the GCM simulation output is compared to the local-scale or station-wise observed data using various statistical and mathematical models, a statistical downscaling model can be constructed, which uses less processing resources and is more effective [10, 11, 12, 13]. When compared to actual climate data, a downscaling model has reduced variance and bias, which increases its accuracy. This is because global climate models (GCMs) have systematic flaws [11]. The statistical downscaling approach is primarily concerned with obtaining information from coarse-resolution atmospheric variables produced by global climate models (GCMs). According to a large number of studies, the performance of dynamic and statistical downscaling was equivalent in regional-scale climate studies compared to historical time-scale climate research. [17]. When the dynamic and statistical downscaling methods were compared in detail, the results revealed that neither method performed significantly better than the other (see Figure 1). Many studies have found that the performance of dynamic and statistical downscaling was equivalent in regional-scale climate studies spanning historical time scales [2], and this has been confirmed by other investigations.

When developing the statistical downscaling approach, it was assumed that the statistical link between historical observed climate and historical GCM model output would stay constant in future climate forecasts. It is the most often used downscaling approach, and it has proven to be extremely successful in downscaling large scale GCMs for application in local-scale climate change research [8, 9].

The Indian subcontinent has seen an increase in the number of studies on climate change and hydrology that have been conducted over a long period of time [22]. The majority of the study, on the other hand, concentrated on large-scale prediction utilising the Coupled Model Intercomparison Project Phase 3 (CMIP3) global climate models. When compared to the current CMIP5 models, these CMIP3 simulations showed wildly different future scenarios and were far older. Previous study has suggested that the model's dependability is site-specific and anomalous in its capacity to recognise a climatic trend [13, 14]. Climate change-related parameters such as precipitation (pr), maximum temperature (tasmax), minimum temperature (tasmin), and near-surface air temperature (tas) were among the primary parameters recommended by the Intergovernmental Panel on Climate Change (IPCC) in The Fifth Assessment Report (AR5) on the scientific, technical, and socio-economic information on climate change (IPCC, 2014).

The Turning test, created in 1950 by Alan Turning, is the first Artificial Intelligence (AI) programme, and it was designed to measure the intelligence of a computer. It is still in use today. The term "Artificial Intelligence" was coined in 1955 by John McCarthy, a well-known computer scientist who was at the time. Artificial intelligence (AI) is a part of computer science that enables computers to comprehend, learn, reason, and make judgments on issues that need human intellect

In 1959, Authur Samuel invented the phrase "Machine Learning" (ML), which refers to a technique to achieving Artificial Intelligence that is still in use today. In Artificial Intelligence, Machine Learning (ML) is a component that allows the computer to enter a state of self-learning without having to be educated or programmed by the user. It is a straightforward concept that, rather than teaching a machine everything, it is preferable to train it on how to learn on its own in the first place. Overall, Machine Learning is used to investigate classification, regression, mining association rules, pattern recognition, and clustering among other things. 5

3. PROBLEM DEFINITION

The Vaitarna river basin is the subject of this investigation. Located in the region north of Mumbai and south of the Tapi River, the river Vaitarna is one of the west-flowing rivers in the region. Located in the Sahyadri mountain range in the Nasik region of Maharashtra State, the river begins its journey near Trimbak and travels around 120 kilometres westward before reaching the Arabian Sea. East longitudes of 72° 45' to 73° 35' and north latitudes of 19° 25' to 20° 20' define the boundaries of the Vaitarna basin in India. In the Triambak-Anjaneri range, the Vaitarna's headstreams spring on the southern slopes of the mountain range and merge to produce three southward-flowing streams that join together to form the Vaitarna a few kilometres north of Dapure.

The Vaitarna takes a highly meandering route southward from here, passing through Zarwad (Jarwar) Budruk. It is joined by its tributary Alvand nadi, which has its origins in the same Triambak Anjaneri range on the southern slopes of the Bhaskargad, Phani dongar, and Harish dongar, which serve as a natural boundary between these and the headstreams of the Val river, which flows northwards.

As it approaches the confluence with the Alvand river, the Vaitarna bends and runs practically straight in a south-southwest direction, carving a deep valley in the Sahyadri mountains. A minor tributary that flows from the northwest to the south-east via a canyon follows the path of the Vaitarna through a valley that is extremely deep carved. The Pinjal, Ganjai, Surya, Daharji, and Tansa rivers are the major tributaries of the Vaitarna river. The catchment area of the Vaitarna basin is entirely contained within the Maharashtra districts of Thane and Nasik. Before it reaches the Gulf of Khambhat, the Vaitarna drains an area of around 2019 square kilometres. There is just one hydrological monitoring site operated by the Central Water Commission (CWC) on the Vaitarna river at Durvesh, which is located upstream of the confluence of the Surya and Tansa streams. The following are the most significant difficulties encountered throughout the research:

State governments are in charge of dealing with water-related issues because the Vaitarna river basin is divided between several different states.. The challenges surrounding interstate water supply have a long history. Climate change will accelerate the progression of these concerns, necessitating the development of a plan for basin-level water resource management.

In the next decades, the amount of water used for irrigation techniques would decline, while the quantities of water used for home consumption and industrial use will rise, according to the World Bank. All states are expected to establish their own water policies, which must be within the defined framework of the national water policy, due to the fact that water resources management and development are the responsibility of each state.

Drinking water comes first, followed by irrigation, then hydropower, then ecology, then industry, and finally navigation. This is the order established by national water policy. Consumption of water for drinking and agriculture are the two most prominent water demands in the Vaitarna river basin.

Agriculture is the primary source of income for the vast majority of the people who live in the basin's economic sphere. When comparing satellite images of the Vaitarna river basin between 1984 and 2021 side by side, it has been stated that the vegetation in the Vaitarna river basin has been reduced by up to 40% during the last three decades.

4. PROPOSED METHODOLOGY

The approaches used to achieve the aims of the research, namely the extreme gradient boosting decision tree methodology, are described in detail below. The first phase will consist of the collection and pre-processing of daily observed station data as well as historical simulated CMIP GCM data, as described above. Because various institutes use different spatial resolutions, the selected GCM gridded data will be re-gridded to a common scale. A technique called bicubic spline interpolation is being investigated for the purpose of obtaining spatially interpolated station wise daily historical model-generated data from re-gridded global climate model data [23]. Later, the datasets will be transformed into time series data, which will be used to measure non-parametric trends.

Following the completion of the processing phases, the final aim will be achieved.

- Data Collection
- Data Pre- Processing
- GCM Ranking
- Statistical Downscaling
- Future Climate Projection
- Hydrological Model
- Stream Flow Projection
- Change Assessment

An illustration of the general research workflow of the study is provided in the following flowchart: 6

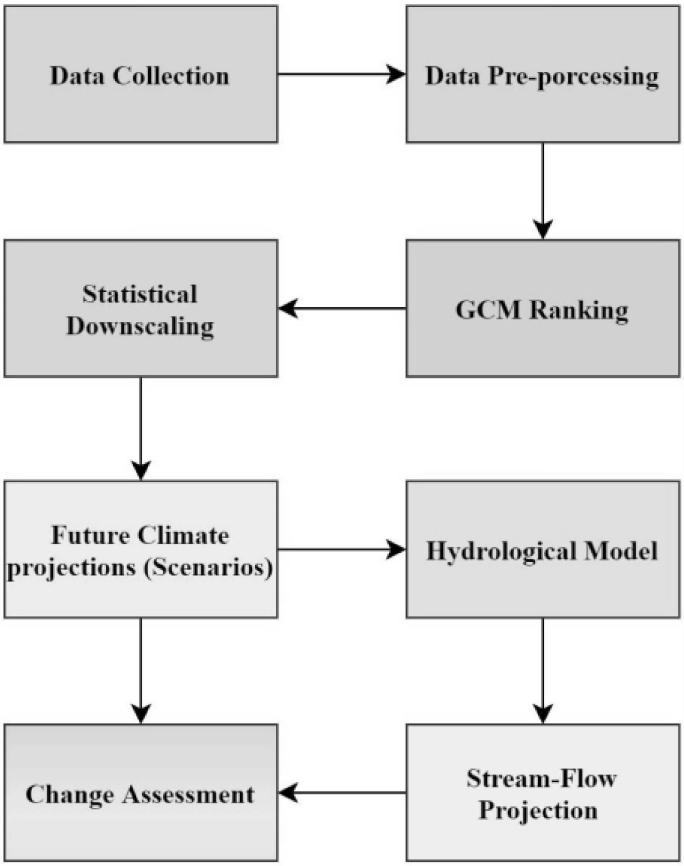

Figure 1: A flowchart explaining the general research workflow

Initially, the gathered observed and GCM datasets will be converted into daily time-series data, which will be used for forecasting. Furthermore, it is necessary to deal with the missing values in the time-series meteorological parameters and discharge measured at the station. Interpolation of IMD gridded data to station level data will be performed using the Bicubic Spline Interpolation (BCSI) approach in order to acquire uninterrupted reference data for the IMD. Later on, this information is utilised to execute a time-series data imputation for the observed station level data using the data from the observation. General circulation model datasets from diverse institutions have varying geographic resolutions, making it difficult to deal with the data as a whole. As a result, a technique known as re-gridding will be employed to rescale all of the data to a common (maximum) resolution using a single dataset.

This project will assess and rank twenty-six CMIP5 global climate models and sixteen CMIP6 global climate models by comparing historical observed data with GCM generated data using various performance evaluation approaches, as described below. In order to assess the credibility of Global Climate Models (GCMs) in simulating regional climate change, the following approach must be followed:

The collection, extraction, and re-gridding of the selected CMIP GCMs datasets (historical and future scenarios) to a common scale are the primary objectives of this project.

Historical observed weather records from thirty-five chosen stations were obtained, and missing data was imputed using the inverse distance weightage interpolation approach.

The historical and prospective datasets for chosen stations were retrieved from the GCMs under consideration and translated to time-series format for analysis.

In order to evaluate the model skill score, the following parameters were generated for the historical datasets: Entropy Gain, Gain Ratio, Symmetrical Uncertainty, Mann-Kendall Trend Test, Sen's-Slope Estimator Test, Normalised Root Mean Squared Error, and Percentage Bias for each of 35 stations.

The final rank for each model will be calculated using compromise programming once the ranks for each of the previously described performance assessment methodologies have been determined.

By executing several rounds, the extreme gradient boosting approach transforms a group of poor learners into a group of strong learners. By minimising the mean squared error (MSE) of the prediction, the algorithm's primary goal is to train a model to predict the target [20], which can then be used to teach other models.

It is the purpose of this study to carry out the procedures required in the selection of a better model for statistical downscaling of GCM at a local scale.

The suggested framework for developing a data-driven hydrological model for simulating and forecasting streamflow in the Vaitarna river basin would be used in the development of the model.

The suggested downscaling model was used to estimate future climatic conditions utilising the CMIP5 and CMIP6 GCM future scenarios, as well as the CMIP6 GCM future scenarios.

The time scale of future predicted data is divided into three time slices: near-future, mid-future, and far-future. The near-future time slice is the shortest of the three time slices. A comparison of historical observed data with future downscaled scenarios data is performed in order to determine the change factors between the historical and future situations. 7

5. CONCLUSION

Statistics downscaling utilising a variety of well-known machine learning approaches will be compared with the suggested extreme gradient boosting decision tree methodology in this study, among other things. Using data from daily observation stations situated inside the research zone, a historical simulation of a global climate model (GCM) is utilised to downscale local climate. When comparing model performance, it should be noted that the mean-variance for the suggested EXGBDT model will be about 15 percent to 18 percent, which is better than the mean-variance for the other models under consideration.

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Phosphorylation state of S6K1 is redundant for its interaction with F actin

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Running Title: Domain specific Interaction of S6K1

Abstract :-

Ribosomal protein S6 kinase 1(S6K1) is an evolutionary conserved kinase that is activated in response to growth factors and viral stimuli to influence cellular growth and proliferation. The serine/threonine kinase, S6K1 which is a downstream effector of phosphatidylinositol 3- kinase / Akt pathway, is frequently activated in certain types of cancers. S6K1 acts as an actin filament cross linking and as a Rho family of GTPase activating protein. We here present the evidence for domain specific interaction of S6 kinase 1 (S6K1) with filamentous actin or F actin. We show for the first time that ("NH2-146 / "CT240 a. acid) region of S6K1 is actually responsible for its discrete binding to F actin. We also provide evidence that the binding of S6K1 to filamentous actin is phosphorylation independent and not facilitated by any other protein rather direct interaction and we couldn't observe any interaction of S6K1 for monomeric actin (G actin).By a time course experiment, we could found that the presence of S6K1 did not affect the kinetics of spontaneous actin polymerization but it enforces stability in F actin by cross linking it and rendering it more stable in the form of multifilament bundled actin. Using electron microscopy we found that these closely apposed bundles were often slightly curved, suggesting flexible cross linking. We further observe that S6 kinase 1 continued to exhibit sensitivity towards filamentous actin that remained unaffected by deletions compromised for ("NH2-146 / "CT104) or ("NH2-46) / "CT104) ("NH2-146) or ("NH2-46) or ("CT104). By computational study we found that ("NH2-146 / "CT240 a. acid) region of S6K1 is rich in hydrophobic amino acids and has predominant a helical and coiled coil structure which serves as a structural basis for some of the actin binding proteins. These data together with the ability of the S6K1 to bind to F actin indicate that binding is phosphorylation independent, direct and facilitated by the ("NH2-146 / "CT240 a. acid) region of S6K1.

Background: S6K1 which is a downstream effector of phosphatidylinositol 3 kinase / Akt pathway is frequently activated in certain types of cancers and acts as an actin filament cross linking protein.

Results: We present evidence for domain specific interaction of S6K1 with filamentous actin. We could for the first time show that (—$NH_{2\text{-}146}$ / —CT_{240} a. acid) region of S6K1 is actually responsible for its discrete binding to F actin. Binding of S6K1 to filamentous actin is phosphorylation independent and not facilitated by any other protein rather it is a direct interaction.

Conclusion: These data together with the ability of the S6K1 to bind to F actin indicate that binding is phosphorylation independent, direct and facilitated by the (—$NH_{2\text{-}146}$ / —CT_{240} a. acid) region of S6K1.

Significance: The (—$NH_{2\text{-}146}$ / —CT_{240} a. acid) region of S6K1 may serve as a therapeutic target for the treatment of certain forms of cancers.

SUMMARY

Ribosomal protein S6 kinase 1(S6K1) is an evolutionary conserved kinase that is activated in response to growth factors and viral stimuli to influence cellular growth and proliferation. The serine/threonine kinase, S6K1 which is a downstream effector of phosphatidylinositol 3- kinase / Akt pathway, is frequently activated in certain types of cancers. S6K1 acts as an actin filament cross linking and as a Rho family of GTPase activating protein. We here present the evidence for domain specific interaction of S6 kinase 1 (S6K1) with filamentous actin or F actin. We show for the first time that (—$NH_{2\text{-}146}$ / —CT_{240} a. acid) region of S6K1 is actually responsible for its discrete binding to F actin. We also provide evidence that the binding of S6K1 to filamentous actin is phosphorylation independent and not facilitated by any other protein rather direct interaction and we couldn't observe any interaction of S6K1 for monomeric actin (G actin).By a time course experiment, we could found that the presence of S6K1 did not affect the kinetics of spontaneous actin polymerization but it enforces stability in F actin by cross linking it and rendering it more stable in the form of multifilament bundled actin. Using electron microscopy we found that these closely apposed bundles were often slightly curved, suggesting flexible cross

linking. We further observe that S6 kinase 1 continued to exhibit sensitivity towards filamentous actin that remained unaffected by deletions compromised for (—NH_{2-146}/ —CT_{104}) or (—NH_{2-46}) / —CT_{104}) (—NH_{2-146}) or (—NH_{2-46}) or (—CT_{104}). By computational study we found that (—NH_{2-146}/ —CT_{240} a. acid) region of S6K1 is rich in hydrophobic amino acids and has predominant á helical and coiled coil structure which serves as a structural basis for some of the actin binding proteins. These data together with the ability of the S6K1 to bind to F actin indicate that binding is phosphorylation independent, direct and facilitated by the (—NH_{2-146}/ —CT_{240} a. acid) region of S6K1.

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Pretreatment of Lignocellulosic Material - Bagasse for Ethanol Production

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Abstract :

Lignocelluloses are most viable raw materials which can be utilized for the fermentative production of ethanol. However, to convert them for biodegradation / hydrolysis these need to be pretreated by various methods. In the present study, biodegradability /digestibility of bagasse has been identified using different physical and chemical methods. The reagents used for pretreatment of bagasse are NaOH, H_2SO_4 and HCl, whereas grinding, milling, steam explosion have been used as physical methods. A significant removal of lignin has been obtained in all the methods used, which ranged from 32-85%. Alkali treatment and steam explosion gave best results, but hydrochloric acid was comparatively less effective and required more time and drastic experimental conditions. Sulphuric acid too was effective in removing lignin and increasing the digestibility of cellulose.

Keywords: *Lignocellulosic waste, Bagasse, Pretreatment, Ethanol etc.*

Introduction :

Fossil fuels including crude oil have been the major resource to meet global energy demand but these are continuously diminishing and at the same time prices are increasing at a fast pace. At present global annual demand of petroleum products is 17000 million metric tons.

Indian requirement of petroleum products is 120 MMT out of which major portion is imported at the cost of heavy outflow of foreign exchange. Ethanol is viewed as an alternate fuel which could partially or fully replace gasoline. Use of ethanol made from lignocellulosic biomass as a renewable transportation fuel could potentially offer many benefits.[1]

Compared to fossil fuels, the bio-ethanol contribution to the net emission of CO_2 is low[2]. Blended with gasoline, combustion of ethanol in car engines lower the emissions of many pollutants such as CO, hydrocarbons and volatile organic compounds[3]. Further more, ethanol increases the octane number[4].

The lignocellulosics comprised of cellulose and hemicellulose bound together by a third component lignin can be utilisied to produced ethanol[5]. From the point of view of ethanol fermentation, they are hard to work with two reasons[6]. First, the lignin protects the cellulose and hemicellulose from the attack by enzymes[7]. Second, when do manage to reach the cellulose and hemicellulose they are hindered by the crystalline structure of these molecules[8].

The low degradation rate, as well as low extent of conversion of native, untreated lignocellulosic inhibits the development of an economically feasible hydrolysis process. Several pretreatment methods are used which increase of porosity, reduction of cellulose crystallinity, removal of lignin and hemicelluloses[9], to make the carbohydrates available for further transformation process[10].

In the present study, different physical and chemical pretreatment methods have been adopted for delignification of bagasse.

Materials and Methods

Raw material (Substrate)

The bagasse obtained from Modi Sugar Factory, Modinagar. The bagasse was washed thoroughly for removal of sugars from bagasse fiber, dried under sun and further in oven.

Pretreatment Methods

The pretreatment of bagasse was done using different physical (grinding, milling and steam explosion) and chemical (NaOH, H_2SO_4 and HCl) methods.

Grinding

The oven dried (90°C) bagasse was cooled and homogenized in an electric blender machine at 5000 rpm for ten minutes at intervals of 2 min. each. The finely powdered bagasse was then sieved to 35, 65 and 85 mesh sizes using Tyler sieves. The grinding at above rpm breaks the lignin-cellulose complex present in bagasse. The powdered bagasse was analysed for decrease in lignin content.

Milling

Dried bagasse was cut into small pieces and then milled through milling machine for 3-4 times at time interval of 5 to 10 minutes each. This milled bagasse was analysed for lignin, hemicellulose and cellulose to assess decrease in lignin content.

Steam Explosion

In this method, dried bagasse kept in an autoclave 121°C, 15 psig of steam for 15, 30 and 45 minutes without adding any chemical. The swelled bagasse after treatment with steam was analysed for any change in its constituents including lignin.

Alkali (NaOH) Pretreatment

NaOH of different concentrations (4, 6, 8 & respectively) was used for different periods of time. For such treatment, 10 g of bagasse was mixed with 100 ml solution of various concentration of NaOH at 40°C for a period of 5, 10, 20, 40, 90, 120 and 140 minutes after which it was washed with water thoroughly, dried and analysed for various constituents.

Acid Pretreatment

The sulphuric acid of different concentrations ranging from 1 to 10% was used at 40°C for a period of 20 minutes, 2 hours and 20 hours. The hydrochloric acid at concentrations of 3, 6 and 9 % was used at 90°C for a period of 30, 60 and 120 minutes. For these studies 10 g bagasse was mixed with 100 ml of acid solution of different concentrations and kept at 90°C for required period of time.

In general, for all the pretreatment methods, 10 g dried bagasse was pretreated by different agents, washed thoroughly with water, dried and digested with 1% NaOH for 1 hour for extraction of lignin. The residual bagasse was analysed for hemicellulose and cellulose content. All the experiments were done in triplicate and the matching values are reported.

Analytical Methods

Moisture was determined by drying bagasse in an oven 90°C over night and observing the change in its weight after cooling. The procedure was repeated to a constant weight.

For the extraction of lignin, dried sample (10 g) was mixed with 1% NaOH (180 ml) and then digested in an autoclave at 121°C for 1 hour. The digested bagasse was washed with distilled water and washings were used for lignin precipitation by 5N HCl. The precipitated lignin was filtered and the filtrate as well as residual bagasse was used for analysis of hemicellulose and cellulose. The precipitated lignin was estimated by Denis reagent method [11].

Hemicellulose content was determined by taking residual bagasse in 10 ml of acetic-nitric acid reagent and refluxed for 30 minutes on a water bath, then cooled and filtered. The filtrate was used for hemicellulose estimation by Orcinol reagent method [12].

0.2 g of residual bagasse left after hemicellulose extraction was dissolved in 4 ml of 67% H_2SO_4 at room temperature for 30 minutes and used for the analysis of cellulose by Anthrone reagent method[13].

Results and Discussion

The lignocellulosic substrates contain lignin which acts as a cementing material for cellulose. This strong bond needs to be softened so as to free the cellulose for any enzymatic, microbial or chemical utilisation. This was done through physicals, chemicals methods which help free part of lignin or soften the bond between cellulose, hemicelluloses and lignin in lignocellulosic since higher the quantity of lignin in any substrate, the more it will be resistant towards any kind of degradation. The pretreatment of bagasse by grinding, milling, steam explosion, alkali and acids have been presented in Tables-1 to 6.

The analysis of bagasse of different sizes showed an increase in the cellulose content of powdered bagasse as the mesh size increased. The maximum value of cellulose contents (42.82%) was obtained with mesh size of 85 against a control value of 41.28% (Table 1). However, hemicelluloses content showed a reverse trend and the content of hemicelluloses decreased with increase in mesh size. The lignin content in the ground bagasse showed continuous decrease and the values were 22.90, 21.70 and 18.30% in bagasse of size 35, 65 and 85 mesh respectively against a control value of 26.98%. Thus lignin

removal varied from 14.67% to 32.17%, the maximum being with 85 mesh size bagasse powder. This showed that lignin removal is more with smaller bagasse particles due to larger surface area to volume ratio thus making it more accessible for further utilisation.

In this study bagasse was milled at time intervals of 15, 35 and 75 minutes, cooled and analysed for cellulose, hemicellulose and lignin content. The results similar to those with grinding were obtained. Here too, hemicellulose and lignin decreased from 8.84 to 6.24% and 26.06 to 16% respectively causing lignin removal to an extent of 40.6% in 75 minutes (Table 2). This decrease in lignin content in attributed to compressive force of milling causing a decrease in degree of polymerization in the structure of lignin and thus reducing the cohesive force between lignin and cellulose.

In steam explosion, bagasse was steamed in an autoclave at 121°C at a pressure of 15 psig for 15, 30, 45 minutes. This pretreatment remarkably increased cellulose content to 50.90% from a control value of 41.28% and a considerable decrease in hemicellulose and lignin content was observed with maximum lignin decomposition of 57.38% when bagasse was treated under those conditions for 45 minutes (Table 3). Steam explosion treatment removes lignin to a large extent as a result of swelling of bagasse which becomes more of a pulpy product from which lignin and cellulose are easily extractable. Hence, steam explosion of bagasse is a very effective pretreatment method and it provides conducive environment for microbial/ enzymatic reaction and/or cellulose hydrolysis.

Alkali treatment of bagasse resulted in increased cellulose content and significant decrease in lignin content at all the concentrations and at all time intervals (Table-4). The exposure of bagasse to higher concentrations of alkali and for longer periods of time provided still better results. The cellulose content in treated bagasse was treated with 10% NaOH for a period of 140 minutes. However, it is seen from the Table-4 that the alkali treatment is very effective method for removal of lignin from bagasse the lignin removal was as high as 84.58% obtained by using 8% alkali for 140 minutes, which is higher than reported earlier[14]. At other time intervals too, lignin removal was significant (over 67% in 40 minutes) at all concentration of alkali.

It was observed that treatment of bagasse by all alkalis for longer duration at nearly all concentrations. This may be attributed to the fact that the presence of alkali for a long period in bagasse causes better swelling of bagasse resulting into loosening/softening of cellulose-lignin matrix, leaving the lignin which consequently gets dissolved in alkali. During delignification, the relative cellulose content increases but holocellulose content decreases due to decrease in hemicelluloses content in case of all pretreatments done.

Treatment with 1% sulphuric acid is more effective in removing lignin than 10% sulphuric acid especially when bagasse was treated duration of 20 and 180 minutes. The treatment by 10% sulphuric acid even for 1200 minutes did not improve delignification. Mild sulphuric acid has been used by several workers for the pretreatment of lignocellulosics[15].

The pretreatment of bagasse with hydrochloric acid at 3,6 and 8% concentrations has been done at 90°C for 30, 60 and 120 minutes respectively. The pattern of results was similar to those obtained with H_2SO_4. The cellulose content increased while lignin and hemicellulose content of bagasse decreased (Table 6). However the extent of lignin removal by HCl was on the lower side. The highest removal of lignin (59.71%) was seen at 6% concentration of HCl at a treatment time of 120 min. 8% HCl treatment also produced similar results.

The data given above show that bagasse, like other lignocellulosics, can be effectively pretreated by various physical and chemical means for the removal of lignin and to increase the digestibility of cellulose. Among the above methods, steam explosion and alkali treatment gave the best result. Milling and grinding also resulted in partial removal of lignin from bagasse. Nearly similar results were obtained in case of acid treatment. The H_2SO_4 treatment was found to be simple as it could be done at a temperature of 40°C while hydrochloric acid treatment was effective at higher temperatures only.

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Mesh size	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Percent Reduction in Lignin Content
Control	41.28	25.74	26.98	-
35	41.80	15.94	22.90	14.67
65	35.60	24.94	21.70	19.57
85	42.82	18.84	18.30	32.17

Table 1: Delignification of Bagasse by Grinding.

Time* (min)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Percent Reduction in Lignin Content
Control	41.28	25.74	26.98	-
15	44.80	8.84	26.06	3.40
35	46.86	7.14	18.70	36.38
75	50.10	6.24	16.00	40.60

Table 2: Delignification of Bagasse by Milling.

Time* (min)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Percent Reduction in Lignin Content
Control	41.28	25.74	26.98	—-
15	50.90	19.94	17.52	35.10
30	49.80	19.14	13.50	50.00
45	47.40	16.74	11.72	57.38

Table 3: Delignification of Bagasse by Steam Explosion in Autoclave at 121°C.

Time* (min)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Percent Reduction in Lignin Content
Control	41.28	25.74	26.98	—
1 %				
20	48.60	9.24	12.70	52.92
120	49.70	12.94	12.40	54.40
1200	38.40	5.94	12.50	53.66
10 %				
20	41.30	10.54	14.90	44.77
12	45.60	14.21	16.60	38.47
1200	40.10	9.74	16.88	37.43

Table 5: Delignification of Bagasse with Different Concentration of H_2SO_4 at 40°C.

Time* (min)	**Cellulose (%)**	**Hemicellulose (%)**	**Lignin (%)**	**Percent Reduction in Lignin Content**
Control	41.28	25.74	26.98	-
3 %				
30	35.66	8.76	21.20	21.42
60	36.68	5.89	19.40	28.09
120	42.98	4.48	16.20	39.95
6 %				
30	41.16	10.86	18.61	31.02
60	43.89	9.20	17.77	34.13
120	46.44	6.89	10.87	59.71
8 %				
30	45.01	10.68	19.58	25.94
60	45.46	8.55	25.94	30.02
120	45.90	5.89	14.16	47.51

Table 6: Delignification of Bagasse with Different Concentration of HCl at 40°C.

Time* (min)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	% Reduction in Lignin Content
4 % NaOH				
Control	41.28	25.74	26.98	-
5	37.62	18.00	20.24	24.61
10	39.80	13.64	15.10	44.03
20	40.55	10.38	10.72	60.26
40	42.86	8.76	9.24	65.75
90	46.38	8.22	8.80	67.38
120	46.98	7.78	8.37	68.97
140	48.40	7.34	7.90	70.71

6 % NaOH				
5	39.20	9.36	20.00	25.87
10	44.00	8.30	15.20	43.66
20	47.11	7.68	10.84	59.82
40	47.18	6.42	9.00	66.64
90	47.44	5.70	7.21	73.27
120	47.98	4.18	6.40	76.27
140	49.87	3.72	5.80	78.80
8 % NaOH				
5	38.62	13.00	19.44	27.97
10	39.48	11.39	14.26	47.14
20	40.78	10.88	10.58	60.78
40	43.70	8.67	8.89	67.04
90	44.23	7.12	6.79	74.83
120	44.64	5.98	5.20	82.72
140	50.87	4.66	4.16	84.58
10 % NaOH				
5	44.38	7.18	20.22	25.05
10	45.49	6.40	15.89	41.10
20	47.40	5.88	12.98	51.89
40	48.56	5.11	12.00	55.52
90	49.28	4.86	9.10	66.27
120	50.59	4.32	6.98	74.12
140	51.40	3.90	6.77	74.98

Table 4: Delignification of Bagasse with Different Concentration of NaOH.

*Treatment time

Random Forest Approach for Malware Detection Using Machine Learning

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Abstract :

Malware is known for its potential network and data breach quality, and most of the time it remains undetected even using anti-malware tools because most of the anti-malware tools are signature-based which are ineffective to deal with much-forwarded malware. Malware programmes that can interfere with and even damage user files can easily infiltrate computers. Many users are unaware of how malware programmes enter a computer, one of which is via a network containing the malware progryamme. To address this issue, this study discusses malware detection based on network traffic and categorises these types of networks based on their groups so that they can assist in determining whether or not the network contains malware. This study proposes to test the efficiency of the random forest algorithm with contemporary algorithms by designing a machine learning approach for malware detection that employs the Random Forest classifier in malware detection. We used the Kaggle Microsoft malware classification challenge dataset for this purpose.

Keywords : Malware, Infiltrate, signature-based, network traffic, Kaggle dataset

1. *Introduction :*

Extensive use of cyber-physical systems in the networking domain necessitated the need for a strong protection mechanism as frequent attacks by advanced ransomware put in peril the entire computer network system and user data. Computer systems play an important role in the day-to-day operations of businesses and government organisations. Attacks involving data centre hacking and compromise of public sector trade secrets are becoming more common. The protection of systems and highly valuable data from malicious activities has emerged as a major goal for the implementation of complex malware detection techniques. The proposed framework includes a Machine Learning analytics platform for analysing the process list data structure from the virtual environment [1].

Using Machine Learning techniques, many novel methods of malware detection have emerged in the research literature over the years.

In this paper, we propose a Machine Learning classifier/ensemble-based method for detecting and monitoring malware behaviour. To predict potential cyber threats, the behavioural data is analysed using the traditional Machine Learning algorithm Random Forest. This method classifies a given sample data as benign or malware with high accuracy and low computational overhead. The goal of this research is to find out the degradation impact of malware on computer systems and networks along with the efficiency of Random forest algorithms over other available algorithms.

2. Objectives :

i) To study the literature and take an overview of relevant research work that took place in the domain of intrusion detection using the ML approach.

ii) To make classification of different algorithms, to check relative advantages over each other in certain conditions when it comes to classifying malware feature.

iii) Validation of results with the help of key parameters such as F1 score, Precision, and Recall in comparison with other state of art models in a similar domain..

iv) Keep malware attack detection strategy in a multi-layered (Random forest classifier) synergy, to handle the sophisticated malware attacks [2].

v) Understand the role of machine learning in cyber threat protection with a modern machine learning approach.

vi) To make Quantitative and Objective analysis by using evaluated parameters, and make a comparison between static and dynamic methods of contemporary methods of intrusion detection using ML.

3. Hypothesis :

In today's rapidly growing cyber-physical system (CPS) aided digitally operated world need felt to have robust malware detection mechanisms as we are going on to rely more on digital devices. Be it computer systems or mobile phones those are operating on various platforms, becoming more prone to malware attacks. The area of research aims to address some criticalities in present research work and aims to provide holistically, a malware detection framework using ML (Machine learning) and RF (Random Forest) approaches.

By using ML aided RF approach the malware detection range of advantages can be assured such as –

i) Random forest classifier ensures minimal variance with multiple tree generation, without bias.

ii) The algorithm is resistant to overfitting, as it produces different data sets without prior matching with already produced one, hence giving reliable future prediction probability.

iii) Frequent patterns will be extracted by using data mining from the available database containing data of interest.

The study will also examine the habitancy of ransomware, their pattern and the extent of infestation with different platforms and CPS, as every ransomware family has sort of common features which will give us prior knowledge to design a holistic malware detection mechanism. This research attempts to compare the random forest algorithm's effectiveness to that of modern methods by developing a machine learning technique for intrusion detection systems that uses the Random Forest classifier.

4. Literature Review :

While concluding the study review of the literature has been taken as follows –

Hwang 2020, proposed a two-stage ransomware model in which, that accommodated different behaviours of emerging ransomware, A mixed ransomware detection model with two stages, a Markov model, and a Random Forest model was proposed which focused on capturing the characteristics of ransomware, creating a Markov model using the Windows API call sequence pattern and then they built random forest model to the remaining data to keep false positive (FPR) and false negative (FNR) error rates under control [3].

Joshi et al. 2018, proposed a novel random forest classifier based malware detection approach to the list data structure, in which a sophisticated analytical premise is built on a database server, with R runtime and in-memory analytics providing scale and performance. Using the Random Forest classification algorithm, this platform analyses the process list data model captured on the VMI framework [1].

Khammas 2020, proposed a static analysis technique to build a model to detect ransomware in which. The significance of the proposed method was the elimination of the disassemble process through direct extraction of features from raw byte using frequent pattern mining, which significantly increased detection speed. For feature selection, the Gain Ratio technique was used, which revealed that 1000 features were the optimal number for the detection process. The study involved the use of a random forest classifier with a thorough examination of the effect of both tree and seed numbers on ransomware detection [4].

Galen et al. 2020, proposed an ANN-based approach that consists of neurons in a hidden layer and validation done with consistent accuracy, precision, recall, and F-1 score. To avoid the problem of overfitting, an accurate number of hidden layers and neurons are chosen. The study provided a comparison of ANN and Random Forest models of the Mirai malware detection dataset formed by merging Mirai and benign datasets about seven IoT devices. The dataset used in this study is the "N-BaIoT" dataset, which represents data from Mirai malware-infected features [5].

Sandeep H 2019, proposed In the study "Static Analysis of Android Malware Detection Using Deep Learning," it was stated that malware detection was detected with the Standard Neural Network structure used in the classification just before installing the application. The detection of software and the detection of proven version packages were detected with an accuracy rate of approximately 94.65 per cent, even before installing malware on the Android system, according to one of the main features of the proposed study. The data is extracted from the application permissions and converted into a vector. The study calculated an accuracy value of 94.64 per cent. The authors stated this accuracy value; they mention that data in malware detection applications can be regarded as a high accuracy rate due to the application's random behaviour and the variability of permissions in applications [6].

5. Methodology :

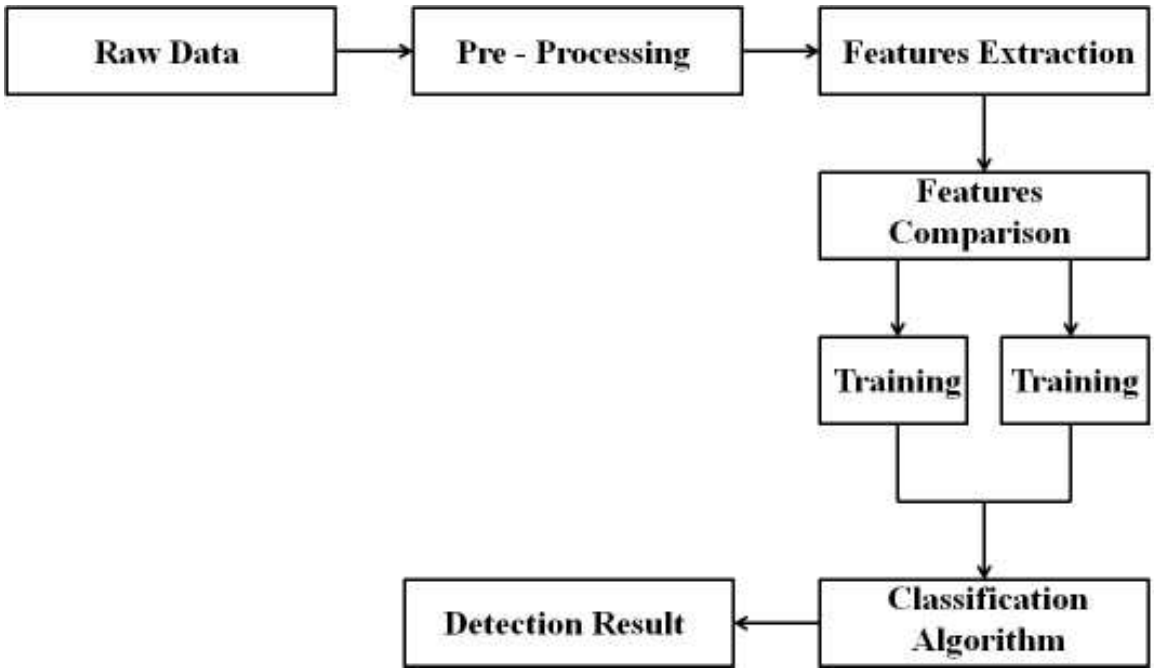

Fig 1. Process flow diagram (Proposed)

We used an ML-based Random forest classifier methodology in this area of research, which included dataset identification and data preparation, model development and evaluation, and an evaluation of deployed model performance over time from training. This last aspect is missing from many previous machine learning-based malware detection studies.

Pre-processing of data is a technique which ensures the transformation of raw input into an understandable format which primarily involves Data cleaning, Data integration, Data transformation etc. after pre-processing stage extraction begins with downloaded malware datasets meanwhile behaviour of malware can be detected by considering parameters such as Locking detector, Threatening text detector, and Encryption detector. Afterwards, feature comparison takes place between training and testing datasets. Then the final step of testing the datasets takes place by using a random forest algorithm. The Random Forest algorithm is a set of tree predictors in which each tree is determined by the values of a random vector sampled separately and uniformly across all trees in the forest.

6. Scope and Limitations :

6.1 SCOPE

i) Because of the accuracy and capability of modern computer systems to handle large datasets, random forest models are often the first choice and hold great promise for future work.

ii) With the further scope of the study, we can also experiment with the multi-scale classification of malware with respective families.

iii) With one step forward, we can also investigate the feasibility of deep learning models on evasive samples generated during feature extraction exercises.

6.2 LIMITATIONS

i) The primary limitation of the proposed system is – As a random forest due to its multiple tree generation; its efficacy is compromised by making the algorithm slow and ineffective for real-time predictions.

ii) Machine learning models can make the entire process of running the algorithm inefficient if models are not trained properly and also makes limited predictions.

iii) ML models sometime may require additional training to comply with extracted patterns and to draw conclusions to detect anomalies and malware identifications.

7. Conclusion :

The proposed mechanism of malware detection using an ML-based approach with a random forest classifier promises better vulnerability protection against potential malware. We propose to define potential results on countable parameters using the current state of art mechanism in comparison with methods that are currently in place. Outcomes demonstrate the effectiveness of a Random Forest machine learning classifier incorrectly classifying benign and malware processes. The goal of this framework is to detect cyber threats in virtualized computer systems and network.

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Evaluation Of Contraceptive Properties Of Hibiscus Rosa-Sinensis Flower Petals On Sex Hormone Profiles Of Male Albino Rats For Population Control.

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Abstract :

India being developing nation is still not able to cope up with the demerits of high population growth. There are a large number of techniques like contraception adopted for antifertility treatment and people are very apprehensive to use synthetic chemicals because of instant affects. But these have side effects. Hence to tackle these issues research is going on to use the herbal techniques that will be safe enough to use. In this research paper, Hibiscus rosa sinensis flower commonly known as Chinese Hibiscus will be used for study. This study is taken to explore the anti-fertility effects of ethanolic extract of the petals of Hibiscus rosa-sinensis on male wistar rats. Dosages of 150mg/kg and 300mg/kg of body weight of extract were administered on mature male rats for four weeks. Hormonal assays of serum were analysed to check levels of gonadotropin that is FSH, LH and testosterone. A strong antifertility effect was observed at the dose level of 300mg/kg body weight. Hibiscus rosa-sinensis treated rats showed increases in the levels of testosterone (0.37 ±0.07ng/ml and 1.30±1.00ng/ml), FSH (2.53±1.92¼Iu/ml and 2.33±1.03¼Iu/ml) and LH/ICSH (3.33±0.82¼Iu/ml and 3.37±0.43¼Iu/ml). Histological studies were conducted out to confirm the effects. Hibiscus rosa-sinensis could represent promising candidate for herbal contraceptive for men.

Keywords: Anti-fertility, Gonadotropins, Contraception, Testosterone, Hibiscus Rosa-sinensis.

Introduction :

Contraception is one of the proximate determinants of fertility. However, universal adoption of small family norm still remains a distant dream in India. Presently, fertility regulation is solely the concern of women. However, in most cultures of the world, women have been relegated to the background when important issues concerning the family are discussed; hence, the need for the man to join in regulating and controlling birth (Scanzoni and Szinovacz, 1980). Oral contraceptive pills for women are widely distributed and used but many do so only if the

husband has consented. On the other hand, available contraceptives for males include condom, a few hormonal drugs and an irreversible vasectomy. Before the sexual revolution initiated by the pill, men were a more integral part of family planning and other reproductive health concerns than they are today. There is an unmet need for effective male birth control, hence, efforts to develop safe and reversible male hormonal contraceptive methods are ongoing. Men considering contraception have few options: withdrawal, condoms, or vasectomy. While each of these alternatives has advantages for some users, associated drawbacks limit usefulness. Withdrawal and condoms have high typical-use first-year pregnancy rates (Fu et al, 1999; Gallo et al, 2003). To this end the Nigerian Government has set as its immediate objective the task of addressing unmet need for contraception in order to achieve the medium-term objective of bringing the total fertility rate down to replacement level by the year 2010. One of the 14 national sociolect-demographic goals identified for this purpose is to achieve universal access to information/counselling and services for fertility regulation and contraception with a wide range of choices. Nearly half of all Nigerian population who need family planning do not receive it. According to the National Population Commission (2000), one in every five married women (18%) can be said to have an unmet need for family planning, 13% for spacing purposes and 5% for limiting births. Hibiscus rosa-sinensis for this study are locally available and have also undergone some preliminary studies. Flower petals used in this study have been suspected to affect male fertility through interference with sperm production and maturation or with sperm storage or with their transport in the female genital tract hence the choice for this study.

Literature review.

Kartikar & Basu (1918, 1933) for the first time compiled the work done on Indian medicinal plants in the form of book "Indian Medicinal Plants". He attempted to update the work by returning to systematic revisions and nomenclature. There was no attempt to be original in the descriptions of families, genera, and species. A large number of plants that grow in India and are familiar, are used medicinally in some other country or countries, were mentioned in this book Kashinathan *et al*. (1972) worked on antifertility effect of *Ocimum sanctum* and reported the decrease in acid phosphatase, alkaline phosphatase, mucoproteins and electrolytes and ph of the seminal plasma of experimental animals.

Spermicidal activity of *Trigonella foenum graecum* seeds was first studied by Setty *et al*. (1976). Setty *et al*. (1977) studied about 1600 plants for their antifertility activity and selected 30 plants which showed spermicidal activity in male albino rats and 16 plants which showed spermicidal activity in human beings in vitro.

Kholkute (1977) worked on antipsermatogenic activity of *Hibiscus rosa sinensis* (L.) on male albino rats and reported mild damage to germinal epithelium to nearly total sloughing depending upon the duration of treatment, and similar reduction in weight of testes, accessary sex organs and pituitary was observed. The alkaline phosphatase in ventral prostate, citric acid content of seminal vesicles and dorsolateral prostate fructose concentration were also reduced.

Munshi *et al*. (1997) reported an antifertility effect of *Piper betel* on male albino rats.

Dixit (1977) reported the mass atrophy of the spermatogenic elements in male house rat, on treatment with the green flower extract of *Malva viscus cozattii*.

Gaintonde and Mahajan (1980) studied the antifertility activity of *Lygodium flexosum*.

Singhwi & Lal (1980) studied the cytostatic and cytotoxic effects of flower extract of *Hibiscus rosa sinensis* on spermatogenically androgenically active testes of a non-scrotal bat.

The discovery of gossypol as a potential male fertility regulating agent by Chinese scientists is a major milestone in the development of male antifertility agents. The long-term treatment of gossypol may cause complete atrophy of the seminiferous epithelium in male albino rats, indicating the possibility of irreversibility of fertility by Dai and Pan (1980), Zhou & Lei (1981).

Research Methodology

Flower petals of H. rosa-sinensis were collected during the dry season (between late February and March), from hibiscus plants used as hedges. Flower petals collected were shade-dried and then oven-dried at 40oC for 8 hours and ground into coarse powder which yielded about 500g. The powder was extracted with absolute alcohol in a Soxhlet extractor for 72 hours. The extract was poured into a conical flask and the ethanol allowed to evaporate at room temperature for 48 hours, yielding a reddish-brown paste. The extract was stored in refrigerator. A suspension of the extract was later prepared in corn oil as vehicle. Thirty mature male rats (Wistar strain) between 213g and 380g body weight were used for the study. They were housed in cages in groups of five and fed rats chow with water ad libitum for one week before the start of the experiment to allow for acclimatization. The animals were then divided into three groups designated Group A, B and C respectively with 10 rats in each group. Rats in group B and C received 300mg/kg and 150mg/kg of body weight H. rosa-sinensis respectively, while group A rats were given corn oil as control. Rats from experimental groups were given 88.78mg/kg/day of extract each as high dose and 45.36mg/kg/day as low dose. A 0.5ml dose was administered for 4 weeks to experimental groups orally while the control group received corn oil (0.5ml). By the end of the treatment period, the rats were sacrificed, dissected and blood samples were collected through cardiac puncture and stored in well-labelled sample tubes. The sample tubes were stored in ice water for clotting to occur and later centrifuged at 1000rpm to obtain serum. The collected sera were refrigerated for hormonal assays. The serum samples obtained from the animals were analysed for levels of testosterone, follicle stimulating hormone (FSH) and luteinizing hormone (LH). The method employed was micro-well enzyme-linked immunology (ELISA) using analytical grade reagents (Syntron Bioresearch, Inc, Carlsbad, USA). Fixed tissue sections were processed for histopathology examination. Microscopic slides prepared for histological examination were observed under light microscope.

Results:

Rats treated with extract of H. rosa-sinensis showed a marked increase in testosterone level (1.30±1.00ng/ml) at high dose (300mg/kg) but no significant increase (0.37±0.07ng/ml) at low dose (150mg/kg). However, there was significant difference in the rate of increase of the level of testosterone in the treatment groups when compared with control. Rats treated with extract of H. rosa-sinensis also showed a marked increase in serum level of FSH at high dose (300mg/kg) and low dose

(150mg/kg). Extract treated rats showed 2.33¼Iu/ml and 2.53¼Iu/ml for high dose and low dose respectively against control group with 1.70¼Iu/ml. Data obtained for effect of extract H. rosa-sinensis on LH showed rats treated with extract recorded significant increase (3.37±0.43¼Iu/ml and 3.33±0.83¼Iu/ml) at high dose (300mg/kg) and low dose (150mg/kg) respectively. Histological sections indicated that male rats fed with 150mg/kg of H. rosa-sinensis extract showed mild effects on the testis. There was degeneration of sperm cells in some of the tubules while some Leydig cells appeared normal. The germinal epithelium and spermatozoon also appeared normal when compared with the control. Rats fed 200mg/kg of extract showed more pronounced effect of the extract. There was complete degeneration of spermatozoa in the lumen of the seminiferous tubules. Epididymal tubules had degenerated epithelial tissue with degenerated spermatozoa and cell debris. The germ cells showed psychosis. There were vacuoles within the tubules and most of the tubules showed increased accumulation of degenerated sperm cells (clumping of cells) (Plate 1). Effect on the prostate gland was more pronounced in the high dose group. Some tubules showed collapse of the villi while most lumen were empty.

Discussion

No record of death of rats treated with extract of H. rosa-sinensis is an indication that the plant is not toxic. Dworkin and Whelan (2007), who worked on the antireality effect of the plant also concluded that there are no known toxicities apart from action as a contraceptive for both male and female due to antispermatogenic and abortifacient effects. The result also supports Vasudeva and Sharma (2008) who reported no acute toxicity in mice administered with oral doses of 2000mg/kg and 4000 mg/kg body weight of extract of Hibiscus rosa-sinensis. With this result, the plant has shown a non-toxic drug potential. Hormone analyses are essential in male infertility, were absence of sperm (azoospermia) or reduced sperm (oligospermia) are indications of bad effects. It is usual to measure plasma FSH, LH and testosterone. High levels of FSH with a low testosterone usually indicate primary testicular failure. For initiation of spermatogenesis and maturation of spermatozoa, FSH is necessary. Higher concentration of FSH is considered to be a reliable indicator of germinal epithelial damage, and has been shown to be associated with azoospermia and severe oligozoospermia (Fertility.com, 2008). Weinbauer and Nieschlag (1995) reported elevated levels of serum FSH with increasing severity of seminiferous epithelial damage. Treatment of male rats with extracts of H. rosa-sinensis showed an increase in the level of testosterone, LH/ICSH and FSH at high dose. It seemed likely that LH/ICSH secretion plays a major role in serum levels of testosterone in male rats. This is in agreement with the known facts and what is reported in the literature (Hackney, 2001; Anderson, 2000; Kitabchi, 1999; MacIndoe et al, 1997). The increased serum level of testosterone and LH/ICSH in the treated animals could have been as a result of the damaging effect of the extracts on the Sertoli cells and the seminiferous tubules. As the doses were increased, so was the damaging effect. This finding was in support of Kholkute (1977) who reported similar effects in rats treated with H. rosa sinensis. Ramesh Babu et al (2004) reported statistically significant ($p< 0.05$) increase in the mean FSH and LH/ICSH levels in all the infertile males in their study when compared with the fertile controls with no significant increase in testosterone. FSH, LH and testosterone are prime regulators of germ cell development. The quantitative production of spermatozoa generally requires the presence of FSH, LH and testosterone (Ramesh Babu et al, 2004). FSH acts directly on the seminiferous tubules whereas LH/ICSH stimulates spermatogenesis indirectly via testosterone. FSH plays a key role in stimulating mitotic and meiotic DNA synthesis in spermatogonia (Ramesh Babu et al, 2004). A rise in the serum level of FSH was an indication that extract H. rosa-sinensis caused damage to the sertoli cells in the seminiferous tubules thereby preventing the cells from secreting inhibin which inhibits FSH secretion. On the other hand, a rise in serum level of LH/ICSH in rats treated with extract was an indication that there was failure in the Leydig cell's function. Hassan (1985) in describing some causes of infertility in men supported this view and opined that when there is low plasma testosterone levels, a high level of circulating gonadotropins will indicate primary hypogonadism, while a low level of gonadotropins will indicate secondary hypogonadism. The result from hormonal assays as presented in this study was a clear indication that the extract of H. rosa-sinensis petals may not have direct effects pituitary axis. The degeneration of sperm cells in rats treated with both plants extracts at high dose and a milder effect at low dose was in support of Udoh and Ekpenyong (2001) who reported a similar result in M. urens treated guinea pigs. Alobari (2008) also reported the same results in M. urens treated rats, while Udoh and Kehinde (1998) reported same in papaya seed treated rats. The effect appeared to be direct on the testes and germ cells as the primary targets but indirect on pituitary-hypothalamus axis. In this study, extract of H. rosa-sinensis (petals) was seen to be non-toxic. Its effects, which was dose-dependent, targeted the Sertoli and Leydig cells and disrupted gonadotropins production via direct action on the gonadal axis. It could represent a promising candidate for further herbal contraceptive for men.

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Review on Characterization of Zinc Oxide Nanoparticles using plant part extract

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Abstract :

Nanoparticles are 1 to 100 nm size of minor material and can be alienated into diverse groups rendering to their belongings, sizes and shape. They can be diversified as ceramics, lipid-based, metal-based, polymeric, semiconductor and carbon-based nanoparticles. The basic appearances used while illustrating the nanoparticles are optical properties, size, shape, surface charge and morphology. morphology, size, surface charge, and optical properties. SEM scanning electron microscopy, TEM Transmission electron microscopy is used to study the structure and morphology of nanoparticles. TGA Thermo gravimetric analysis is used to study the stability of nanoparticles, Spectral study is employed to crisscross optical possessions, though, FTIR Fourier transform infrared spectroscopy, U V Visible spectroscopy, EDAX Energy dispersive X ray spectroscopy, XRD X- ray crystallography is used for educate the essential properties of nanoparticles. This review wills give attention on the operation of these methods in the description of nanoparticles.

Introduction :

Nanotechnology, a blend of values relating biology, physical and chemical that generates nano-sized particles landingspecificpurposes. For this resolution, noble metal nanoparticles like Pd, Pt, Au, Ag etc. and non-metallic, in-organic oxides like the zn-oxide, ti-oxide have been broadly oppressed since of their exclusive chemical, mechanical, optical, electronic and magnetic properties [1-2]. The nanoparticles have inimitable belongings of displaying higher surface area to volume ratio, size, shape like spherical or rod, etc. due to which they are presence used in the frequent lands of suggestive catalysis, cytotoxicity, discovering of drug, threptic applications, toxic metal assessment in nature, biological inquiries, ontological-electronics, instrumentation, catalysis, fabrication of biological sensors[3-6]. For the fusion of nanoparticles, there has stayed growth in the development of healthy and environment-friendly approaches which don't need the misuse of the poisonous chemicals. The development of metal nanoparticles by means of physical or chemical approaches are not courteous or healthy owed to the usage of reducing agents which are extremely sensitive or lethal in flora for human feasting or to the atmosphere, and these are also rather exclusive for upscale construction. The green mixture includes reducing factories as microbes like viruses, bacteria, fungi, algae fungi and plants between which algae, is known as the "bio-nanofactories" as it is naturally active, inexpensive, are exclusively controlled, macroscopically and have a high ability of metal uptake[7-9]. The poisonous compounds shaped during the nanoparticle synthesis can easily be degraded with the help of enzymes present inthe microbes or plants. For example, in the case of fungi, the nitrate reductase is elaborated in the nanoparticle reduction [10-12]. The reduction of Zn ion to Zn atom includes binding of the atom to the cell surface, while additional reduced Zn also binds and aggregates to form zinc nanoparticles. Zinc oxide is one of the utmost conquered n-type semi-conducting metal oxide resources due of its tunable and multi-functional belongings [13]. It is considered by an extensive direct band gap of 3.37 eV and tall inner variation energy of 60 meV. This has numerous promising possessions like transparency, extra radiance in room temperature high electron mobility, etc. These assets are used in applications of nano-medicine, diabetes, degradation, biological processes detectors, solar cells activities [14-16]. Zinc oxide nanoparticles can be fashioned by numerous methods such as solvothermal, hydrothermal, sol–gel and pulsed laser deposition [17]. In totaling, such approaches are usually exclusive, labor-intensive and hypothetically damaging to the atmosphere and alivecreatures [18]. In current ages, there is flying research courtesy to surge the approach esmeant to yield eco-friendly nanoparticles, which prepares not use lethal materials [19]. Green bases can act as both stabilizing and reducing agent for the blend of shape and size-controlled metal and metal oxide nanoparticles. This biological method seems to be a cost-effective substitute to conservative physical and chemical approaches of synthesis. The enzymes, leaf extract and bacteria play a vital role in green synthesis of nanoparticles.

Characterization of ZnO NPs

The manufactured nanoparticles are categorized by applying frequent methods: F EDAX (energy dispersion analysis of X-ray), UV-Visible (UV-visible spectroscopy), XRD (X-ray diffractometer), TEM (transmission electron microscopy), FTIR (Fourier transform infrared spectroscopy), TGA (thermo-gravimetric analysis), FE-SEM (field emission scanning electron microscopy) and SEM (scanning electron microscopy) [20-24].Plants are actuality studied widely predominantly that belong to family such as Anoectochilus elatus [25], Salvia officinalis [26], and Plumbago indica [27] which had the creation of NP with diverse forms such as hexangular, rod-shaped with agglomerates, quasi-spherical, and spherical, and extra numerous sizes are also observed. From the outcome, it is clearly identified that the size of synthesized NPs is decreased on increasing the concentration of a plant extract [28-32]. From the results, the size range is being observed and compared using various techniques such as TEM, XRD, and FE-SEM which had a nearer series of values [33-35], whereas SEM and EDAX had a similar result diverse from XRD results. The Debye–Scherrer equation, synthesis of NPs from vegetable leaf extracts had a similar size, which was confirmed through XRD analysis [36]. A similar size range of NPs was identified in every experiment, which was confirmed through the analysis of TEM and XRD with nanobuds, hexagonal disc shape, and spherical shape. From the studies, it is revealed that the formation of NPs is through the involvement of amine, carboxylic acid, carbonate moieties, alcohol, alkane, and amide, which was further confirmed by FTIR studies and agglomerate formation, was seen in the NP synthesis, which was extracted from Camellia sinesis, Dysphania ambrosioides, Moringa oleifera, Duranta erecta [37-42]. To accept the blend of NPs, UV-spectrophotometry is waged, and the crystal NPs are gained over centrifugation of combination and aeration the pill in a hot air oven and calcination.

Table: Characterization

Plant name and part used	U.V. Visible/ Band gap	FTIR	XRD	SEM	TEM	EDAX	TGA	Ref .no.
Myristica fragrans (Fruit ex.)	358 nm 2.57Ev.	469cm^{-1}	41.23nm Spherical to hexagonal	43.3 – 83.1 nm Semispherical	35.5nm Spherical to hexagonal	Zn=37.16% O=48.83%	600^{0}c.	1
Purple tea (leaves ex.)	380 nm3.8eV	441cm^{-1}	22nm Wurtzite	40 nm Spherical.	15.1nm Spherical, hexagonal	Zn=59.96% O=49.04%	———	2
Aegle marmelos (Beal juice)	377nm3.29eV	410cm^{-1}	17nm Hexagonal wurtzite	16nm Sheet like, spindle	20nm Hexagonal	Zn=51.67% O=48%	———	3
Citrus lemon l. (Leaves ex.)	365nm3.6eV	465cm^{-1}	97.90nm Hexagonal zincite	50nm Rough surface	10 -40nm Polygon shape	Zn=13.53% O=30.69%	———	4
Punica grantum (Leaves ex.)	382nm	610cm^{-1}	20nm crystalline	20nm	10-30nm Poly crystalline, spherical	Zn=76.10% O=16.18%	———	5
Brassica oleracea (Leaves ex.)	303nm 3.37eV	———	14 and 18.2nm Crystalline	——	14nm Crystalline	———	———	6
Hedyotis capitellata (Leaves ex.)	———	470cm^{-1}	28nm Crystalline wurtzite	20nm Hexagonal	2-6nm Nanoballs	———	800^{0}c	7
Hibiscus cannabinus (Leaves ex.)	410nm	——	Polydispersed crystalline particles	1-1.5 nm Spherical	———	———	——	8

Pinus densiflora (Pinecone ex.)	377nm 3.29eV	499cm^{-1}	18.98nm Spherical, hexagonal wurtzite	———	40-60nm Spherical	———	——	9
Orange fruit (peel ex.)	———	450cm^{-1}	12nm Crystalline	——	10-20nm Spherical	———	———	10
Aluilegia pubiflora (Leaf ex.)	————	863cm^{-1}	19.58nm Hexagonal wurtzite	34.23nm Spherical	———	———	——	10
Koseret lippa adoensis (Leaf ex.)	360-363nm 3.21eV	436cm^{-1}	26.7nm Crystalline	22.6nm Spherical	19.78nm Spherical, hexagonal	Zn=59.10% O=40.57%	400^{0}c	11
Mentha pulegium (Leaf ex.)	370nm 3.35eV	495cm^{-1}	44.94nm Hexagonal	38-49nm Semispherical	40nm Quasi-spherical	Zn=56.26% O=43.74%	——	12
Trifolium pratense (Flower ex.)	283nm	515cm^{-1}	60-70nm Agglom-erated	100-190nm Agglomerated	——	———	——	13
Beta valguris (Leaf ex.)	———	618cm^{-1}	20nm Hexagonal	——	16-24nm Hexagonal	———	———	14
Corymbia citriodora (Leaf ex.)	368nm 3.07eV	480cm^{-1}	21nm Hexagonal wurtzite	———-	20 and 120nm Polyhedron	Zn=32.10% O=48.08%	420^{0}c	15
Citrullus colocynthis. L. (fruit, pulp and seed ex.)	350nm F=3.40 eVP=3.28e VS=3.25eV	390-350cm^{-1}	F=27nm P=64nm S=85nm Hexagonal wurtzite	85-100nm Hexagonal, block like morphology	———-	———	——-	16
Azadirachta indica (Gum ex.)	———	400-500cm^{-1}	13.33nm Hexagonal	70-100nm Highly porous, honey comb like phase.	15nmSpherical shape.	——	——	17
Rauvolfia tetxyphylla (Seed ex.)	——	——	38.16nm Hexagonal wurtzite	32nm Spherical	——	Zn=57.91% O=42%	——	18
Phoenix dactylifera (Fruit waste ex.)	381nm 3.25eV	445cm^{-1}	29.3nm Hexagonal wurtzite.	32.3nm Uniform spherical	36.1nm Monodispe rsed and spherical	Zn=63.3% O=36.7%	400^{0}c	19
Euphorbia sanguinea (Leaf ex)	350-400nm 3.10eV	693cm^{-1}	27nm Hexagonal	34nm Flower shape	———	Zn=18% O=30%	——	20
Lemna minor (duckweed)	369nm 3.35eV	———	11.7nm spherical	10-20nm spherical	10-20nm spherical	Zn=24.38% O=48%	——	21

Elaeagnus angustifolia (Leaf ex.)	399nm	498.25cm^{-1}	26nm Triangular	26nm Spherical, agglomerated	26nm Spherical	————	———	22
Rhamnus virtiga (Leaf ex)	400nm	402.70cm^{-1}	20nm	————	20-30nm Triangular	———	——	23
Punica granatum (Leaf, flower ex.)	L=284nm F=357nm	584cm-1	L=57.75nm F=52.50nm Crystalline	3nm Flower like shape	L, Zn=77.24% O=22.74% F, Zn=72.75% O=27.25%	————	——	24
Anoectochilus elatus (Leaf ex.)	380nm 3.12eV	480cm^{-1}	———	3-8nm Rod like, spherical	————	————	——	25
Salvia officinalis (Leaf ex.)	368nm 2.96eV	456cm^{-1}	11.89nm Polycrysta-lline	26-30nm Clumsy phase	26.14nm Clumsy phase	Zn=53.13% O=26.05%	780^{0}c	26
Plumbago indica (Leaf ex.)	368nm	524cm^{-1}	35-28nm Hexagonal	19.64-23.21nm Hexagonal	2.56-8.83nm Hexagonal	———	——	27
Scutellaria baicalensis (Root ex.)	360nm	469.17cm^{-1}	32nm Sphere like shape	————	50nm Spherical	Zn=79.41% O=20.59%	——	28
Coffea arabica (Leaf ex.)	360nm	——-	40nm Cubic crystal	40nm Cubic crystal	———	———	——	29
Cayratia pedata (Leaf ex.)	320nm3.8eV	435cm^{-1}	52.24nm Hexagonal	40nm Hexagonal	——-	Zn=78.32% O=12.78%	——	30
Azardica indica (Leaves ex.)	359nm	——	——	100-300nm Flower shape	———	Zn=51.10% O=29.08%	——	31
Ocimum tenuiflorum (leaf ex.)	368nm	——-	——-	70-400nm	———-	Zn=54.18% O=32.16%	——	32
Cissus quadrangulris (stem ex.)	378nm	671.58cm^{-1}	65nm Hexagonal wurtzite	———	70-90nm spherical	Zn=57.98% O=11.89%	——	33
Euphorbia hirta (leaf ex.)	370nm	513cm^{-1}	28nm Hexagonal	20-25nm spherical	——	——	——	34
Vegetable ex. Onion, cabbage, carrot, . tomato	O=276nm Cab=375nm Car=310nm T=217nm 3-4eV	———	O=17nm Cab=18nm Car=24nm T=15nm Hexagonal	O=Spherical Cab=Nanorod Car=Nanorod T=spherical	———-	————	——-	35

Camellia sinesis (Leaf ex.)	355nm	——-	———	45-75nm Rod like shape	———	Zn=20% O=35.26%	——	36
Datura Stramonium (Leaf ex.)	368nm	———	———-	40-90nm nanoflakes	———————	Zn=22.03% O=38.02%	——	37
Duranta erecta (Leaf ex.)	35nm	———-	28nm Hexagonal wurtzite	75nm spherical	———	———	——-	38
Moringa oleifera (gum)	———	417cm^{-1}	60nm amorphous	50nms pherical	———	———	——	39
Lemon (Peel ex.)	358nm	450cm^{-1}	60.5nm spherical	———	60nm spherical	————	——	40
Carambola (star fruit ex.)	336nm	597cm^{-1}	11.07nm crystalline	18.07nm Spherical	——	———	—-	41
Dysphania ambrosiodes	——-	410cm^{-1}	17.04nm hexagonal	15-36nm Quasi-spherical	15nm Quasi sphere shape	———-	400^{0}c	42

Conclusions

Many studies account the opportunity of gaining ZnO nanoparticles concluding a green fusion course by means of a variability of plants, fungus, bacteria and algae. Furthermore, the studies mentioned here specify that these substrates perform as reducing and stabilizers or as chelating materials contempt its foundation. It is stimulating to sign that also the alteration among the arrangements produced in biological abstracts, parameters such as conditions of temperature, time of reaction, pH and concentrations, meaningfully change the concluding belongings of the produced nanoparticles. Amongst these restrictions and conferring to the prose mentioned, the attentions of both biological extract and zinc basis and likewise the pH of the solution show a main character on the concluding possessions of ZnO nanoparticles gained using green course.

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A Study on Identification and Classification of Rice Plant Diseases Using Machine Learning

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Abstract:

India's largest and most important industry is agriculture, which provides between 65and 70 percent of the population with their main source of income. For their means of subsistence, more over 59 percent of people who reside in rural areas depend on farming and crop production. One of the most significant staple foods in India for a very long time is rice. In South Asia, leaf ailments cause the loss of 20% of the rice crop each year. In conventional methods, the identification of rice phytopathogens by specialists is subjective, and laboratory testing is moment. As a result, agricultural production declines as farmers incur economic losses. To combat this, there seems to be a necessity for the development of efficient and rapid technologies for detecting and classifying rice plant illnesses. This research aims to determine ways to cure plant diseases that harm rice leaves. Numerous substances, such as bacteria and fungus, are capable of inflicting plant illnesses. In order to provide the best results for paddy leaf identification of illness The major purpose of this work is to explore many forms of rice plant leaves, including brown spots, sheathed rot, phytophthora, and leaf blast, utilising an automated tracking strategy using classification techniques CNN models that could reach high precision. This is intended to be achieved as an alternative to the conventional, labor-intensive manual illness diagnosis approach, which is also insufficiently accurate.

Keywords: CNN, Machine learning, transfer learning, paddy leaf disease, Disease Detection.

1. Introduction

Agriculture is the foundation of every nation's economy. For smallholder farmers, plant diseases are a constant problem that put their livelihood and food security at danger. Plants can get a variety of diseases, including bacterial, viral, and fungal ones. It's also feasible that manual detection or observation with just your eyes won't produce any useful information. Additionally, it has been noted that many farmers use pesticides indiscriminately, which can harm both plant quality and human health, in order to mitigate the effects of disease without first proving the existence of any particular illnesses. Many farmers desire to switch to modern agriculture, but many are unable to do so for a variety of reasons, including a lack of knowledge about new equipment and the expensive expense of it. [1]

1.2 Rice leaf diseases

1.2.1 Paddy Diseases and their Symptoms

Paddy disease can be brought on by a range of factors, including pathogenic organisms, insect pests, a deficiency of nutrients, and abnormal environment factors. Pathogens can harm both aboveground and below-ground sections of a plant. [2]

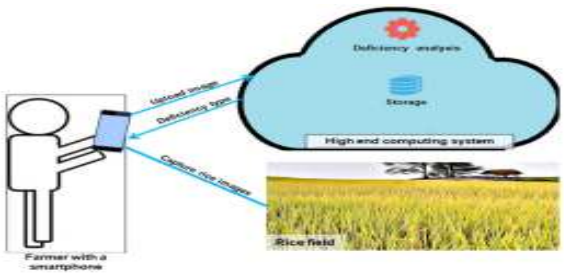


Fig. 1.1 **Cloud-based nutrient deficiency diagnosis framework in agriculture.**

Fig. 1.2 **Types of deceased images on rice leaves**

1.2.2 False Smut

Silver-white frames in the start and orange fumes at the end. False dust or dreck as it increases. Panicle growth occurs when it becomes infected. Even though it is late in the growing season, the disease cycle has already reduced direct yield. [1]

1.2.3 Sheath Blight

The rice straw was infected with the fungus Phytophthora solani, which led to scab. It takes place when the grass's sclerotia fall off before the rice is harvested. The sheaths of the leaf and sclerotia both had dots at first. It was either full of grains or empty, making the florets on the bottom empty. [3]

1.2.4 Rice Blast

For many years, Middle Gujarat has been afflicted by a major disease caused by massive rice boom, and in Gujarat for the last 20 years.[4] In several image processing applications in recent years, machine learning-based approaches have performed well. Artificial intelligence-based applications for learning have produced useful results.[5]

1.3 Objectives

- *To research several rice leaf diseases, including leaf blast, sheath rot, and brown spots.[3]*
- *To examine the effectiveness of the Convolutional Neural Network algorithm.[6]*
- *To analyze and evaluate the use of CNN for identifying different kinds of rice leaf diseases.[3]*

1.4 Scope of the study

The suggested approach is quite effective at identifying crop diseases. Farmers may be able to manage their fertilizer usage as a result. Farmers can locate the source of an infection and fertilise crops in a way that prevents future crop failure by accurately recognizing an ailment.[7]

1.5 Future scope

1. In order to process results fast, the system for detecting diseases can be connected to the cloud. [8]

2. Integrating soil-measurement sensors with an automated system for disease detection. [2]

2. Literature Review

Jyoti Dinkar Bhosale et.al.(2022) "Identification and Classification of Rice Plant Diseases using Machine Learning" [9] Plant disease detection is essential for averting decreases in agricultural productivity and production, as argued in this research. Several machines have been developed to alleviate agricultural problems. The application of learning and image processing technology. This review focuses mostly on rice plant disease. Detection the basis of picture inputs from diseased rice plants utilising multiple ML in addition to image processing methods. Moreover, the essential Concepts of machine learning and image processing in plant identification throughout the categorization, diseases have been mentioned.

Evolutionary Probabilistic Neural Network (PNN) Techniques (GA), and k-Nearest Neighbour Neighbour) classification algorithms. Neighbour Classifier (KNN) and Support Vector Machine (SVM) are two machine learning algorithms. More (SVM). The dependability of an output is dependent on its inputs. When used in a variety of agricultural studies applications. Consequently, choosing a categorization approaching is a crucial task. Agriculture, biological study, and agriculture and so on. Are there additional sectors that use leaf disease? classification? Comprehensive study of the rice plant illnesses, image dataset size, processing & segmentation Methodologies or classifiers are crucial factors to consider.

Md. Sazzadul Islam Prottasha et.al (2022), "A SVM classifier based on element - wise discrete Convent to detect rice plant pathogens" was studied.[4] This study states each year, a percentage of rice diseases do a lot of damage to crops all over the world. Farmers and researchers have had a hard time figuring out how to spot diseases in rice plants early and correctly. Recent improvements to convolutional (CNNs) have made it easier and more accurate to process images. Because of this, in this study, a classification model premised on a taken under consideration separable Convent has been proposed to find 12 different kinds of rice plant pathogens.

Eusebio L. Mique et.al (2018) Performed research on "Rice Pest and Disease Detection Using Convolutional Neural Network". [8] This study investigates Growing more rice may be challenging if you encounter problems with rice infestation and clean up infected fields. According to the Research Facility, infestations cause farmers to lose 37% of their crop yield annually. Farmers can only identify diseases and pests in their rice fields using modern technologies like mobile phones. This study produced a design for an app that would aid sustainable farming discovers rice disperses issues using Deep RNN and CNN. It discusses how to control pests in rice fields. It also looked at what farmers know about rice pests and illnesses and how individuals cope with them.

Feng Jiang et.al (2020) carried out research on "Image detection from four rice plant leaves using deep learning environments vector machines".[6] In agricultural data, researchers have sought to predict rice leaf diseases. Pattern matching research focuses on convolutional and SVM technologies. Together, they may fix the problem and improve recognition. This study uses CNNs to extract rice leaf disease traits from pictures. SVM classifies and predicts. Cross validation determines the appropriate SVM parameters. When C = 1 and g = 50 are applied, the deep learningbased SVM rice disease diagnosis model achieves a 96.8% recognition rate.

Dr. Abdul-Wahab Sami Ibrahim et.al (2021) Conducted study on "Deep Learning or Learning Based Techniques for Disease Detection in Rice Leaf".[10] In just this research, it is shown that plant pathogens hurt the farming sector. The diseases make the crops less productive and cause the farmers to lose a lot of money. For agriculture to get better, it is also very imperative to know plant pathogens so that the crop yield is protected. It is also essential to use less herbicides so the performance of the crop yield gets better. Algorithms for image data analysis and data mining work together to help find and analyse diseases. With these methods, rice leaves can be used to find diseases.

Shreya Ghosal et.al (2020) Research on "Rice Leaf Disease Diagnosis Using CNN without Transfer Learning" was carried out.[3] This paper suggests that grain was among the most important crops grown in India and that it gets sick at different times during its growth. Farmers don't know nearly enough about these maladies to be able to correctly identify them by hand. Latest events in Deep Learning prove that Automatic Image Processing processes that use Convolutional Neural (CNN) models are very helpful in these kinds of situations. Since the rice disease detection image dataset isn't easy to find, we made our own small dataset and used Pretrained to build our deep learning method.

Vaibhav Tiwari et.al (2021), completed research titled "Multiclass plant disease detection or classifying using multilayer convolutional neural networks on leaf pictures."[3] Article explains Plant viruses are a major concern in agricultural, and their automated detection is key to keeping an eye on them. Plant leaves display most illness indications, but it's costly and timeconsuming for lab professionals to find out what's wrong. This article describes a technique for detecting and classifying plant diseases using leaf photographs. A massive convolutional architecture is trained on plant leaf pictures from several nations. The planned effort examines six crops in 27 categories in the lab and field. This dense neural network took into account changes between and within picture classes and complicated and demanding situations.

Md. Sazzadul Islam Prottasha et.al (2022) conducted study on "A classification model based on depth wise separable convolutional neural network to identify rice plant diseases"[4] In analysis Annually, rice diseases devastate the global harvest. Accurate early The forecast of rice diseases is a challenge for farmers and scientists. Recent advances in CNNs have making photo editing simpler and more precise. In this research, a convolutional networkbased classification model for identifying 12 types of rice plant diseases is constructed. The performance of eight cutting-edge fully convolutional models

for identifying rice plant diseases has been evaluated. In comparison to current CNN architectures, the suggested model performs well.

Md. Ashiqul Islam et.al (2021) conducted study on "An Automated Convolutional Neural Network Based Approach for Paddy Leaf Disease Detection"[1] In this research, Bangladesh and India are major paddy producers. Rice is Bangladesh's main crop. In Bangladesh's recent 11 years, agriculture contributed 15.08 percent to GDP. But farmers who labor hard to raise this crop risk tremendous losses due to paddy illnesses. There are 30+ paddy leaf diseases, and 7-8 are frequent in Bangladesh. Common and quite well paddy leaf diseases include Brown Spot Diseases, Burst Disease, the Bacterial Leaf Blight.

3. Research Methodology

This methodology part is known as formal papers, literature resources, databases, authors experience, and historic land usage that established ecosystems. It presents strategies for maintaining and protecting genetic reserve areas to ensure the longterm viability of critical plant populations.

3.1 Plant Disease Detection Process

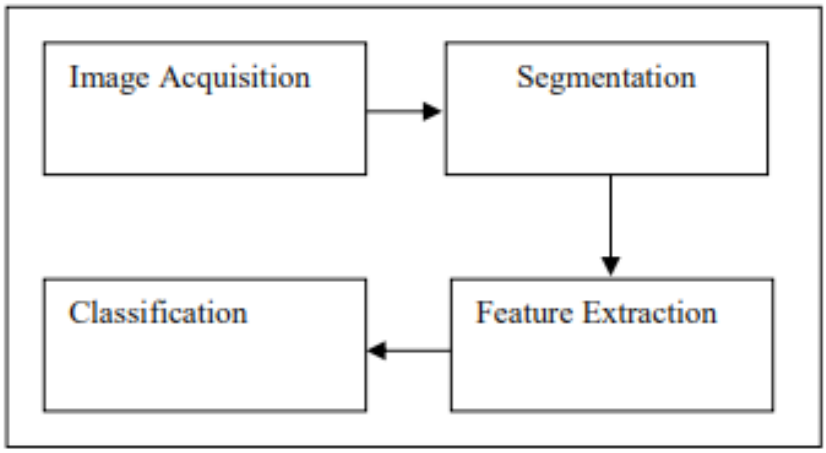


Fig.3.1: Phases of plant disease detection system

Four major phases to detect and classify the diseases which are image pre processing, Segmentation, Feature selection and classification.

- Image Quality capture is the process for acquiring the pictures used in this study.
- During preprocessing, the photos there in sample are shrunk then cropped in order to reduce storage and computational needs.
- Inside this study, the K-means clustering algorithm is used for picture classification. Clustering is the method for organizing a picture into groupings.

3.2 Convolutional Layers

Convolutional layers are a component in Convolutional Neural Networks. This has also known as the Convolutional layers. This has utilized to generate related aspects of a input picture using filters with a set of automatically learning parameters. The framework of CNN essentially contains There are three basic components, input layer, output neurons, the output layers. That block graphic depicts the crucial step required to distinguish healthy leaves from unhealthy ones.

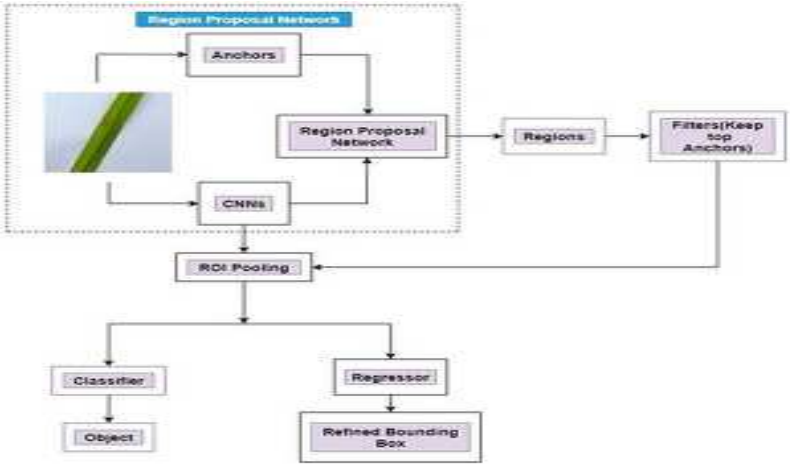


Fig. 3.2 Proposed Work Flow

Fig 3.4 Architecture of Faster R-CNN

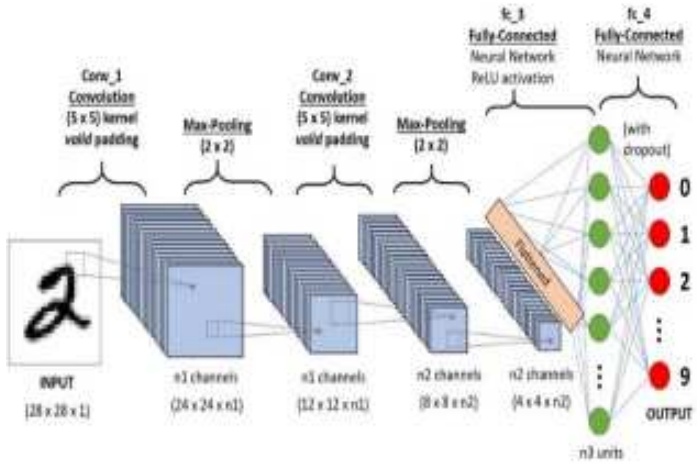


Fig 3.3 Schema of the Convolutional Neural Network (CNN) based Model

4. Experimental Results & Discussion

Python 3 are a general-purpose interpreted, interactive, object-oriented, & high-level programming languages. For implementation of an innovative dashboard to diagnosis of Rice leaf decease detection using machine learning.

4.1 Experimental Results

```
Found 4624 files belonging to 3 classes.
Using 3700 files for training.
Found 4624 files belonging to 3 classes.
Using 924 files for validation.
['brown spot', 'leaf blast', 'leaf blight']
```

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
rescaling_1 (Rescaling)      (None, 180, 180, 3)       0
conv2d (Conv2D)              (None, 180, 180, 16)      448
max_pooling2d (MaxPooling2D  (None, 90, 90, 16)        0
)
conv2d_1 (Conv2D)            (None, 90, 90, 32)        4640
max_pooling2d_1 (MaxPooling  (None, 45, 45, 32)        0
2D)
conv2d_2 (Conv2D)            (None, 45, 45, 64)        18496
max_pooling2d_2 (MaxPooling  (None, 22, 22, 64)        0
2D)
flatten (Flatten)            (None, 30976)             0
dense (Dense)                (None, 128)               3965056
dense_1 (Dense)              (None, 3)                 387
=================================================================
Total params: 3,989,027
Trainable params: 3,989,027
Non-trainable params: 0
_________________________________________________________________
```

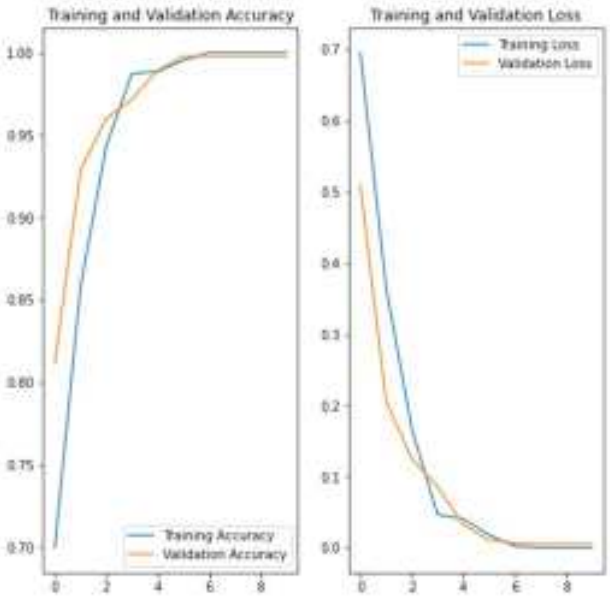
In sequential model, layer type and its output shape of dimensions' parameters and Param are given in above model. In this model there are Total params are 3,989,027, trainable params 3,989,027 and non- trainable params.

```
epochs=10
history = model.fit(
  train_ds,
  validation_data=val_ds,
  epochs=epochs
)
print('model created')
```

Model creation process is represented in above image, in this 10 epochs are taken and then they are compared with history data. If no epochs data is matched with history then it prints model created.

```
Epoch 1/10
116/116 [==============================] - 277s 2s/step - loss: 0.6956 - accuracy: 0.6995 - val_loss: 0.5093 - val_accuracy: 0.
8117
Epoch 2/10
116/116 [==============================] - 288s 2s/step - loss: 0.3656 - accuracy: 0.8581 - val_loss: 0.2057 - val_accuracy: 0.
9288
Epoch 3/10
116/116 [==============================] - 282s 2s/step - loss: 0.1671 - accuracy: 0.9435 - val_loss: 0.1255 - val_accuracy: 0.
9600
Epoch 4/10
116/116 [==============================] - 349s 3s/step - loss: 0.0869 - accuracy: 0.9873 - val_loss: 0.0860 - val_accuracy: 0.
9719
Epoch 5/10
116/116 [==============================] - 358s 3s/step - loss: 0.0409 - accuracy: 0.9886 - val_loss: 0.0330 - val_accuracy: 0.
9892
Epoch 6/10
116/116 [==============================] - 265s 2s/step - loss: 0.0184 - accuracy: 0.9954 - val_loss: 0.0114 - val_accuracy: 0.
9978
Epoch 7/10
116/116 [==============================] - 257s 2s/step - loss: 0.0023 - accuracy: 1.0000 - val_loss: 0.0067 - val_accuracy: 0.
9978
Epoch 8/10
116/116 [==============================] - 257s 2s/step - loss: 7.2383e-04 - accuracy: 1.0000 - val_loss: 0.0052 - val_accurac
y: 0.9978
Epoch 9/10
116/116 [==============================] - 256s 2s/step - loss: 4.6201e-04 - accuracy: 1.0000 - val_loss: 0.0057 - val_accurac
y: 0.9978
Epoch 10/10
116/116 [==============================] - 270s 2s/step - loss: 2.9914e-04 - accuracy: 1.0000 - val_loss: 0.0058 - val_accurac
y: 0.9978
model created
```

10 epochs are executed in above image, in that for epoch required timespan per steps are given and the accuracy, loss values are also displayed in above table.



```
epochs = 15
history = model.fit(
  train_ds,
  validation_data=val_ds,
  epochs=epochs
)
print('second model created')
```

Fig 4.3 Graph for Training and Validation of Accuracy and loss

For second model 15 count for epochs are taken based on this it will take images from datasets at time of execution.

```
[0.6045945882797241, 0.7685405449867249, 0.8118919134140015, 0.8554053902626038, 0.8805405497550964, 0.9081081151962328, 0.92781
78486633301, 0.9351351261138916, 0.9486187994384918, 0.9532432556152344, 0.9583783745765686, 0.9629729986190796, 0.9604594707489
7615, 0.9656756520271301, 0.9829729795455933]
[0.7175324559211731, 0.8062770366668701, 0.8041125535964966, 0.8805201682014465, 0.8690476417541504, 0.9307359457015991, 0.9220
778942108154, 0.9567099809646606, 0.8917748928070068, 0.9426487217979431, 0.9166666865348816, 0.9285714030265808, 0.99242424964
90479, 0.9772727489471436, 0.9787702481313782]
```

```
Epoch 1/15
116/116 [==============================] - 290s 2s/step - loss: 0.8677 - accuracy: 0.6046 - val_loss: 0.6399 - val_accuracy: 0.
7175
Epoch 2/15
116/116 [==============================] - 293s 3s/step - loss: 0.5886 - accuracy: 0.7686 - val_loss: 0.4869 - val_accuracy: 0.
8063
Epoch 3/15
116/116 [==============================] - 289s 2s/step - loss: 0.4687 - accuracy: 0.8119 - val_loss: 0.4551 - val_accuracy: 0.
8041
Epoch 4/15
116/116 [==============================] - 289s 2s/step - loss: 0.3842 - accuracy: 0.8554 - val_loss: 0.3861 - val_accuracy: 0.
8885
Epoch 5/15
116/116 [==============================] - 289s 2s/step - loss: 0.3023 - accuracy: 0.8805 - val_loss: 0.3704 - val_accuracy: 0.
8690
Epoch 6/15
116/116 [==============================] - 288s 2s/step - loss: 0.2581 - accuracy: 0.9081 - val_loss: 0.2261 - val_accuracy: 0.
9307
Epoch 7/15
116/116 [==============================] - 287s 2s/step - loss: 0.2004 - accuracy: 0.9278 - val_loss: 0.2059 - val_accuracy: 0.
9221
Epoch 8/15
116/116 [==============================] - 290s 2s/step - loss: 0.1796 - accuracy: 0.9351 - val_loss: 0.1162 - val_accuracy: 0.
9567
Epoch 9/15
116/116 [==============================] - 290s 2s/step - loss: 0.1748 - accuracy: 0.9480 - val_loss: 0.2841 - val_accuracy: 0.
8918
Epoch 10/15
116/116 [==============================] - 286s 2s/step - loss: 0.1337 - accuracy: 0.9532 - val_loss: 0.1623 - val_accuracy: 0.
9426
Epoch 11/15
116/116 [==============================] - 286s 2s/step - loss: 0.1226 - accuracy: 0.9584 - val_loss: 0.2011 - val_accuracy: 0.
9167
Epoch 12/15
116/116 [==============================] - 285s 2s/step - loss: 0.1106 - accuracy: 0.9630 - val_loss: 0.1625 - val_accuracy: 0.
9286
Epoch 13/15
116/116 [==============================] - 286s 2s/step - loss: 0.0825 - accuracy: 0.9695 - val_loss: 0.0358 - val_accuracy: 0.
9924
Epoch 14/15
116/116 [==============================] - 288s 2s/step - loss: 0.0687 - accuracy: 0.9657 - val_loss: 0.0650 - val_accuracy: 0.
9773
Epoch 15/15
116/116 [==============================] - 289s 2s/step - loss: 0.0570 - accuracy: 0.9830 - val_loss: 0.0849 - val_accuracy: 0.
9708
second model created
```

As shown below in sequential_2 model, layer type and its output shape of dimensions' parameters and Param are given in above model. In this model there are Total params are 3,989,027, trainable params 3,989,027 and 0 non- trainable params.

Fig 4.3 Graph for Training and Validation of Accuracy and loss

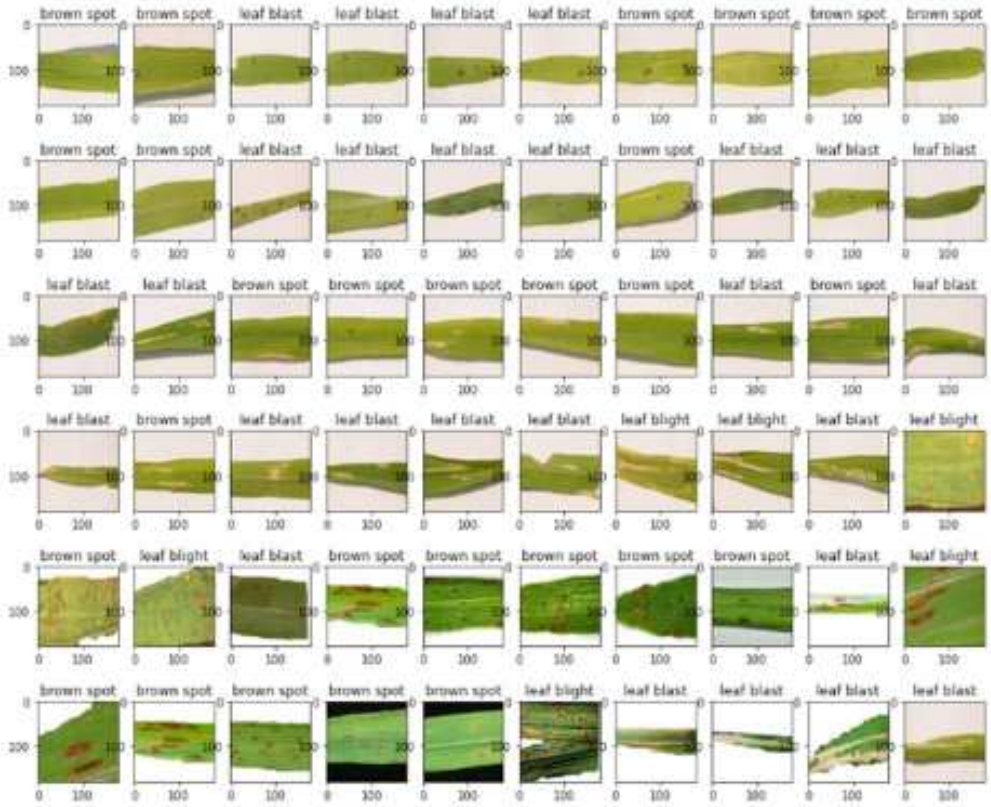


Fig 4.4 **Outputs for Rice Leaf disease detection using both algorithm**

4.2 Limitations of the study

1. When choosing a transport deep learning model, this same three most significant things to keep in mind are:

- The theoretical scheme is used to group diseases that affect different types of crops.
- Deep learning was used in the framework that was proposed.
- The suggested scheme also used the popular research idea of transfer learning to make a more effective model.

2. When there are more categories, machine learning techniques are not as good at predicting diseases from images of leaves.

5. Conclusion

The rice leaf picture database includes healthy leaf and rice blast, brown spot, and hispa. We employed picture augmentations to enhance the dataset, which familiarizes the model with image circumstances. This improves model performance and generalization. The suggested study's findings are optimistic for diagnosing healthy and diseased leaves in laboratory-based and real-field images. In this scenario, the model benefits from the use of reinforcement and transfer learning can enhance the accuracy with which the CNN generalises inputs.

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A Review on The Impact of Pesticide Exposure with Respect to Human Health

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Abstract :

The information on pesticide openness and human wellbeing during the past twenty years were acquired by a cautious assessment of 33 examination distributions distributed in an assortment of esteemed worldwide diaries. The course of pesticide openness and its wellbeing outcomes, including neurological, fetal turn of events, birth, and malignant growth. Various pesticides go about as neurotoxins, bringing about neurological problems and degenerative sicknesses; some influence undeveloped turn of events, bringing about intrinsic abnormalities; and others are cancer-causing to people. Worldwide specialists' information investigation discovered that far reaching utilization of pesticides expands their openness to people, fundamentally expanding the gamble of malignant growth, neurological and birth irregularities.

Keywords:*Fetal growth; Carcinogenicity, Pesticide; Exposure; Neurotoxicity*

I. *Introduction :*

Synthetic substances are utilized in contemporary horticulture to support crop yield. Compost is utilized to invigorate growth and pesticide is utilized to safeguard against bothers. As the amount of these synthetic substances in the climate grows, a large number of occurrences of pesticide harming are accounted for every year [1].

Pesticides incorporate all mixtures used to oversee bugs, parasite, and weeds, and are classified by the organic entities they target, like insect poisons, herbicides, fungicides, or fumigants. Certain classes of pesticides are additionally partitioned by their dynamic fixings, for instance, insect poisons are classed as organophosphates (OPs), organochlorines, carbamates, and pyrethroids[2].

Pesticides are hazardous to utilize attributable to their antagonistic outcomes; Rachel Carson's 1962 book "quiet spring" point by point the destructive impacts of DDT, which brought about the synthetic's disallowance from horticultural utilization. Additionally, to how other poisonous pesticides have been progressively transitioned away from all through the years by the EPA (Environmental Protection Agency), EDB (ethylene dibromide) was deliberately gotten rid of in 1983 in light of the fact that to its cancer-causing and freak impacts. Pesticide deposits persevere for a drawn out timeframe, causing major destructive impacts and disturbing environmental equilibrium by killing innocuous bugs, creatures, and fish, as well as modifying their DNA by instigating protection from these pesticides (bother) [3].

As indicated by the EWG (Environmental Working Group), in the wake of breaking down 47 products of the soil, they found that 12 food varieties contain the most noteworthy centralization of pesticides. These food varieties are alluded to as the "filthy dozen" (Peach, Apple, Bell pepper, Celery, Nectarine, Strawberries, Cherries, Kale, Lettuce, Grapes, Carrot, and Pear) and have various adverse consequences on human wellbeing, especially during the fetal growth and early The OTA Organic Trade Association explains on similar effects of pesticide buildup [4].

II. EXPOSURE OF HUMAN TO PESTICIDES AND FACTORS IMPACTING EXPOSURE

Human openness to pesticides might happen because of their business, like horticultural specialists in open fields and nurseries, pesticide industry work force, and exterminators of family bothers [5]. Whether or not the business requires the utilization of pesticides, the presence of such synthetic substances in the working environment makes a gamble of word related openness. Obviously, work force who blend, burden, transport, and apply figured out pesticides are frequently remembered to be the gathering that will get the most openness because of the idea of their calling and are along these lines at the most serious gamble of intense harming [6]. In interesting occurrences, pesticide openness could happen because of substance spills, spills, or breaking down splashing hardware. Laborers' openness to pesticides rises when they dismiss essential wellbeing prerequisites on the utilization of individual defensive hardware and principal sterilization methodology, for example, washing hands after pesticide taking care of or prior to eating.

Various factors might impact openness to pesticides during pesticide taking care of [7]. The manner in which pesticide items are figured out may affect the level of openness. Fluids are inclined to spilling and spilling, which might bring about direct skin contact or roundabout skin contact through polluted garments. While stacking solids into application hardware, residue might be produced, bringing about facial and eye openness, as well as breathing risks. Pesticide item bundling may likewise affect conceivable openness. For instance, contingent upon the sort of bundling and the organization of the dynamic fixing, opening pesticide sacks might bring about some degree of openness. Furthermore, the size of jars, bottles, and other fluid compartments might affect the probability of spilling and sprinkling. Furthermore, adjuvant synthetic substances utilized in pesticide definitions to expand their natural movement (e.g., by expanding the contact between the dynamic fixing and its particular sub-atomic objective) as well as to work with application and arrive at target species, might be poisonous, adding to the general impact of openness to a business pesticide item [8]. At the hour of utilization, climate factors, for example, air temperature and stickiness might affect the substance unpredictability of the item, the pace of sweat on the human body, and the clients' use of individual defensive hardware [9]. Twist fundamentally expands splash spread and, as an outcome, the instrument's openness. The amount of pesticide lost from the objective district and the distance went by the pesticide increment with wind speed, subsequently higher breeze speeds ordinarily bring about more float. Furthermore, low relative stickiness and high temperature make splash beads dissipate all the more quickly between the shower spout and the objective than high relative moistness and low temperature do. Representatives' overall cleanliness works on during pesticide utilization may likewise affect openness. For example, work force could limit openness by trying not to blend and splashing during blustery conditions. Appropriate utilization and care of defensive articles of clothing are viewed as basic practices related with diminished substance openings. Furthermore, openness is impacted by the recurrence and length of pesticide taking care of on an occasional and lifetime premise. Individual ranchers' openness to pesticides is lower than that of expert instruments who frequently apply pesticides for some back to back days or weeks all through a season [10].

Everybody is presented to pesticides for the most part by means of the utilization of pesticide-polluted food and water, however critical openness to pesticides may likewise happen while residing close to a pesticide-utilizing working environment or when representatives convey home sullied items [11]. Non-word related openness to pesticide deposits in food, air, and drinking water is frequently low measurements and persistent in nature (or semi-constant). Be that as it may, indisputable proof connecting explicit pesticides to explicit wellbeing outcomes can be shown distinctly in creature tests, and the measurements utilized in these exploration are far more noteworthy than the legitimately commanded pesticide limits [12]. Subsequently, the risk to human wellbeing is by all accounts inconsequential because of these examination. Be that as it may, genuine intense openness might be more than anticipated attributable to explicit dietary inclinations, buildup changeability across individual food things, and ingestion of a solitary food thing at a higher rate than expected. People can be presented to pesticides in or around the home during the arrangement and utilization of pesticides or even a short time later, by means of inward breath of lingering air fixations or openness to deposits found on surfaces, clothing, bedding, food, dust, disposed of pesticide compartments, or application hardware. Furthermore, inadvertent pesticide harming in the house is a gamble because of pesticide application around the house or nursery. Openness is probably going to happen as an outcome of pesticide spillage, unseemly utilization, or inappropriate stockpiling because of inability to peruse and represent the pesticide mark. Pesticide abuse, like moving things from their unique bundling into home compartments and neglecting to follow name prerequisites, may likewise bring about openness.

III. PESTICIDE AND NEUROTOXICITY

Various pesticides, including organophosphates, organochlorines, and carbamates, destructively affect the focal and fringe sensory systems. Pesticides have been found to have intense or persistent, long-or transient consequences for the neurological framework whether uncovered at high or low levels all through adulthood, earliest stages, or in utero, and may bring about exceptionally constant nerve sicknesses, for example, Parkinson infection [13].

A. Alzheimer Disease

Dementia is a decrease in cerebrum capacity; dementia has filled as of late. One hypothesis for the current ascent is that it is the aftereffect of expanding pesticide openness; pesticides might have sped up the advancement of dementia. Notwithstanding, extra review demonstrates that pesticides debilitate neuron work at the sub-atomic level by slowing down microtubules and causing hyperphosphorylation, which brings about Alzheimer's infection [14]. Organophosphate and organochlorine pesticides have been displayed to influence the control of acetylcholinesterase at synaptic intersections in

the sensory system, which might bring about Alzheimer infection, especially in those uncovered in their late years [15]. Another review found that a few herbicides (rotenone and paraquat) influence the bioenergetic exercises of mitochondria, oxygen digestion, and redox work, all of which add to the improvement of Alzheimer infection [16].

B. Parkinson Disease

Parkinson infection happens when the critical nigra neuron (dopaminergic) in the cerebrum neglects to deliver dopamine, bringing about an absence of coordination, shaking, and loss of strong control. Certain pesticides, like rotenone and paraguata, harm these dopaminergic neurons, diminish dopamine amalgamation, and result in Parkinson infection [17]. Pesticide openness has been connected to Parkinson infection, and pesticides and their metabolites influence mitochondria and control xenobiotic digestion, bringing about Parkinson sickness [18]. Separate review has shown that when rodents are presented to rotenone, neurodegeneration happens in the fringe sensory system, with a decrease in engine nerve conduction speed, especially in the sciatic nerves. This is on the grounds that dopamine is insufficient and substance neural connections in the fringe sensory system are disturbed [19].

C. Organophosphate And Neurotoxicity

As indicated by study, insect poisons (OP, carbamate, organochlorine) and fungicides act as neurotoxins, adjusting synaptic neurotransmission. Operations are concentrated exhaustively; it is accepted that they have two sorts of impacts: one that happens rapidly and shows manifestations like cerebral pain, queasiness, regurgitating, pupillary tightening, discombobulation, and unreasonable perspiring, tearing, and salivation; and one that happens gradually and shows side effects like muscle shortcoming and jerking, bronchospasm, and shifts in perspective rate and can bring about seizures and extreme lethargies. Over powered openness brought about a condition known as OP-instigated postponed polyneuropathy, in which the axonal region of the neuron is seriously harmed and incapable to produce the neuropathy-focusing on esterase catalyst, as well as unreasonable initiation of postsynaptic cholinergic receptors [20].

IV. PESTICIDE AND FETAL GROWTH

It is assessed that 54% of pregnant ladies are presented to pesticides, with 45% presented attributable to pesticides utilized in their room and 47% presented because of pesticides utilized somewhere else in the house. Ladies presented to this insect poison by inward breath, ingestion, or skin contact. Little youngsters are more uncovered and in danger since they consume polluted residue, their breathing zone is shut to the ground, and they invest more energy at home with a bigger uncovered body surface attributable to less articles of clothing. What's more since fetus's and youngsters have a debilitated insusceptible framework that is unequipped for detoxifying pesticides, they are more defenceless in case of immediate or backhanded openness [20].

A. Pesticide Exposure in Fetus

Pesticide openness in fetus's is evaluated utilizing blood from the umbilical string and placenta, albeit this technique just distinguishes as of late presented and industrious pesticides [21]. In another review, by inspecting tests taken from body parts, hairs, umbilical string blood, and fetus meconium, it was found that meconium contains the most noteworthy centralization of pesticide buildup, and it contains practically all pesticides to which pregnant ladies are uncovered during their development period. Most of pesticides distinguished in meconium are utilized in houses, including propoxur, pretilachlor, DDT, cyfluthrin, and cypermeth.

B. Weight Loss in Fetus Due to Pesticide Exposure

Pesticide openness detrimentally affects fetus growth, most outstandingly weight reduction. In a review including 20 distinct pesticides (10 insect poisons, 6 herbicides, 3 fungicides, and 1 repellant), it was found that two pesticides, diethyltoluamide and vinclozolin, are all the more as often as possible distinguished in the blood of umbilical string fetuses, and fetus weight is conversely corresponding to pesticide number Pesticide combinations, especially two fungicides (vinclozolin and acetochlor), affect fetal advancement [18].

C. Carcinogenic Effects of Pesticide on Fetus

Cancer-causing pesticides additionally affect the fetus during or after development; the presence of pesticides in maternal string blood demonstrates that they are moved from mother to fetus during incubation, possibly expanding the gamble of malignant growth. On the off chance that openness happens before to origination, it results in epigenetic changes in quality articulation, like engraving and DNA methylation in the parent's gametes. After origination, openness modifies immunological and hormonal working and furthermore causes transformations in the fetus' substantial cells, which bring about malignant

growth, most outstandingly cerebrum disease. Ongoing review exhibits that the gamble of creating cerebrum malignant growth is twofold more noteworthy in newborn children whose moms were presented to horticultural synthetic substances, especially herbicides, while working [19].

D. Endocrine Disrupting of Fetus and Pesticide Exposure

As indicated by research, openness to five pesticides (bitertanol, propiconazole, cypermethrin, malathion, and terbuthylazine) causes critical endocrine interruption in people [20]. On the off chance that a fetus is presented to ecological endocrine disturbing synthetic substances (EDCs) during pregnancy or early earliest stages, they adjust the fetus' endocrine framework. It brings about growth and gestational age irregularities. Ongoing review demonstrates that overweight and corpulence are brought about by pesticide openness in private and horticultural regions, which expands the gamble of metabolic and cardiovascular sicknesses [21]. Certain industrious pesticides, for example, organochlorine, polychlorinated biphenyls, and polybrominated biphenyl ethers, are lipophilic and stick to serum lipids. Different pesticides, for example, azole (fungicide) and atrazine, increment gestational length, virilize female little guys, and upset the fetus' endocrine framework; on the off chance that applied right off the bat in incubation, the fetus' regenerative organs neglect to create [20].

V. CONCLUSION

Pesticides are generally utilized in horticultural enterprises these days to expand creation by safeguarding crops from possible dangers. They are additionally utilized in homes and other public spots to discourage bugs and other undesirable animals. As pesticides are utilized all the more as often as possible, their openness to people increments also. Because of their long life, these synthetic substances don't corrupt effectively and are found nearby and on the items on which they are utilized. Their quality and openness to people can cause malignant growth.

As indicated by this exploration survey, expanding instances of Alzheimer's infection and Parkinson's sickness, as well as other neural imperfections, for example, cognitive decline, interruption of neural coordination in the body, loss of motion of other body frameworks like the stomach related and respiratory frameworks, hindrance or overproduction of synapses, and a high or no reaction of receptor destinations to these synapses, are brought about by pesticide openness or its composition. Pesticide openness is dangerous to grown-ups, however little youngsters and fetus's are more delicate to pesticides all through their formative stage attributable to their juvenile and dormant insusceptible frameworks. At the point when a fetus is uncovered in the mother's belly, intrinsic irregularities and hereditary sicknesses emerge because of DNA harm during advancement. Interruption of the endocrine framework happens both during and after birth. Pesticides are especially harming to grown-ups and youngsters attributable to their cancer-causing properties. Youngsters and grown-ups presented to this substance foster leukemia, bladder, clone, thyroid, and cerebrum malignant growth. As indicated by our exploration, pesticides are incredibly destructive to people when they are uncovered, however we can't totally boycott or confine their utilization because of the financial and health advantages related with vector control. Be that as it may, we can decrease their openness and impact by carrying out explicit wellbeing measures for ranch laborers and restricting openness to youngsters and pregnant females.

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A Study on the Impact of Yoga on Women's Stress, Anxiety, and Depression

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Abstract :

Several medical and scientific investigations on yoga have shown it to be particularly effective in the treatment of certain disorders in recent decades. The purpose of this study was to see how yoga affected stress, anxiety, and depression in women in Guntar, Andhra Pradesh. This is a pre-post test in a quasi-experimental study. The DASS21 (Depression Anxiety Stress Scale 21) questionnaire was used to collect data. An expert led hatha yoga exercises and training sessions for eligible samples for 4 weeks (3 times/weekly; 60-70 minutes each). SPSS version 20 was used to analyze the data. The study involved 52 women with an average age of 33.5 6.5 years. After 12 sessions of regular hatha yoga practice, women's depression, anxiety, and stress levels improved dramatically (P 0.001). Yoga has been shown to help people cope with stress, anxiety, and depression. As a result, it can be utilized as a form of supplemental medicine.

Keywords: Depression, Anxiety, Women, Yoga

1. *Introduction :*

In the field of complementary medicine, there is a category of therapies and interventions that have not been raised in the context of conventional medicine. Yoga is a Sanskrit word that literally translates as "union of mind and body." It has been practiced in Eastern nations for more than 5000 years and has recently gained widespread interest in Western countries. Several medical and scientific investigations on yoga have been conducted in recent decades, and the results have demonstrated that it is quite beneficial in the treatment of certain disorders.

How Yoga is beneficial for stress, Anxiety and Depression?

Yoga's popularity continues to grow as more people discover the physical and emotional benefits of practising it. Initiating a personal yoga practise can aid in the prevention and reduction of stress, which is a popular desire among people who wish to experience positive growth and improve their overall well being. Breathing, meditation, and relaxation techniques such as yoga nidra can all be incorporated into your daily yoga programme in addition to physical postures. Learn more about the stress-reducing advantages of yoga and how you can utilise your practise to improve your overall health and well-being by continuing reading this article.

What is the mechanism by which yoga helps to relieve tension and anxiety?

Yoga promotes mental and physical relaxation, which is beneficial in the reduction of stress and anxiety. Physical postures that enhance flexibility, release tension, and alleviate pain are demonstrated in the video. Yoga positions may aid in the release of physical obstructions such as muscle knots, as well as the release of emotions and stress. They also encourage the release of mood-enhancing endorphins, which are the feel-good hormones that can have a favourable impact on your ability to cope with stress and anxiety.

Keeping your attention on the present moment during your yoga practise increases your awareness, improves your concentration, and helps to centre your thoughts. It might be easier to let go of attachments to happy, negative, and neutral experiences as you become more conscious of the transient nature of your physiological sensations, thoughts, and feelings. You may also learn to create positive emotions such as love, joy, and tranquilly through meditation.

What does the evidence say about yoga as a stress-relieving technique?

Numerous scientific studies have been conducted to support the stress-relieving advantages of yoga. According to a 2017 study, women who did Hatha yoga three times a week for four weeks saw significant improvements in their health. Their tension, despair, and anxiety levels significantly decreased after 12 sessions Yoga, according to these findings, can be used as a supplemental therapy and may even reduce the need for prescription medications.

A greater number of in-depth studies are needed to determine the long-term effectiveness of yoga in the treatment of stress, depression, and anxiety. Yoga nidra practise also has the additional benefit of increasing mindfulness and decreasing negative emotions. A follow-up six weeks later revealed that all of these advantages had persisted.

2. Research Methodology

Yoga has been shown to be beneficial for a variety of ailments, including multiple sclerosis, asthma, irritable bowel syndrome, cancer, hypertension, drug addiction, osteoarthritis, and mental health difficulties, according to scientific evidence. Stress, depression, and anxiety have all increased as a result of the current way of living. Because of the negative side effects of medications used in the treatment of anxiety and depression, as well as their ineffectiveness un some circumstances, researchers are looking for no pharmacological and noninvasive treatments for these illnesses. Yoga workouts were found to improve the characteristics of self-description, psychological well-being, and overall life satisfaction. Yoga, as an intellectual and cerebral activity, has been shown to boost one's overall health feeling, according to research. Besides that, yoga has been shown to improve the psychological conditions for recognising and managing stress and negative emotions, as well as raise good emotions and promote mental equilibrium. However, despite its widespread use and the good psychological and physiological impacts it has, yoga has not been extensively researched to see how effective it is at preventing and treating mental problems.

The purpose of this study was to explore the effects of yoga on stress, anxiety, and depression in women living in Guntar, Andhra Pradesh, between 2016 and 2017. The participants were women who lived in Guntar, Andhra Pradesh between 2016 and 2017.

Method of the study

Design and Ethics

The study is designed on the quasi-experimental design method. The sample consisting of all the women who had participated in this study that is 52.

Inclusion and Exclusion criteria

Women who were educated, non-athletes, and not pregnant were eligible to participate if they had the ability to execute hatha yoga movements without being unable to exercise. The refusal or unwillingness to practice yoga constantly, as well as concurrent exercise and receiving medicine for mental illnesses, were all considered exclusion factors.

Tools for evaluation and management

The DASS-21 (Depression Anxiety Stress Scale-21) questionnaire was used to gather information. In a study titled "Validation of depression, anxiety, and stress scales for an Iranian population," Sahebi et al. assessed the validity and reliability of this standard questionnaire, and Cronbach's alpha was estimated to be 0.7, 0.66, and 0.76 for depression, anxiety, and stress, respectively. Seven questions are asked for each of the aforementioned states.

Each question is worth one point. By a specialist, hatha yoga exercises and training sessions were held three times a week for 60-70 minutes each (postures, breathing techniques, and meditation) for 60-70 minutes. Questionnaires were completed by women prior to the intervention's implementation. The intervention took place over the course of 12 sessions. At the conclusion of the 12th session, the DASS21 questionnaire was once again completed by female participants.

3. Results and Discussions

Statistical Methods

The information gathered was analyzed with the help of SPSS version 20. (IBM, Armonk, NY, USA). The results were compared before and after the intervention using a paired sample t-test, which was performed in accordance with the established normality. The significance level was chosen at $P< 0.05$, which is the smallest possible value.

3.1 Results

The entire eligible sample consisted of 52 women with a mean age of 33.5 ± 6.5 years and a standard deviation of 6.5 years. Other demographic characteristics are included in Table 1, as well as other information.

Table 1 demographic characteristic of the women

Variable	n(%)
Age	33.5 ± 6.5*
MARITAL STATUS (%)	
Single	18(34.6)
Married	34(65.4)

JOB (%)	
Unemployed	10 (19.2)
Housewife	19 (36.5)
Employed	9 (17.3)
Retired	2 (3.8)
Other Jobs	12 (23.1)
Level of Income (%)	
Low	6 (11.5)
Average	36 (69.2)
High	10 (19.2)
Education (%)	
Primary	3 (5.8)
Diploma	13 (25)
University Degrees	36 (69.2)

*Mean ±SD SD = Standard Deviation

This study found a statistically significant difference between mean depression, anxiety, and stress scores prior to and after 12 sessions of regular hatha yoga practice that is disclosed in the table 2.

Table 2: Comparison of mean stress, anxiety and depression ratings before and after 12 sessions of regular hatha yoga practise was performed.

Variable	N	Mean ±SD	Correlation	P
Depression				
Before intrusion	52	6.5 (5.5)	0.8	0.001
After intrusion	52	5.1 (5)		
Anxiety				
Before intrusion	52	5.7 (4.5)	0.7	0.0001
After intrusion	52	4.2 (4)		
Stress				
Before intrusion	52	7.8 (4.8)	0.7	0.0001
After intrusion	52	5.6 (4.2)		

3.2 DISCUSSIONS

Women's tension, anxiety, and depression were shown to be significantly reduced after 12 sessions of intervention as regular hatha yoga exercise, according to the findings of this study. There have been several other studies that have confirmed the significant positive effects of yoga in the reduction of stress, anxiety, and depression. These include studies by Tayyebi and colleagues among hemodialysis patients, Rahnama and colleagues among multiple sclerosis patients, Javnbakht et al. among women living in Mashhad, and Gong and colleagues among pregnant women It was discovered in the study by Streeter et al. that participants who participated in a 12-week yoga intervention saw larger improvements in mood and greater decreases in anxiety than those who participated in a walking group. Oken et al. found no evidence of a substantial benefit of yoga on improving mood in patients with multiple sclerosis; nevertheless, the study's drawback is the short number of intervention sessions conducted (one session per week). Yoga, according to Dalgas et al., has a calming effect on the central nervous system and the mind. Moreover, unlike other sports, yoga has a calming effect on the nervous system, hormonal emissions, physiological factors, and the regulation of nerve impulses; as a result, it can be effective in treating depression and mental disorders. Due to the fact that there are no yoga clubs for guys in this area, this research was unable to include them as participants due to a restriction of the study.

4. CONCLUSION

Yoga has an effective role in lowering stress, anxiety, and depression, and it can be called supplementary medicine. It also has the potential to lower medical costs per treatment because it reduces the usage of pharmaceuticals and other medications. It is advised that further research be conducted to study the long-term effect of yoga on stress, anxiety, and depression, given that the explanation for the effect of yoga on stress, anxiety, and depression is not evident to us and may be ephemeral in nature.

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A Critical Review of Challenges Faced by Primi Mothers after Caesarean Section

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Abstract :

In recent years the number of caesarean sections has risen rapidly and this scenario is not creating a problem for health-related issues but also an alarming indication towards the health status of babies and mothers. The scenario becomes more difficult for those women who have never experienced such a situation earlier in their life, even they have not seen someone else going through such a situation. This situation pauses more challenges among such women. This study would try to explore the available literature to understand the problems faced by primi mothers in such situations. Present study uses secondary data such as research papers, periodicls and reports etc for completing the research paper. The author has gone through related literature and major viewpoints of different authors have been provided into the paper. The paper not focuses its attention on how primi mothers faces the issues but focuses its attention on what are the major challenges mothers are facing after their delivery by caesarean section. Some of the major challenges have been identified as no proper knowledge about how the situation is handled, no proper support from family and society, lack of proper counselling by medical professionals and lack of knolwdge & support for managing the family and work life balance effectively etc. These challenges are such problems which can be solved if proper knowledge is provided to both i.e. mothers and their families and if proper counselling is done by medical professionlas, it will enable the mother to face the problem more confidently etc. Helping a women would not only help the mother in managing their babies but will indirectly help the society in maintaining helathy growth of the nation.

Keywords: Primi Mothers, Caesarean Section, Challenges Faced by Primi Mothers, Pregnancy, Outcome of Pregnancy.

1.0 *Introduction :*

Caesarean section is a surgical method of delivery by surgical procedure. This method is generally adopted when there are some complications with respect to the normal delivery. Primi Mothers are those mothers who are undergoing delivery very first time i.e., they do not have given birth earlier to this pregnancy in any way i.e., neither vaginal delivery nor delivery by caesarean section.There can be so many challenges a mother can face especially primi mothers after the caesarean section and these challenges may cause concern among the women. This also impacts the normal growth of the baby and may cause medical complications as well. The present study will try to explore the review of literature available in this regard and try to explore the major challenge faced by mothers especially primi mothers after birth given to their babies by caesarean section.

2.0 Literature Review

Olaru et al., (2021), in their study found that the Experience of birth depends on many factors such as age, income, occupation and other factors (Olaru et al., 2021).**Wigert, H. et al., (2020),** in their study concluded that fear of women may be due to many reasons such as fear of no control or pain during the surgery and sometimes may be related to injuries that may arise due to such surgeries (Wigert, Nilsson, Dencker, Begley, Jangsten, et al., 2020). s**Davis et al., (2020),** performed a research study and found in the analysis that the post-surgery recovery period is very crucial for mothers and if they are informed and managed properly, they can be motivated to plan a normal delivery in subsequent childbirths(Davis et al., 2020). **Kallianidis et al., (2019),** conducted a study and concluded that caesarean section nowadays is considered a safe method of delivery for the new-born but it has many negative implicants and attention must be paid to decrease the rate to improve the health of mother and baby(Kallianidis et al., 2019). **Shelton & Lee, (2018),** performed research and found that mothers have reported certain challenges in doing exercise for the period after the birth of the baby such as unavailability of time and increase in responsibility (Shelton & Lee, 2018). **Haider et al., (2018)**, researched and explored that caesarean section rates

are rising rapidly but it is not directly related to enhancing the health condition of mother and baby but the contrast to it this procedure is becoming a cost-related burden for the family as well as for the government (Haider et al., 2018). **Sandall et al., (2018),** undertook a study and indicated that Caesarean section has been considered as a life-saving treatment method if applied properly but without indication of such surgery may increase the chances of maternal and fetal mortality, also may create a matter of concern for both mother and baby (Sandall et al., 2018). **Masukume et al., (2018),** undertook a research and indicated the results as there is no significant relationship has been found which can support the relationship between the delivery with the help of caesarean section and obesity among the children (Masukume et al., 2018). **Renuka & V, (2016),** in their study concluded that public awareness must be increased for decreasing the rate of caesarean sections, authors also pointed out that emergency CS is more common among those women who are comparatively at low age (Renuka & V, 2016). **Hobbs et al., (2016)** in their study stated that planned Caesarean section has been found associated with early signs of breastfeeding cessation and also stated that women with C section had more difficulties in breastfeeding as compared to their counterparts who have undergone vaginal deliveries(Hobbs et al., 2016). **A. Brown, (2016),** conducted a study and concluded that mothers are very positive about the promotion and education related to the importance of breastfeeding and say it should be done but they also opine that the way it is done should be changed(A. Brown, 2016). **Lindqvist et al., (2016),** researched and reported that medical professionals should also motivate women for doing the optimal level of exercise according to the guidelines and women should be made aware of the benefits of the same (Lindqvist et al., 2016). **Maharlouei, (2016),** in their study mentioned that if proper support to the mother is provided it not only helps the mother in managing her situation but also helps in reducing her postpartum anxiety, the author also suggested that training for the same should be given to both the mother and the father about how to treat the baby and the situation(Maharlouei, 2016). **Kok et al., (2014),** in their study explored that The author also indicated that there are high chances of Stillbirth and postpartum haemorrhage especially uterine in second delivery after planned first caesarean section compared to second delivery after first emergency caesarean section(Kok et al., 2014). **Mannion et al., (2013),** researched and the author mentioned active support by the father helps the mother in doing so and also helps in doing some other work so that the mother can do it easily(Mannion et al., 2013). **Waller-Wise, (2012),** wrote an article and reported that the family is the basic unit of society and they are always working as a single unit, be it any situation but they remain on one side so why in hospitals they are treated differently and why they cannot be treated as a single unit and why the hospitals are not providing them care as a single unit (Waller-Wise, 2012).

3.0 Objective of Study

1) To study challenges faced by mothers after caesarean section.
2) To study the challenges faced by primi mothers after caesarean section.

4.0 Research Methodology

This paper is descriptive in nature and based on secondary data. To complete this study various books, magazines, periodicals and journals have been consulted, and various reports have been reviewed. Internet & website searching has also been done to complete the study.

5.0 Results and Interpretations

5.1 Challenges faced by mothers after caesarean section

Lack of Partner Support : Partner means husband in this case, support of the husband in doing the housework and also giving mental support can help a woman in coping with the situation.

Lack of Knowledge and Awareness :. Making the right decision requires the availability of the right information such information can be increased by educating the women about the scenario.

Work-Life Balance: Many women are nowadays working professionals. There are many reasons because of which the mother needs to join their office as early as possible but this situation may increase their burden and may put them in stress on managing so many activities in one go.

Lack of Medical Counselling : This scenario is more common among those women who reside in non-urban areas as there is a lack of availability of medical professionals.

Demographic Factors: Demographic factors such as education, income, occupation and age have been found as important variables which may affect the outcome of caesarean section.

Lack of Social Awareness: Society is also responsible for helping women in such situations as they also have a moral responsibility of doing so.

5.2 Challenges faced by primi mothers after caesarean section

Challenges faced by primi mothers are not different from challenges faced by mothers having more than one baby but some challenges are more severe for primi mothers in comparison to mothers having more than one baby or we can say have some previous experience. Such challenges include a lack of knowledge and awareness, lack of medical counselling, lack of social awareness and certain demographic factors etc. These are the challenges which affect the primi mothers more deeply than other challenges. It does not mean that other challenges do not affect the primi mothers but the severity of these challenges is more for primi mothers than for mothers having more than one baby.

6.0 Future Scope & limitations of the Study : The study is based on secondary data. Reliability of secondary data is not under the control of the author. Though due care has been taken to rectify the concern but still there can be discrepancies from the side of the original data collector or researcher which is difficult to eliminate. The study is of much importance for the policymakers in the sense that they would be able to understand that what are the actual challenges mothers are facing. The research would also be helpful for the mothers in identifying the challenges they may face.

7.0 Conclusion: Women generally feel pain and find themselves in a condition where they need to manage their bodies as well as their babies after CS section. The situation may be more critical for those women who have no such experience. In such cases, some challenges may impact them more dominantly. Such challenges are lack of knowledge and awareness, lack of medical counselling, lack of social awareness and some demographic factors such as occupation, area of residence and education etc. Primi mothers may overcome the situation if proper education is given to them, proper medical counselling is done, moral and physical support provided by husbands, social support is provided by society and help is provided to mothers who are working professionals in this regard.

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A study to assess the Structured Teaching Programme on knowledge and Attitude regarding Importance of Play needs among mothers of under five year children in selected hospital, Garhshankar, Punjab.

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Abstract :

Play has many benefits for children, families and the wider community, as well as improving health and quality of life. Play provision can increase their self-awareness, self - esteem, self - respect and improve their physical and mental health. Objectives: To assess the knowledge and attitude on the importance of play needs among mothers of under five years children. Methodology: A Quasi experimental one group pretest post test research design and Convenient Sampling Technique was used. The data collection included three parts. Part A: Demographic variables, Part B: A Structured questionnaire to assess the knowledge, Part C: Attitude scale used to elicit attitude regarding Importance of play needs among mothers of under five children. The study was conducted in Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, Punjab and 50 mothers of under five year children were recruited for this study. Conclusion: The study concluded that the Structured Teaching Programme on knowledge and Attitude regarding Importance of Play needs among mothers of under five year children, was found to be effective in improving the knowledge and attitude of mothers as evidenced by significant change between pretest and post test knowledge scores.

Keywords: Assess, Importance of play needs, Structured Teaching Programme, Knowledge, Attitude, Mothers of under five children.

1. *Introduction :*

Play is an important medium for children for several reasons. Play is a natural language from which children express themselves. Developmentally, a play bridges the gap between concrete experience and abstract thought. Play offers children the opportunity to organize their real life experiences that are often complicated and abstract in nature. Child gains a sense of control through play and also learns coping skills. Play therapy utilizes this understanding of children by offering children a therapeutic environment.[1-4]

2. Need for study:

Play allows children to use their creativity while developing them imagination, dexterity and physical, cognitive and emotional strength. Play is important to healthy brain development. It is through play that children at a very early age engage and interact in the world around them play allows children to create and explore a world they can master, congruity their fears while practicing adult roles, sometimes in conjunction with other children or adult care givers.[5-8]

Play allows children to create and explore a world they can master, conquering their fears while practicing adult roles, sometimes in conjunction with other children or adult caregivers. As they master their world, play helps children develop new competencies that lead to enhanced confidence and the resiliency they will need to face future challenges. Undirected play allows children to learn how to work in groups, to share, to negotiate, to resolve conflicts, and to learn self- advocacy skills. [9]

3. Objectives of the study:

- To assess the pretest regarding knowledge and attitude on the importance of play needs among mothers of under five years children in experimental and control group.
- To develop and administer self-structured teaching program regarding importance of play needs among mothers of under five years children in experimental group.
- To assess the post test regarding knowledge and attitude on the importance of play needs among mothers of under five years children in experimental and control group.
- To associate the finding of post test of experimental and control group with selected socio demographic variables.

4. Research Methodology:

Quantitative Research Approach. Quasi experimental one group pretest post test research design. The setting of the study was conducted at Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, and Punjab. The samples selected for this study was 50 mothers of under five year children were recruited from Rai Hospital & Maternity Home, Garhshankar, Hoshiarpur, Punjab. Convenient Sampling Technique was used to select the sample. Self -Structured Knowledge Questionnaire and Five point likert scale was used.

Results:-

Table-1

Frequency and percentage distribution of demographic variables among mothers of under five years children in experimental and control group in selected hospital.

Sl. No	Demographic Variables	Experimental group (n=25)		Control group(n=25)	
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
1	**Age (in years)**				
	21-25	12	48%	09	36%
	26-30	08	32%	12	48%
	31-35	03	12%	02	08%
	36-40	02	08%	02	08%
2	**Religion**				
	Hindu	08	32%	09	36%
	Muslim	04	16%	06	24%
	Christian	08	32%	07	28%
	Others	05	20%	03	12%
3	**Education**				
	Illiterate	04	16%	05	20%
	Primary school education	06	24%	05	20%
	Secondary school education	08	32	07	28%
	Higher secondary education	04	16	05	20%
	Graduate	03	12	03	12%
4	**Occupation**				
	Home maker	12	48%	14	56%
	Government employee	03	12%	02	08%
	Business	0	0%	0	0%
	Self employee	10	40%	09	36%
5	**Monthly income (In Rupees)**				
	Below 3000	02	08%	04	16%
	3001-4000	08	32%	06	24%
	4001-5000	08	32%	06	24%
	Above 5000	07	28%	09	36%
6	**Types of family**				
	Nuclear family	16	64%	18	72%
	Joint family	09	36%	07	28%

7	**Number of children in family**				
	1 child	06	24%	05	20%
	2 children	10	40%	12	48%
	3 children	06	24%	05	20%
	More than 3 children	03	12%	03	12%
8	**Age of child**				
	New born	06	24%	07	56%
	Infant	04	16%	03	24%
	Toddler	08	32%	09	08%
	Pre-scholar	07	28%	06	12%
9	**Place of residence**				
	Rural area	12	48%	14	56%
	Urban area	08	32%	06	24%
	Sub urban	03	12%	02	08%
	Other place/ Slum	02	28%	03	12%
10	**Source of information regarding play needs**				
	Mass media	08	32%	07	28%
	Peer group	07	28%	08	32%
	Family members	06	24%	05	20%
	Health workers	03	12%	04	16%
	None of them	01	04%	01	04%

Table 1 depicted by the above table shows the demographic variables of the participants. In experimental group maximum 48%(12) of the subjects are from age group 21-25 years, 32% (08) of them belongs to Hindu and Christian, 32%(08) of them studied up to secondary school education, 48% (12) of the participants home maker, 32% (08) of them earned up to 3001-4000 & 4001-5000, 64%(16) belongs from nuclear family, 24% (06) of the participants had 01 child & 03 children, 32% (08) of the participant's children are toddlers, 32% (08) of them belongs to rural area and 32% (08) of participants get information from mass media. In control group maximum 48%(12) of the subjects are from age group 26-30 years, 36% (09) of them belongs to Hindu, 28%(07) of them studied up to secondary school education, 56% (14) of the participants home maker, 36% (09) of them earned above 5000, 72%(18) belongs from nuclear family, 48% (12) of the participants had 02 children, 36% (09) of the participant's children are toddlers, 36% (14) of them belongs to rural area and 32% (08) of participants get information from peer group.

Table 2:-

Distribution of statistical value of pretest and post test value of knowledge score among mothers of under five years children among experimental group.

Sr. No	Level of knowledge	Pretest		Post test	
		Frequency	Percentage	Frequency	Percentage
1	Inadequate	08	32%	0	0%
2	Moderately adequate	17	68%	05	20%
3	Adequate	0	0%	20	80%

Table 2 shows that the distribution of level of knowledge in experimental group before and after administration of structured teaching programme. In the pretest 8(32%) sample were found to have inadequate level of knowledge, 17(68%) sample were found to have moderately adequate level of knowledge. In post test 5(20%) sample was found to have moderate level of knowledge 20(80%) sample was found to have adequate level of knowledge. Hence administration of structured teaching programme had more significantly increased level of knowledge among mothers of under five years' children.

Table 3:-

Distribution of pretest and post test knowledge score among mothers of under five years children among control group.

Sr. No	Level of knowledge	Pretest		Post test	
		Frequency	Percentage	Frequency	Percentage
1	Inadequate	13	52%	0	0%
2	Moderately adequate	12	48%	14	56%
3	Adequate	0	0%	11	44%

Table 3 shows the distribution of level of knowledge in control group before and after administration of structured teaching programme. In the pretest 13(52%) sample were found to have inadequate level of knowledge 12(48%) sample were found to have moderately adequate level of knowledge. In post test 14(56%) sample was found to have moderately level of knowledge 11(44%) sample was found to have adequate level of knowledge.

Table 4:-

Distribution of Pretest attitude score among mothers of under five years children of experimental and control group.

Sr. No	Pretest attitude score	Experimental group		Control group	
		Frequency	Percentage	Frequency	Percentage
1	Unfavourable	12	48%	15	60%
2	Moderately favourable	08	32%	04	16%
3	Favourable	05	20%	06	24%

Table 4 shows comparison of pretest attitude score among mothers of under five years of children of experimental and control group in selected hospital.

In experimental group 12 (48.7%) samples were found to have unfavourable attitude 18 (32%) sample were found to have moderately favourable attitude 5(20%) sample were found to have favourable attitude. In control group 15(60%) sample were found to have unfavourable attitude 4(16%) sample were found to have favourable attitude.

Table 5:-

Distribution of Post test attitude score among mothers of under five years children of experimental and control group.

Sr. No	Post test attitude score	Experimental group		Control group	
		Frequency	Percentage	Frequency	Percentage
1	Unfavourable	14	56%	16	64%
2	Moderately favourable	07	28%	04	16%
3	Favourable	04	16%	05	20%

Table 5 shows comparison of post test attitude score among mothers of under five years of children of experimental and control group in selected hospital.

In experimental group 14 (56%) samples were found to have unfavourable attitude 07 (28%) samples were found to have moderately favourable attitude 4(16%) sample were found to have favourable attitude. In control group 16(24%) sample were found to have unfavourable attitude 5(20%) sample were found to have favourable attitude.

5. Discussion:-

The mean knowledge score in experimental group 16.8, standard deviation 2.53 and mean knowledge score in control group 15.48, standard deviation 3.32. The tabulated value was 2.069 and calculated value is 1.2316 which is less than table value hence there is no significance difference between level of knowledge in control group and experimental group before administering of structured teaching program. The mean pretest attitude score 12.34, standard deviation 5.96 and mean post test attitude score 20.22, standard deviation 3.10. The tabulated value was 2.069 and calculated t-test value was 15.93 greater than tabulated value. Hence, there is significant difference between pretest attitude score and post test attitude score.

6. Conclusion:

The study concluded that the Structured Teaching Programme on knowledge and Attitude regarding Importance of Play needs among mothers of under five year children, was found to be effective in improving the knowledge of mothers as evidenced by significant change between pretest and post test knowledge scores. There was no statistically significant association found that with the demographic variables of age, religion, education, monthly income, type of family, number of children, age of child, place of residence and source of information with $P<0.05^*$ level.

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Green Energy based Energy Harvesting Techniques for WSN based Railway Infrastructure Condition and Traffic Monitoring and ControllingSystems

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Abstract :

The performance of the WSN based monitoring systems in Railway traffic monitoring systems is mainly is limited by the energy efficiency of the WSN nodes. Rechargeable batteries are deployed to supply electrical energy to the WSN nodes. Since the WSN Nodes are deployed at remote places near to the railway tracks or to monitor railway infrastructures like bridges, tunnels or surrounding environmental conditions are often deprived from a grid power. Energy efficiency plays a major role for performance of the WSN networks. Once the power is depleted from the commercially deployed batteries the WSN nodes becomes "dead" temporarily till the battery is recharged again. So different green energy harvesting technologies to be deployed depending upon the actual location of the WSN nodes and the power requirement of the WSN nodes. This paper surveys readily available green energy harvesting technologies and proposes major factors while designing WSN node.

Keywords : WSN performance, Green energy, Energy storage, battery charging systems.

1. Introduction

Low cost WSN network is the key element of Railway Traffic Monitoring and Control systems in India now. The top ten emerging technologies includes a WSN network which is second largest network after Internet [1].Internet of Things (IOT) based WSN network is a backbone of railway monitoring systems[2].The main factor which limits the performance of the WSN network is Energy efficiency[3]. Rechargeable batteries are employed to power the WSN nodes. The battery life can be extended by various techniques [4].It is not always possible to in remote and in accessible locations to change the batteries even in the case of extended life batteries for on board monitoring systems the WSN nodes are embedded in the structure which is monitored. Replacing the batteries requires a special maintenance schedule which is time consuming and expensive and is nearly impossible [5]. WSN node becomes temporarily dead if the energy in the stored battery is fully consumed. In such situation the actual condition monitoring of the infrastructure and or traffic monitoring is at high risk and may cause a fatal accident.

To retain battery energy different techniques has been proposed like recharging operations. The network performance is decreased with these recharging operations since it is slow and sometimes expensive and may have time period in which the recharging is possible. For example Solar Panel based recharging operations has charging window period of 6to 8 hours. The electrical energy harvested from solar energy (sunlight) can also be used directly to power a WSN node. Alternatively, the collected

Energy may be warehoused in a rechargeable battery (or a super capacitor) for future purposes (e.g., during nighttime when sunlight is not available) [6].

The major problem of the WSN batteries is the leakage current .The depletion of the energy in batteries is to be slow down. The duty cycle based operation and power control techniques plays important role in keeping WSN node active for a longer time .Sleep mode approach plays a major role in retaining the battery power for a longer time and is proven very effective. The sleeping WSN nodes can be activated by simply detecting a pressure signal from a strain gauge [7].Re-chargeable batteries and Super capacitors are the energy –storage systems widely employed in WSN networks.[8].Energy-storage density ,discharging, leakage current, size of the energy –storage device and Life time of it plays major factor for selection as a power source for WSN network[9].Apart from that the batteries used for WSN networks should not affect the environment .Each

WSN network may use one or more batteries but the volume of the WSN network is rapidly increasing in every application in Railway systems so the total volume of the batteries after their usage may affect the environment, hence disposal of such used batteries requires a standard procedure and careful methodology to dispose it collectively. Since the WSN network is second largest network other than Internet network the new energy Green energy harvesting and energy storage system is main focus area of the research now. Due to higher leakage current and lower power density Super capacitors are seldom deployed in Railway applications [10].

In impenetrable zones non rechargeable batteries power up the WSN nodes. The life time of such WSN nodes is decided by the battery life time .There is a rapid development in electronics field so day by day most powerful WSN nodes with small size and high data sampling capacities are employed in Railway applications. However the development in battery technology is comparatively is slow and not developing at the same rate as that of electronics field. The discharge characteristics of the battery and surrounding temperature conditions plays a significant role decides the WSN life time [11]. WSN nodes have a limited energy and needs to be optimized in order to increase the operational life time of the sensor nodes.

Energy Harvesting, Energy Transfer and Energy Conservation these are the main factors which determines the performance of the WSN nodes and a base station which is in remote railway field. Dedicated Green Technologies based hardware is required to charge the batteries of the WSN.

For WSN installations at a large scale the energy harvesting and energy transfer increases hardware complexities, size of the WSN nodes and cost hence it is not popular. For WSN energy conservation algorithms are used to optimize the energy requirement.

WSN Batteries are highly non linear devices and their performance largely depends up on the surrounding environmental conditions such as humidity, vibrations, temperature fluctuations and electrochemistry of the battery Therefore for WSN node energy –aware algorithms requires specific battery characterization [12].

2. Green Energy harvesting for WSN nodes.

Energy can be extracted from surrounding environment and can be transferred to energy storage devices to power the railway WSN networks. The railway network in India has wide variety of environmental conditions. Hence based on geological and surrounding environmental favorable parameters can be exploited to extract the energy for WSN nodes. Today it is possible to to extract energy from surrounding physical parameters due to the developments of sensor and harvesting various technological methods .Some of the challenges and opportunities are mentioned briefly in this paper.

Energy harvesting for WSN nodes can be done from various energy types available in railway field as indicated by Fig 1.

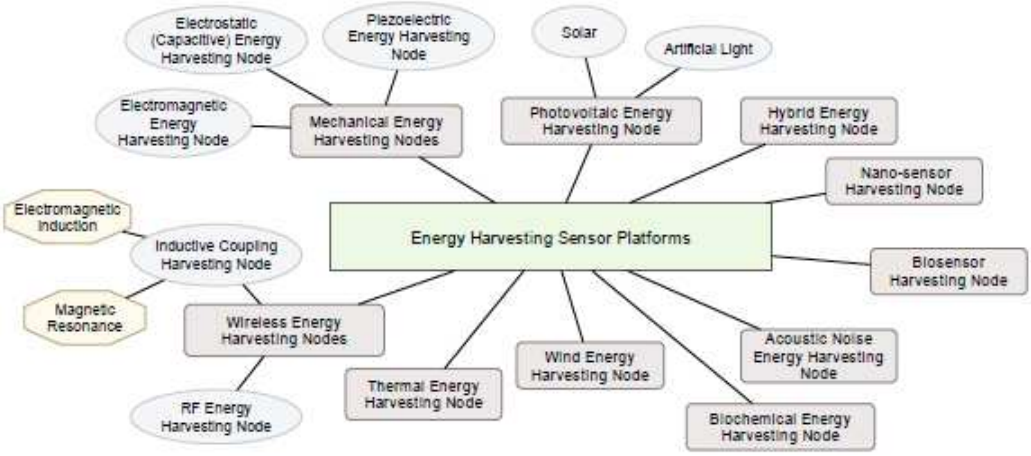

Fig.1: Types of Energies and Sources[13].

2.1 Mechanical Energy Harvesting

As the name suggests the Mechanical energy is converted into Electrical energy .Displacement of and oscillations of the springs converts the mechanical energy into an electrical energy from the surface of the sensors, high pressure motors, waste rotational movements and Force. Mechanical energy harvesting can be: Piezoelectric, electrostatic and electro-Magnetic.

Piezo-electric crystals are able to convert mechanical pressure into electrical voltage at the surface of the piezoelectric crystal is used here. Mechanical energy from pressure, force or vibrations is transformed into electrical power by straining a piezoelectric material such as quartz crystals or Roschell Salts.

A cantilever structure is used with a seismic mass attached into a piezoelectric beam that has contact on both sides of peizo-electic material can convert mechanical energy into an electrical energy. Strains in the piezoelectric material produce charge separation across the harvester, creating an electric field and hence voltage, proportional to the stress is generated.

AC signal is generated whose voltage varies with respect to time randomly as per the mechanical pressure and or stress on the surface of the piezoelectric crystal beam. [14].It is an active transducer hence does not require a separate energy source. The high voltages can be generated for a short time and when used with the low pass filter this energy can be transferred to the energy storage batteries for WSN nodes.

2.2 Electromagnetic energy harvesting

Faradays law of electromagnetic induction. is used to convert mechanical motion into energy harvesting for a WSN node. Inductive spring mass system for converting mechanical energy to electrical energy .The voltage is induced by a moving a mass of magnetic material through a magnetic field created by a stationary magnet. Vibrations of the permanent magnet attached to the spring inside the coil changes the flux and produce an induced emF as per the faradays laws of electro-magnetic induction. The induced emf is directly proportional to the rate of change of the flux as well as on the number of turns of the coil. Some examples of electromagnetic energy harvesting systems are presented in [15].

2.3 Light energy Harvesting:

It is most widely used energy harvesting technique in railway applications not only for powering the WSN nodes but for signalling Systems also it has been effectively used. Light is harvested into an electric energy using a photovoltaic (PV) cellar a Solar Cell. Solar provides an excellent source of energy for wireless systems or stand-alone device that have no access to fixed power. Given the commercial interest in green technology and alternative energy sourcing, Solar or Photovoltaic (PV) cells continue to improve at a rapid pace, both in terms of higher efficiencies and lower production costs. On an average, the amount of solar energy falling onto a square meter at the equator of planet earth is 1000 w/m2 [16].

When the light falls on the PN junction of a photovoltaic cell it releases electrons. Photovoltaic energy conversion is a traditional, mature, and commercially established energy-harvesting technology. It provides higher power output levels compared to other energy harvesting techniques and is suitable for larger-scale energy harvesting systems. The efficiency of the conversion of the photovoltaic cell depends upon the several factors such as availability of the light, materials used for photovoltaic cells, conditions of photovoltaic cells etc.

2.4 Thermal energy harvesting

It is implemented by thermopile or thermocouple. Thermoelectric energy harvesting is the process of creating electric energy from temperature difference (thermal gradients) using thermoelectric power generators (TEGs). [17].The core element of a TEG is a thermopile formed by arrays of two dissimilar conductors, i.e., a p-type and n-type semiconductor (thermocouple), placed between a hot and a cold plate and connected in series. Recent developments in Thermoelectric energy harvesting is successfully applied in railway applications can be useful in extreme weather conditions such as Himalayan railway stretch.

2.5 Pyroelectric energy harvesting

It is the process of generating voltage by heating or cooling pyroelectric materials. These materials do not need a temperature gradient similar to a thermocouple. Instead, they need time-varying temperature changes. Changes in temperature modify the locations of the atoms in the crystal structure of the pyroelectric material, which produces voltage. To keep generating power, the whole crystal should be continuously subject to temperature change. Otherwise, the produced pyroelectric voltage gradually disappears due to leakage current [18].

Pyroelectric energy harvesting achieves greater efficiency compared to thermoelectric harvesting. It supports harvesting from high temperature sources, and is much easier to get to work using limited surface heat exchange [19]. On the other hand,

thermoelectric energy harvesting provides higher harvested energy levels. The maximum efficiency of thermal energy harvesting is limited by the Carnot cycle [20]. Because of the various sizes of thermal harvesters, they can be placed on the human body, on structures and equipment. Some example of this kind of harvesters for WSN nodes in near future can be deployed in railway fields to power WSN nodes.

2.6 Wireless energy harvesting techniques.

Recently wireless energy harvesting technology has gained lot of attention for low power applications such as human wearable electronic gadgets and also for WSN nodes. With the rapid development of silicon technology, even a tiny amount of energy is able to do plenty of work. Energy harvesting intends to scavenge wasted energy from the ambient environment. Electromagnetic radiation can be utilized to power low-power devices in an eco-friendly manner. EH is a promising solution to power sensors, wearable's, biomedical implants, RFIDs, and so on.[21]

Wireless energy harvesting can be categorized into two main categories: RF energy harvesting and resonant energy harvesting. RF energy harvesting is the process of onverting electromagnetic waves into electricity by a rectifying Antenna, or Rectenna.

Energy can be harvested from either ambient RF power from sources such as radio and television broadcasting, cellphones, WiFi communications and microwaves, or from EM signals generated at a specific wavelength. Although there is a large number of potential ambient RF power, the energy of existing EM waves are extremely low because energy rapidly decreases as the signal spreads farther from the source. Therefore, in order to scavenge RF energy efficiently from existing ambient waves, the harvester must remain close to the RF source. Another possible solution is to use a dedicated RF transmitter to generate more powerful EM signals merely for the purpose of powering sensor nodes. Such RF energy harvesting is able to efficiently delivers powers from micro-watts to few mill watts, depending on the distance between the RF transmitter and the harvester[22].

Resonant energy harvesting,

It is also called as resonant inductive coupling. In this process it transfers and harvests an electrical energy between two coils, which is highly resonating at the same frequency. Specifically, an external inductive transformer device, coupled to a primary coil, can send power through the air to a device equipped with a secondary coil. The primary coil produces a time-varying magnetic flux that crosses the secondary coil, inducing a voltage. In general, there are two possible implementations of resonant inductive coupling: Weak inductive coupling and strong inductive coupling. In the first case, the distance between the coils must be very small (few centimeters).

However, if the receiving coil is properly tuned to match the external powered coil, a \strong coupling" between electromagnetic resonant devices can be established and powering is possible over longer distances. Note that since the primary and secondary coil is not physically connected, resonant inductive coupling is considered a wireless energy harvesting technique. Some recent implementations of wireless energy harvesting techniques for WSNs can be found in [23].

2.7 Wind energy harvesting

Energy in the air flow can be converted into electricity. It is the most proven technology in remote areas and also it supplies energy to the power grids in most parts of India now. The most advantage of this technology is that it can be used in the day time as well as in a night time also, unlike solar panels which harvest energy only in a day time Solar panel produces little or less energy in monsoon season due to the lack of clear sun shine. But wind energy harvesting technique is suitable in a region where minimum speed of the wind is more than 40 km/hour and deployed especially in mountain regions. Since Indian Railway is constructing a new railway network in Himalayan region from Banihal to Jammu section as well as in Leh to Bilaspur stretch where the railway shall travel at the height above 10,000 feets above sea level .This technology shall be very useful to harvest the wind energy into an electrical energy for monitoring the railway field in such Himalayan rail network.. Many eco friendly materials are now used and which can be recycled as wind turbine blades and are light weight so they can be transported easily to the remote regions in Himalya.

A properly sized wind turbine is used to exploit linear motion coming from wind for generating electrical energy. Miniature wind turbines exists that are capable of producing enough energy to power WSN nodes [24].

Aeroelastic instabilities such as vortex induced vibrations coupled with piezo electric materials using cantilever beam is one possible solution other than miniature wind mill for energy harvesting. Many new designs has been discussed in various wind energy harvesting survey papers recently [25]

However, efficient design of small-scale wind energy harvesting is still an ongoing research, challenged by very low flow rates, fluctuations in wind strength, the unpredictability of flow sources, etc for railway network other than Mountain region parts of India.

2.8 Bio chemical energy harvesting.

The Railway networks are exposed to variety of environmental variations. coastal railway networks has a vast energy available in sea waters near to the railway tracks, The energy in sea ,ponds and rivers in Bio Chemical l forms harvesting is the most recent energy source can be tapped to harvest for small power applications where the other ambient energy cannot be harvested.

In this the endogenous substances and oxygen is converted into electricity via electrochemical reactions. Bio fuel cells acting as active enzymes and catalysts can be used to harvest the biochemical energy in bio fluids into an electrical energy. There are many fluid substances in human body can be converted into an electricity using enzymes and catalysts [26].

Research efforts have proposed many innovative prototypes that use biochemical energy harvesting to power microelectronic devices and can be applied in railway monitoring WSN network in near future.

Acoustic energy harvesting:

Railway field WSN requires very less power and this requirement can be easily fulfilled by some acoustic energy harvesting devices, where in railway field the noise level is always more than 80 db in extremely busy tracks and railway yards where electric grid power is not easily available at remote locations.

Here continuous acoustic wave in surrounding railway field is converted into an electric energy by an acoustic transducer or by a suitable resonator. The harvestable acoustic emissions can be in the form of longitudinal, transverse, bending, and hydrostatic waves ranging from very low to high frequencies [27].

Efficiency of the harvested acoustic power is low and such energy can only be harvested in very noisy environments. Harvestable energy from acoustic waves theoretically yields 0:96_W=cm3 [28], which is much lower than what is achievable by other energy harvesting techniques. Acoustic waves belong to one kind of mechanical waves and utilizing ambient energy sources has always been a hot topic in recent years. Generally, acoustic energy is ultimately dissipated into thermal energy at the propagation stage, and low- and mid frequency sound waves have attracted the most attention.[29] An AEH device has low requirements in terms of installation and operation, and can be integrated into other engineering structures to obtain smart structures.

All previously described harvesting techniques can be combined and concurrently used on a single platform (hybrid energy harvesting). A bird's eye view of the amount of energy harvestable from different sources is given in Table 1.1. For each energy harvesting technique we show its power density and conversion efficiency. The power density expresses the harvested energy per unit volume, area, or mass. Common unit measures of power density include watts per square centimeter and watts per cubic centimeter. Conversion efficiency is defined as the ratio of the harvested electrical power to the harvestable input power. The energy conversion efficiency is a dimensionless number between 0 and 100%.

Energy harvesting technique	Power density	Efficiency
Photovoltaic	Outdoors (direct sun): 15 mW/cm^2 Outdoors (cloudy day): 0.15 mW/cm^2 Indoors: <10 $\mu W/cm^2$ [9, 21, 105, 126]	Highest: $32 \pm 1.5\%$ Typical: $25 \pm 1.5\%$ [48]
Thermoelectric	Human: 30 $\mu W/cm^2$ Industrial: 1 to 10 mW/cm^2 [53, 126]	$\pm 0.1\%$ $\pm 3\%$ [126]
Pyroelectric	8.64 $\mu W/cm^3$ at the temperature rate of 8.5° C/s [77]	3.5% [125]
Piezoelectric	250 $\mu W/cm^3$ 330 $\mu W/cm^3$ (shoe inserts) [21, 105]	*
Electromagnetic	Human motion: 1 to 4 $\mu W/cm^3$ [88, 121] Industrial: 306 $\mu W/cm^3$ [8]; 800 $\mu W/cm^3$ [121]	*
Electrostatic	50 to 100 $\mu W/cm^3$ [124]	*
RF	GSM 900/1800 MHz: 0.1 $\mu W/cm^2$ WIFI 2.4 GHz: 0.01 $\mu W/cm^2$ [9]	50%[8] [94]
Wind	380 $\mu W/cm^3$ at the speed of 5 m/s [103, 104]	5% [103]
Acoustic noise	0.96 $\mu W/cm^3$ at 100 dB 0.003 $\mu W/cm^3$ at 75 dB [14, 95]	*

CONCLUSION

WSN network is a backbone of the railway traffic monitoring and control which communicates the railway field information with highest speed using integrated IOT technologies. Hence its operation is very crucial for smooth functioning of the railway traffic monitoring and control. Since WSN networks are deployed in remote locations and are exposed to the extreme weather conditions. Since the power grid is not available at such a remote locations energy requirement for smooth functioning of the WSN nodes is a major issue. We can explore suitable methods to power up the WSN Nodes and Sensor nodes using suitable green energy harvesting technologies mentioned above in our paper for future WSN sensor node in specific environmental conditions.

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The Craft Management (Indian Crafts of India)

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Abstract :

The Indian Crafts are experiencing a revival in modern society, but our understanding of its role in global society remains limited. It is an important sector of the new economy, with the potential to reduce inequality in modern society and a value to the Craft culture and Craftsmanship of Indians. As a result, improving our understanding of the craft revival appears to be of utmost importance. Furthermore, we lack a solid understanding of the diverse organizations and networks like Trend Forecasting, Design process and Web 3 platforms, which when skillfully and creatively applied in managing craft production and distribution will bring strength in the industry. These are the key factors that can achieve a balance between traditions and Cultural innovations.

The purpose of this research is to bring together diverse methodologies and solutions on the Indian craft to Discuss the importance of the Crafts and recent developments in the area.

1. ***Establish a course for future research, progress, planning and execution with Trend Forecasting Tool.***
2. ***Engage in methods of promoting the craft globally and strengthening the core craft community***

"Identifying a unique angle on understanding craft through extensive expertise studying the interplay between design and business with Trend Forecasting, Design Process and technology. My ongoing research is focused on traditional crafts growth in India and their management".

Keywords : Craft Culture, future research, Craft community, Trend Forecasting, Design Process, technolog

Introduction :

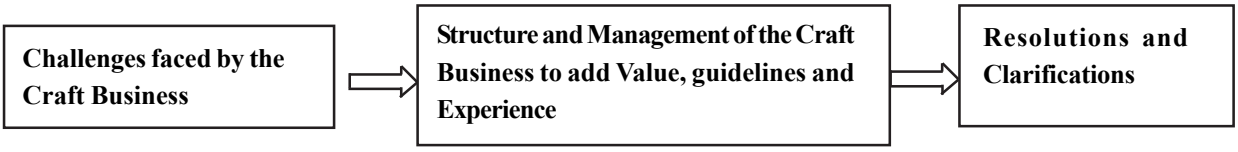
Throughout my journey as Faculty at NIFT Mumbai (Ministry of textiles) for the past 18 years, I have been deeply involved with various crafts like Banjara, warli Painting, Lambadi, crochet, etc. in form of craft cluster projects with students, we would study and involved in

their process and working, build questionnaires to understand the gaps between Design and their Business, this has led me build first hand data on their real problems and challenges that needs solution and expansion.

It is time for the Craft industry to adopt modern solutions and advanced methodologies to add value and purpose to their craftsmanship.

Handicrafts have great potential, as they hold the key for sustaining not only the existing set of millions of artisans spread over the length and breadth of the country but also for the increasingly large number of new entrants in the crafts activity. Presently, handicrafts contribute substantially to employment generation and exports.

In this research paper of "The Craft Management", I will describe



or the revival of craft, we also are lacking a solid understanding and process of **the unique organizations and networks** that engage in craft production and supply.

- we **have a limited** understanding of the survival, global upgrade and preservation of heritage craft firms, their strengths, styles, distribution and global exposure
- many fields contain traditional craft firms that have somehow been able to survive the era of globalization and corporate. The key for these organizations' survival appears to be striking a balance between the maintenance of **tradition and innovation, for example using intricate embroidery prints instead of techniques and lowering the cost of production.**
- Similarly, craft entrepreneurs and organizations are trying to find balance in the craft revival struggle with finding a balance between the **authentic restoration** and the innovative transformation of their crafts to build successful firms of alternative form.
- These unique forms of organizing with the Trend Forecasting tool provide a great opportunity to enhance our existing theories of organizations, yet relatively little work has been done in the area so far.
- Secondly, I will elaborate on the understanding of the craft movement and related dynamics required to look at the organizations who are constructing and reviving crafts and are diffusing and maintaining craft knowledge and skills. The division of the craft industry in different craftsmanship skills and efforts is another way to appreciate and add value.

CHALLENGES

SECTOR GROWTH The lack of organized system in Handicraft sector has been the major challenge and along with it, the additional issues are of lack of education, low capital, and poor exposure to new technologies, absence of market intelligence and tools, and a poor institutional framework, neglecting the value and importance of real craftsmanship.

ABSENCE OF TOOLS lack of professional touch in craft building practices, Design Processes and The Trend Forecasting tool.

EXPOSURE OF THE CRAFT Outdated Production Methods

DESIGN PROCESS & TREND FORECASTING - due to the breakdown of the historic artisan-consumer relationship, and the increasing urbanization and globalization of markets for craft, artisans have difficulty understanding how to tailor their products to changing demands.

LACK OF AUTHENTICITY Artisans industry is manipulated by fake product manufacturers.

MARKET AND TREND ANALYSIS -lack of Market Linkages

MANIPULATION dominance of middlemen Inadequate information of **NEW TECHNOLOGY**

COMMUNITY BUILDING - Less interest of young people in craft industry.

Handloom vs Power loom Industry - In crafts such as weaving, handloom weavers have to compete with the power loom industry for high quality raw materials, which are more easily accessible to the power loom industry as a result of **Government subsidies**

Lack of financial Aid, Artisans economic and value growth

FUNDING PARAMETERS – Craft producers suffer greatly from a lack of working capital and access to credit and loan facilities, in spite of many available schemes by the Indian government the aid and help never reach Craftsmen and Creatives on time, as a result of this the growth is delayed and is not in synchronization with the global demands. Banks offer poor recovery rates, wrong utilization of funds, lack of marketing facilities for finished products and lack of education on part of the borrowers as reasons for the low proportion of loans made to artisans. In general, this forces artisans to borrow from their local moneylender or trader at high interest rates and they are always trying to meet ends meet, resulting in discouragement of the craftsmen's skills and value.

NEW GENERATION'S DISINTEREST – Rural youth are increasingly disinterested in continuing their family craft traditions, for three main reasons. First, having seen their parents struggle to find markets and fair prices for their products, there is no value added to the skills that our people have, they are inclined to pursue other trades for money as the wages paid to them are not enough in comparison to the selling of the products. The market is totally undervalued when it comes to paying the creators, Second, the school system today does not integrate lessons regarding the importance of crafts into the school curriculum, and instead students are pushed towards corporate jobs, even if they are lower paying. Lastly, the crafts are strongly associated with a family's caste. In many cases, such as leatherwork, artisans are ostracized for being from the lowest caste, which further dissuades rural youth from joining the family trade as it puts them in categories, instead of doing it as pride.

STRUCTURE AND MANAGEMENT OF THE CRAFT INDUSTRY

UNESCO -UNCTAD/WTO (ITC) adopted a definition for handicrafts that says **"Artisan Products are those produced by the artisans, either completely by hand, or with the help of hand tools or even mechanical means, as long as the direct manual contribution of the artisan remains the most substantial component of the finished product. The special nature of artisanal products derives from their distinctive features, which can be utilitarian, aesthetic, creative, culturally attached, decorative, functional, traditional,**

religiously and socially symbolic and significant."

The New redefined framework of the Indian Craft Industry is structured below

1. **Community Empowerment and diversification**: To empower handicraft artisans by making them active entrepreneurs-cum-primary stakeholders of development and giving them stature and compensation, enhancing their operational efficiency and competitiveness, and enabling them to face new challenges as a viable, self-supporting economic entity with global exposure.
2. **Emphasizing on Craft education in schools**, encouraging and allowing global exchange and development programs.
3. Inclusion of Trusted Creative Tools and Processes: **DESIGN PROCESS & TREND FORECASTING**
4. **RESPONSIBLE PRODUCTION & DEVELOPMENT** Environment and conservation need to be conceptualized together. A number of items can be designed which will have both aesthetic and utility value, merchandise made out of materials such as bamboo, wood, jute, terracotta, recycled paper and earth. The wood used in artifacts may be compressed out of wood shavings, an approach of responsible behavior.
5. Tourists are major consumers of craft goods. **Foreign tourists** should be able to have **easy access to non-exploitative avenues to source their purchases and experience** it as cultural and craft exchange in TRADE **SHOWS**. There are several untapped international market channels, e.g., museums, boutiques and other niche markets. The trusted tools of trend forecasting also plan the development and distribution of the craft as per the **geographical needs**.
6. **International Volunteer exchange programs**, with the help of continuous evolving tools Design Process and Trend forecasting can bring new developments and value to the craft market. It will also bring global exposure to various crafts.
7. The Craft Industry should have an exposure to **WEB 3 world of NFT, BLOCKCHAIN SYSTEM** – to be able to UpToDate and benefit Digitally also **protection and documentation** of their work.
8. The International Volunteers programs can help in the **exchange of monetization methods**, added **value** and distribution in multiple categories / Industries.

- **International Communal Structure**
- **TOOLS - The Trend Prediction and Design Procedure**
- **RADE SHOWS – foreign tourist**
- **INTERNATIONAL VOLUNTEER exchange programs**
- **WEB 3 and BLOCKCHAIN SYSTEM introduction in craft design promotion**

The state should have clear guidelines for the handicrafts industries, which should be overseen by a specific nodal directorate/ department.

A critical review of the efficacy of the schemes and programs initiated so far by the state and the Centre for the growth of handicrafts in the state by a reputed non-government agency/institution, even by a foreign expert with or without assistance from UNDP/World Bank, is required in order for appropriate lessons to be learned and strategies to be formulated.

A clear need is highlighted for proper synergy and coordination to be ensured between the Central and state government agencies and institutions involved in the development of handicrafts, just as it is critical that the institutional mechanism is imbued with the requisite ethos and elan appropriate to this vital sector, which essentially deals with the community that has existed on the margins; a concerted and sustained effort to provide them support would itself be a significant achievement.

Over 800 Development Commissioner (Handicrafts) staff in the central region must obviously be drastically reduced and their deployment appropriately reoriented.

Different developmental schemes, and agencies, in the purview of the state government involved in rural development, infrastructure development, industrial development, etc. would necessitate proper coordination for the resources to be

correctly targeted according to an **umbrella master plan with Trend Forecasting** that may be put in place as per geographic requirements, action plans, big idea, product variations and creations.

The State Directorate of Industries should conduct **a survey on occupational hazards/diseases and challenges associated with certain crafts,** and follow up for appropriate techniques/processes/methods to overcome them.

Continuously **questionnaires** should be conducted and analyzed to **bridge the balance**

between Majors:

Design – Business – Craftsmanship

REASONS TO JOIN CRAFT INDUSTRY

Reasons to join the Handicraft	Frequency	Percentage
Easy	**7**	**17.5%**
Less Investment	**4**	**10.0%**
Utilization of Free Time	**26**	**65.0%**
Govt. Assistance	**2**	**5.0%**
No Decision	**6**	**15.0%**

The majority of artisans work in the traditional and poorly coordinated manner, where they are vulnerable to exploitation and low wages. They are at the bottom of the social and economic hierarchy. These people are mostly employed in household or cottage industries, where they work hard but do not earn enough to live on. The middlemen who take a major portion of the profit, leaving very little for the artisans, are a major issue in this situation.

Historically, artisans were the backbone of Indian society, but today they are the most valuable character for development.

There is a need for a collaborative approach to sector development, such as the establishment of some prototype hobby Centre's for children in selected schools, particularly among selected craft clusters, to instill skills and interest in the development of regional crafts, allowing children to pursue viable vocations.

Welfare-oriented programs in favor of craftsmen should be taken up by harnessing schemes in areas like Rural Development, Education and Health, etc.

The issue of craftsmen's housing needs may be linked to rural housing programs.

The main areas for which management and assistance are required include the following:

- supply of raw material/credit facility,
- common facility,
- procurement,
- technical assistance,
- skill upgradation,
- related social services.

SOLUTIONS FOR THE INDIAN CRAFT INDUSTRY

The Community Building Development & Expansion on Global Level

Inclusion of Trusted Tools for continuous organized growth, THE TREND FORECASTING & DESIGN PROCESS

Schools and Colleges involvement, participation and learning projects DESIGN & AESTHETICS

Maximize unit value realization by means of quality upgradation, improvements in packaging and presentation, value addition in terms of information regarding the characteristics of the craft and the craftsmen, as well as suggestion for maintenance and upkeep of the product.

Diversification of products and markets for a substantial increase in export volumes with help of Trend Analysis and Trend Spotting.

Exposure to Media and technological advancements for the awareness among craftsmen about international requirements and market.

Focus on building planned TRADE SHOWS in INDIA as well as Internationally, attracting tourism and Volunteer exchange Programs.

Documenting and constructing Digital Portfolios for each and every Indian Craft through volunteering programs and various service exchange opportunities.

Introduction to WEB 3 platform that can equip the Indian Craft Industry with Artist work Credibility and various other benefits, it can strengthen the economics

Enforcing Fair Pay and Overcoming Gender Disparity

CONCLUSION

The handicraft sector must develop flexible work models as well as upskilling programs for the next generation in order for them to actively participate in the generation of handicrafts. Finally, the government's social and welfare programs must be easily accessible to each artisan. While many schemes exist, their knowledge and accessibility are still limited.

New-age businesses and entrepreneurs, in particular, can play an important role in propelling this forward by bringing technology prowess and expertise to the grassroots and providing access to digital markets. Several handicraft industry founders agree that the buying experience of craft products needs to change—with more awareness, interaction, and emotional connection. As part of this, a concerted effort must be made to educate new-age customers on the various Indian handicrafts, their creation, and skill, in order to foster a greater appreciation for the art. We can increase appreciation and acceptance of Indian handicrafts by bringing artisans to the forefront of the conversation, visual documentation, and advertisements.

The Trend Forecasting tool has the capability of translating our Indian Craft,

- it is important because it helps prevent businesses from spending resources on products that may not be successful with their target audience and instead allows them to create products that meet the desires and priorities of their customers.
- It builds the responsible **Big Idea and the concept** for the products to be produced and placed in the market.
- It helps understand, develop and promote crafts based on **geographical needs** and requirement
- Trend Forecasting is the process **of researching and formulating** predictions on consumers' future buying habits. By identifying the source, tracing the evolution, and recognizing patterns of trends, forecasters are able to provide designers and brands with **a 'vision' of the future.** Forecasters research and identify social, cultural, ethical, or environmental shifts, and how they are likely to affect future consumer behavior. Through this process, they can identify products and services that consumers will be looking to buy.
- Added Value to the Craft Industry by Studying and applying trends as per the selected season and have a closer look at the markets that are being catered for creating better tomorrow.
- Very importantly, deciding on the product category with **Trend Analysis, Trend Spotting, Zeitgeist, Strategy window, Trend and Color Forecast.**

The Design Process Tool is a defined system of steps presented to aid a designer in the planning and execution of a plan. it involves the Creative thinking process and the creative engagement techniques to determine successful final products.

With Trend Forecasting and Design Process the approach towards marketing crafts will be updated. It is clear that online presence is no longer a choice and is a requisite. The internet is also the perfect medium to put across the intimate story of an artifact. Consumers can be targeted precisely across the world through a result-oriented action plan that will multiply engagement. The power of visual engagement that the web provides can work wonders for driving business for the craft industry.

Trend Forecasting and Design Process will work with the evolution and adaptation of the products to match the utility of modern life. The crafts industry cannot churn out profits from mere nostalgia. It has to catch up to the current realities of changing consumer behavior, rapid urbanization, and a generation that has little knowledge of the intricate detailing in a piece of craft. There is a market beyond the emporiums that needs to be captured. The product approach for this industry should shift from decorative and ornamental to functional. This calls for a fraternizing work environment involving design schools, local artisans, merchants, and international buyers.

The future of the crafts industry remains optimistic. A favorable economic environment can facilitate the engagement of bright entrepreneurial minds capable of transforming this segment into a strong area for start-ups and capitalize on the interconnection of tradition and technology. There may be a profitable enterprise that produces sustainable building materials that also aid in temperature control in houses built with various clays used by artisans to create ancient artifacts. The skilled jaali makers can be commissioned to recreate their ancient magic in modern homes, which will not only help with ventilation but will also enchant the residents with light and shadow play every morning and evening.

It is past time for the crafts industry to be given the attention it deserves. With the current push for locally produced goods, this sector is in a strong position. With the right resources and investment, this industry can grow into a thriving industry that will benefit millions of people. Start-ups and entrepreneurs can capitalize on this opportunity to the best of its ability by combining community experience with a reconstituted marketing approach to this traditional trade. This one-of-a-kind industry situation necessitates proactive measures to boost the entire genre. To ensure the survival of trade and turn it into a flourishing business, the current scenario necessitates a comprehensive amalgamation of intervention and innovation in digital as well as organized creative strategies related to this field.

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Women: Major Drivers in the Eradication of Poverty and Hunger

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Abstract :

Eradication of hunger and poverty is a top priority of the international development agenda. However poverty reduction policies have mostly focused on men which has widened the gap in productivity and income between the two genders and that has led to gender inequality. This paper aims to determine the impact of a multicomponent program on women's empowerment and their role in poverty reduction. Empowered women further improve the livelihood of poor households and helps lift them out of poverty and malnutrition researchers and policymakers need to pay more attention to poverty issues phone perspective of gender.

Keywords: Women, hunger, empowerment poverty

1. ***Introduction :***

Today's world is characterised by the coexistence of agriculture bounty and widespread hunger and malnutrition. Global evidences shows that ensuring adequate and nutritious food supply is still a challenge in the 21st century for many economies including developed and developing ones. Malnutrition ranges from extreme hunger to undernutrition to obesity found in all countries irrespective of the economic development. Undernourished are found in all countries across the globe specifying the lack of adequate nourishment in their diet .

Hunger in its broader term signifies health and nourishment and also the outcome due to it .Despite all the scientific research in the field of nutrition and agriculture the world still has unacceptable high number of undernourished people

According to WHO there are roughly 800 million undernourished people around the globe of them 780 million underdeveloped countries the continent of Africa and Asia have the greatest number of people living in extreme poverty. Women are pivotal to addressing hunger, malnutrition and poverty specially in the developing countries .They comprise approximately 43% of the agriculture labour force across the developing countries yet their participation in decision-making ,also in leadership of rural institution is very low.

The fight to end poverty is a herculian task..it also calls for gender-based discrimination and violence .Discrimination against the female section of the society had led to an increase in the feminisation of poverty in both developed and developing countries as well as in urban and rural areas. Woman are not only the ones that are most affected by food insecurity but they are also in charge with the food and nutrition responsibilities for their household .Slowdown of the economy,commodity price volatility and age old agriculture practises and faulty trade policies are the compounding factors for prevalent hunger and malnutrition in the society .With rising pressure on farming land ,on natural resources and also climatic change are the contributing factors for the increasing food prices. There is a serious urgency to find a solution in regards to food insecurity across the globe.Achieveing sustainable development ,food security and gender equality women's role are concomitant and inextricably interlinked.

Role of Women is of pivotal in addressing the issues of hunger ,malnutrition and poverty. They comprise 43% of the total labour employed in the agriculture sector…8 out of 10 agriculture workers in Africa woman and in Asia this ratio is 6 out of 10 .Furthermore women are the front runners of nutrition in a family ,they are involved in producing storing cleaning cooking food for consumption .

2.Literature Review

Laxmi Puri UN assistant secretary and deputy executive director UN Women ,in her news release ..talks about empowerment ,autonomy and rights of girls and women. In the UN 2030 agenda to sustainable development goals to eradicate poverty ,hunger from all round the globe it also aims at reducing the proportion of women and children of all ages living in poverty in

all its dimensions by half. Laxmi Puri unleashes a series of reforms needed for the cause .She mentions that there are structural barriers and discriminatory social norms that continue to constrain women's decision making power and political participation. She briefly discusses the UN agenda of achieving zero hunger by 2030 The 2030 agenda recognises that working towards the gender equality and also empowerment of women will make a crucial contribution to the progress of the goals of sustainable development programs

3.Research Methodology:

The research methodology adopted in this research paper is of descriptive type. I have tried to analyse information gathered in from different sources.

4.Results and Discussion:

The five agencies of the UN warn that " Five years after the world committed to end hunger ,food insecurity and all forms of nutrition we are still off track to achieve this objective by 2030" .China and other populous countries have led to a sustainable cut in the number of the hungry people. After steadily diminishing for decades chronic hunger is slowly begin to rise in 2014 and continues to do so.

According to the World health organisation Asia remains home to the greatest number of malnutrition affected population it's approximately 381 million , followed by Africa 250 million, LatinAmerica and Caribbean with 38 million. The overall percentage of hungry people has changed little at 8.9% but the absolute numbers have been rising since 2014 .This stands true to the UNO report of increasing poverty and hunger in step with the global population. Overcoming hunger and nutrition in all its forms is more about securing enough food to survive for the entire population on the globe. What people eat and specially what children eat must also be nutritious but the key obstacle is the high cost of nutritious food and the low affordability of healthy diet

- The latest estimate states that a staggering 3 billion people or maybe more cannot afford a healthy diet …this is the case of 57% of the African and South Asian population though no region including North America and Europe are spared. The ways to eliminate hunger seems to be compromised .According to the WHO report in 2019 quarter and third of children under the age of five years had stunted and wasted growth. On the other hand another 38 million in the same category were overweight. Meanwhile among adults obesity has become a global pandemic in its own right
- The Economic and social disruption caused by the corona pandemic is devastating .The pandemic is likely to halt two decades of global progress towards universal health coverage.
- "There is no time to spare "said Dr Tedros Adhanom Ghenreyesus ,WHO Director General…" all governments must immediately resume and accelerate efforts to ensure everyone of their citizens can access health services with fear of the financial consequences"He added " prior to the pandemic many countries had made progress but it was not robust enough. This time we must build health system that are strong enough to with stand shocks"
- In 2019 prior to Covid 19 pandemic 60% of the global population was covered by essential health services but they had not made such advances in ensuring affordability .Only when countries have an accurate picture of the way that their health system is performing it will be possible for them to effectively target action to improve the way they will meet the needs of food and nutrition

Recent report of the World committee on food security argued that "malnutrition in all its form -not only hunger but also micronutrient deficiencies as well as overweight and obesity is a critical challenge not only in the developing countries but also in the developed countries. "The consequences of inequalities within the society is seen in slow economic growth. However much Agro Research have been done in the agriculture industry in the past two decades still the issue of hunger and malnutrition continues

5.Figures and Tables:

Title: Hungry people around the globe.

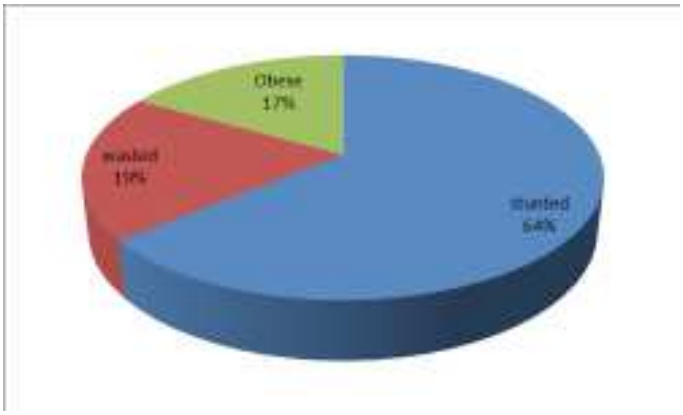
Year	Number of Hungry people (In Millions)
2013	620
2018	680
2019	690

Source: WHO report

Classification of Malnutrition affected children below 5 years of Age

Type	No.of children under 5years of age(in millions)
stunted	149
wasted	45
Obese	38.9

Source: WHO report dated 9th June 2021



6.Conclusion

This research paper focuses on the global issues of hunger and malnutrition also inequalities and intersexuality is a reflected in the struggles of women .Women in all age groups face multiple forms of discrimination and disadvantage.

Gender disparities is very deep rooted in our society ,women have a very low participation in the economic related issues. This article discusses the issues of malnutrition and poverty focusing on the female population.The gender biases in our society is by far responsible for woman's plight full condition. Women take on equal burden of unpaid domestic responsibilities and they have over represented in informal and precarious jobs.

- The social disadvantages and inequality women face shape the experience of poverty differently from that of man. Their vulnerability due to their soft nature makes it more challenging for them to move out of poverty. We need more research on the global issues of hunger poverty and malnutrition as these issues are not being addressed in a equivocal way .There has been good economic growth in the last two decades along the globe and also in our country yet India continues to suffer from alarming hunger and acute malnutrition among kids under five years of age. Though we have a National Food security act but its success depends on some non-legal factors Such as increase of food production in backward regions ban exports of food products, and does increase availability of good and cheap food products . The government of India also has to improve the design of the central welfare schemes such as the Public distribution system which seeks to distribute subsidised foodgrains to the poor. However food alone does not solve the problem of underweight children did need multidimensional trust in health and hygiene.

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The Study of the CeO_2-ACs Composite Thin Film in Non-aqueous Electrolyte for Supercapacitor

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Abstract :

Supercapacitors have increased much attention on account of high specific capacitance, long life cycle, high power density and almost maintenance free, experiencing no memory effect, safe and maintain a bridge for power-energy difference that exists between capacitor and fuel cells/batteries (large energy storage).In this study, CeO_2-ACs composite thin films were deposited by SILAR method. The thickness of deposited film was found to be 0.0004 g/cm^2 on the stainless steel substrate. Characterizations like XRD, Surface morphological and EDAX were studied. The electrochemical response of the composite material was studied in non-aqueous 0.5 M KCl electrolyte. In non-aqueous electrolyte, the maximum value of capacitance was observed to be 161 F/g.

Keywords: - Supercapacitors, capacitance, non-aqueous electrolyte

1. ***Introduction :***

Supercapacitors, are also known as "electrochemical capacitors" or ultra-capacitors, are one of the main electrochemical energy storage devices having capability of storing electrical energy at much greater extent and rate than that of the conventional capacitors and batteries. The carbon nanomaterial and its several hybrid architectures have been extensively used for high-performance supercapacitor electrodes. Graphene, a recently exposed two dimensional, sp^2 bonded single-graphitic layered carbon allotrope, has created extraordinary research interests owing to its very good electrical and thermal conductivity, superior charge-transfer properties, ultra-high mechanical strength, and excellent electrochemical activity. It has been extensively used for various electronics [1, 2], optoelectronics [3–5] and electrochemical devices [6–8]. In specific, graphene showed enormous promises for enhancing the performance of various electrochemical devices, including, batteries, supercapacitors, fuel cells, photovoltaics, photo-catalysis, hydrogen generations, sensors, and many more [6, 9, 10]. In this study, the synthesis CeO_2-activated carbon (AC) composites by SILAR method has been discussed. The structural, morphological as well as electrochemical supercapacitor properties of CeO_2-AC nanocomposites have been studied.

2. Experimental

2.1 Solution preparation:-

Initially, the cerium nitrate hexahydrate (AR grade) was weighted carefully by using microbalance and then dissolved slowly in double distilled water to from 0.01 M concentration. Similarly, AR grade activated carbon (AC) also taken to prepare the 0.01 M solution. So the composite material was prepared from the equal concentrations of the two solutions. The same quantity of both the solution was mixed slowly with each other by constant stirring. Here also the anionic precursor was 0.01 M NaOH solution prepared in double distilled water.

2.2Experimental set up for the deposition of CeO_2-ACs composite thin films by SILAR method:-

It consists of two beakers containing cationic solution with AC (Ce^{3+}/AC) and anionic (OH^-) solution along with the two beakers placed in between. The stirrer-heater assembly may be used to maintain the desired temperature of the beaker system. The substrate is inserted in the beaker in regular interval of time. The thin film formation is seen after the repetition

In this method formation of films occurred by sequential ionic reactions under ion-by-ion process along with ACs would be sandwiched between it. Sometimes in another process called cluster process, the colloidal particles are absorbed at the substrate surface to produce layer. So in this method both the CeO_2 and ACs get deposited at the same time on the substrate forming a composite.

3. Deposition of CeO_2-ACs composite thin films by SILAR and thickness measurement:-

In the deposition of the composite CeO_2-ACs film both anionic and cationic precursors were kept at 300 K temperature. At the time of deposition, the substrate was immersed in cationic precursor solution in which both cerium and ACs were present. The ions were get adsorbed on substrate forms very thin layer. Next to that, the substrate was rinsed in double distilled water to remove loosely bonded or excess cerium and copper ions. Further, the reaction occurs with the OH^- ions from anionic precursor and form a composite layer of CeO_2-ACs material on the substrate. Again the adsorption-reaction was varied as 10-20, 20-40, and 30-60 s for the deposition of CeO_2-ACs composite thin films. In the reaction the substrate was immersed in cationic solution (first beaker) for 30 s and in anionic solution (forth beaker) for 10 s, in between it was rinsed in distilled water for 10 s is a one cycle of deposition. The adherent film was obtained at 30 cycles of the deposition which was then considered for electrochemical study in supercapacitor. The thickness of deposited film was measured by using the weight difference method and found to be 0.0004 g/cm^2 on the stainless steel substrate.

4. Characterizations of CeO_2-ACs composite films

4.1 X-ray diffraction studies:-

The structural information of as-deposited CeO_2-ACs composite material was obtained from the XRD techniques. The sample was scanned in between the range of 20-80^0 diffraction angle with Cu K_a radiation (ë = 1.5418 A°).

The XRD pattern of the CeO_2-ACs thin film grown on the stainless steel substrate is as shown in Fig.1. It gives the intensity distribution of thin film samples with respect to scanning angle. The XRD analysis of the composite concludes that the observed peaks were not from the particular element of the deposit but from the substrate itself which confirms the formation of amorphous cerium (CeO_2-ACs) composite material.

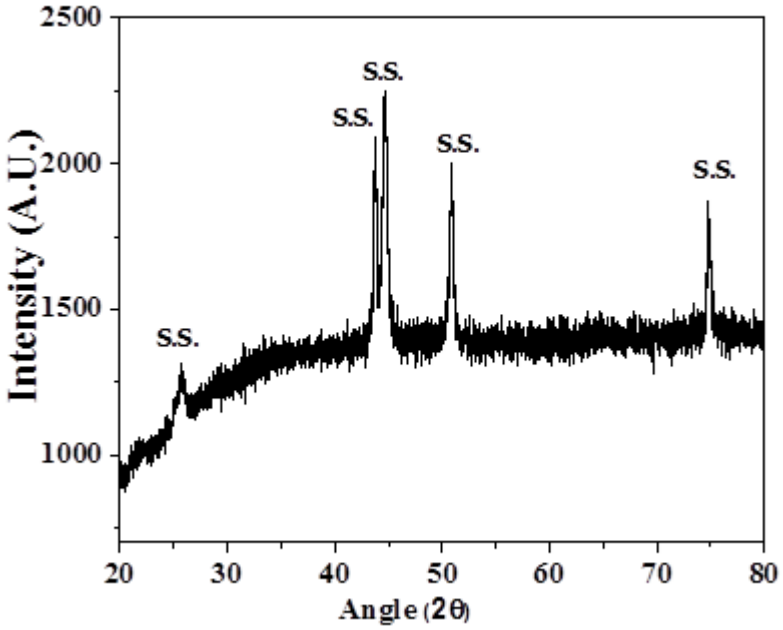


Fig. 1: The XRD pattern of CeO_2-ACs composite thin films

4.2 Surface morphological and EDAX study:-

The morphological study of the composite film was carried out by scanning electron microscopy (SEM) (Model: JEOL JSM-6360) at the same time attached with an energy dispersive x-ray analysis (EDAX) analyzer was used to measure the composition of the existing material.

To know the exact morphology, the sample was scanned at different magnifications in a vacuum condition. The Fig. 2 shows micrographs for as-deposited composite material at 1,000 X magnifications. It showed film is get peeled off from the substrate surface which form the cracked morphology of the material, and it could be argued that ACs are not fitting inside the material deposit but trying to get outside from the layer.

The EDS pattern of the synthesized material is shown in Fig. 3. It concluded the formation CeO_2 and ACs composite material formed on the substrate. It showed the elemental percentage of cerium is about 18 % and that of carbon 29 % while the remaining percentage was covered by oxygen which is about 53 % in whole of the sample. Here it was observed the preparative conditions in the method were favourable to deposit the composite of CeO_2-ACs material.

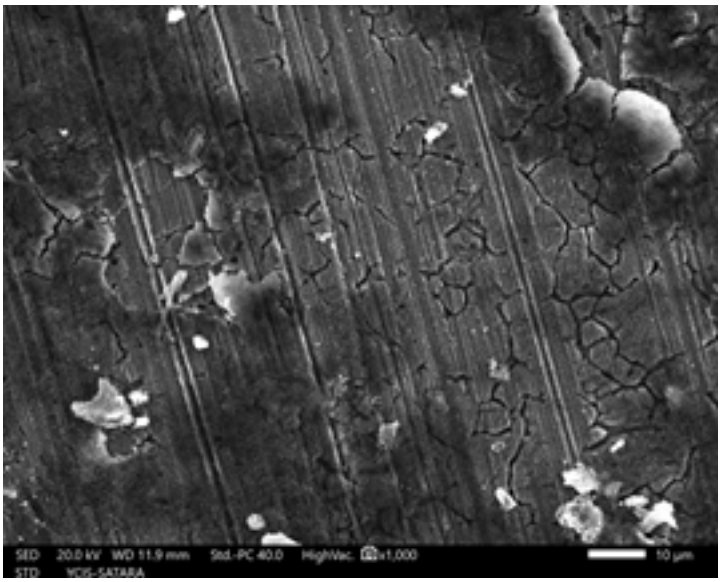
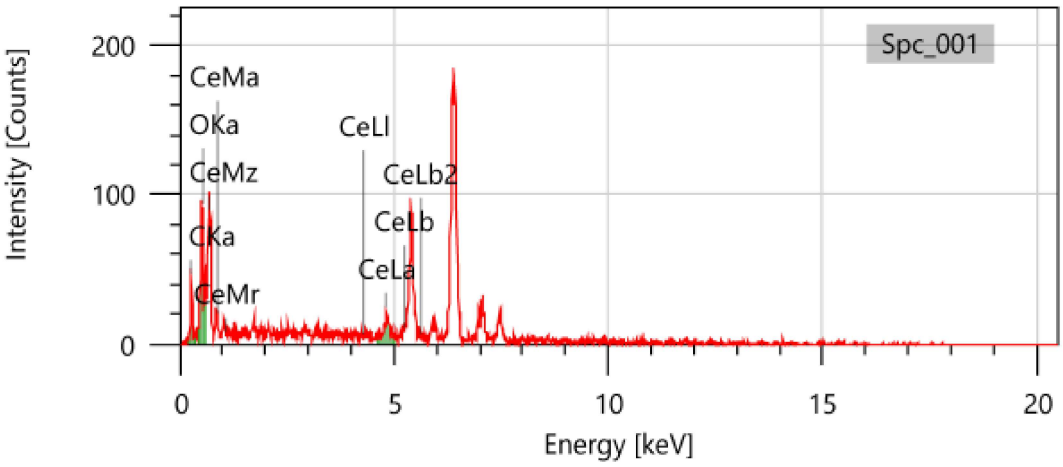


Fig. 2: The Scanning electron micrographs (SEM) of CeO_2-ACs composite thin film



Element	Line	Mass%	Atom%
C	K	28.75±1.18	40.94±1.67
O	K	53.19±2.82	56.86±3.02
Ce	L	18.07±2.79	2.21±0.34
Total		100.00	100.00
Spc_001			Fitting ratio 0.9215

Fig. 6.5: The EDS pattern and compositional analysis of CeO_2-ACs composite film

5. Electrochemical performance of CeO_2-ACs composite in non-aqueous electrolyte:-

The electrochemical response of the composite material was studied in non-aqueous 0.5 M KCl electrolyte shown by following figures. The cyclic voltammetry curves were plotted individually to get the idea of the nature of curve of the composite material after the stabilized current (Fig. 4 to Fig. 8).

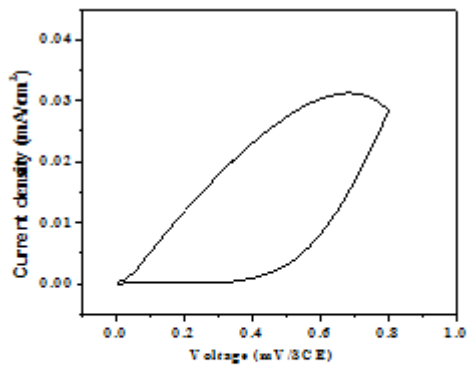


Fig. 4: Electrochemical response of CeO_2-ACs composite in 0.5 M KCl at 5 mV/s scan rate

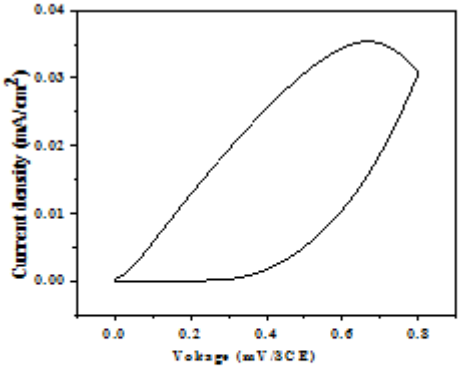


Fig. 5: Electrochemical response of CeO_2-ACs composite in 0.5 M KCl at 10 mV/s scan rate

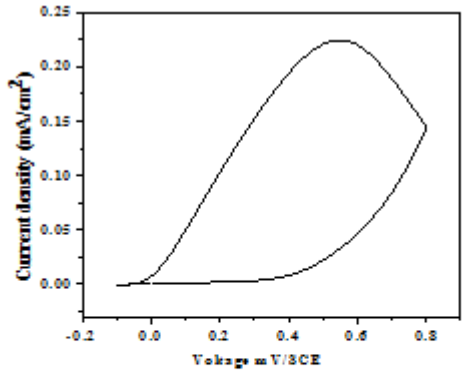


Fig. 6: Electrochemical response of CeO_2-ACs composite in 0.5 M KCl at 50 mV/s scan rate

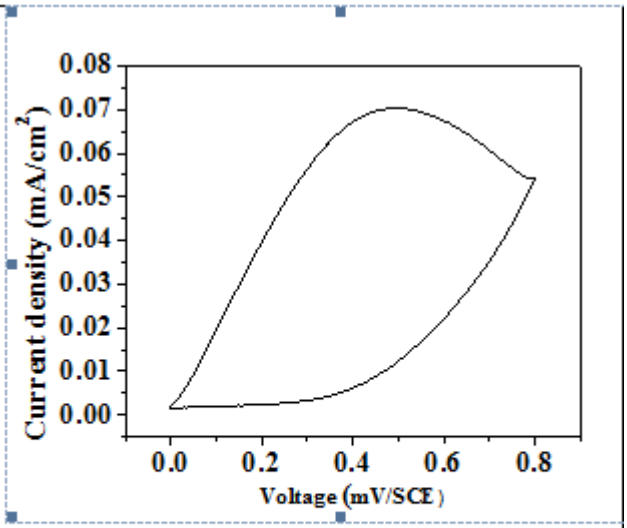


Fig. 7: Electrochemical response of CeO_2-ACs composite in 0.5 M KCl at 100 mV/s scan rate

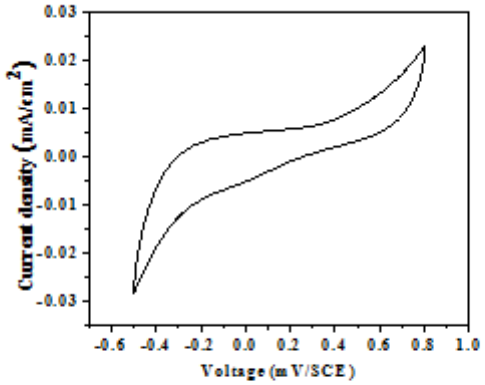


Fig. 8: Electrochemical response of CeO_2-ACs composite in 0.5 M KCl at 500 mV/s scan rate

Table 1.1: Super capacitance values of CeO_2-ACs composite electrode in non-aqueous 0.5 M KCl electrolyte

Sr. No.	Scan rate(mV/s)	Interfacial capacitance (F/cm^2)	Specific capacitance (F/g)
1	5	0.1290	161
2	10	0.0652	82
3	50	0.0170	21
4	100	0.0015	2
5	500	0.0001	0.14

The table 1.1 shows the capacitance of CeO_2-ACs composite material using the cyclic voltammetric with respect to san rate. It has been observed that, the interfacial capacitance of the electrode decreases with increase in the value of scan rate. The maximum Interfacial capacitance was obtained at 5 mV/s scan rate which shows the value of 0.1290 F/cm^2. Also from the table it is observed the maximum value of specific capacitance was obtained for maximum value of interfacial capacitance at 5 mV/s scan rate. The maximum specific capacitance is 161 F/g in case of CeO_2-ACs composite in 0.5 M non aqueous KCl electrolyte.

6. Conclusions:-

The simple chemical method was used to fabricate the CeO_2-ACs composite material at 300 K. The thickness of the material was found to be 0.0008 g/ cm^2 calculated from the gravimetric weight difference method. The XRD depicted the formation of amorphous composite material on the stainless steel substrate. The compositional analysis from the EDS showed the materialization of CeO_2-ACs composite on the substrate. The cyclic voltammetry study showed that the capacitance of the CeO_2-ACs composite electrode was increased with increase in the scan rate in case of non-aqueous 0.5 M KCl electrolyte. In case of non-aqueous electrolyte, the maximum value of capacitance was observed to be 161 F/g.

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Psycho-Social Dimensions of Sustainable Development

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Abstract :

It's our mission to enable a safer and more sustainable ecosystem for people, the environment, and companies. We help society to tackle the risks that are inherent to technological development, including the need to become more sustainable. Our services are embedded in sustainability, helping to establish trust and ensure safety in today and tomorrow's sustainable development. Climate change is the most critical challenge to achieving sustainable development in the coming decades. The psychology of sustainability and sustainable development constitutes a new research area in the field of Sustainability Science.

Keywords: Challenges, Psychology of sustainability, Protective factors, Risk factors, Psycho-social adjustment and well-being

Introduction :

Our goal is to create an ecosystem that is safer, more sustainable, and beneficial to businesses, the environment, and people. We assist society in addressing the hazards associated with technology advancement, such as the requirement to become more sustainable. Our services are rooted in sustainability and contribute to building safety and trust in sustainable development both now and in the future. The greatest obstacle to attaining sustainable development in the ensuing decades is climate change. A new topic of study in the field of sustainability science is the psychology of sustainability and sustainable development.

Literature Review

By tracking national movements, nations around the world are committing to this goal. Companies are rising to the challenge at the business level by committing to actions that are in line with the UN Sustainable Development Goals. In the ensuing decades, sustainability is anticipated to dominate both industry and society's narratives.

Research Methodology

A detailed reading and analysis of the writing by and about the writer chosen for the study is part of the research approach. Numerous related reference books, research papers, theses, periodicals, journals, newspaper articles, and other web-based sources will be employed for the collecting of secondary sources.

Results & Discussion

By offering a psychological viewpoint and supporting the trans-disciplinary framework at the core of Sustainability Science, it helps with sustainability challenges. Recognizing and integrating the value of psychology and the psychological approach in the construction of processes related to sustainability and sustainable development is necessary to steadily establish the psychology of sustainability and sustainable development as a research area, as opposed to one that only presents sporadic contributions (and frequently only as theoretical reflections).

During the United Nations (UN) Climate Action Summit in June 2019, UN Leaders announced the urgency of limiting global temperature rise to 1.5°C in response to the global climate crisis. To realize this, UN calls upon the world to attain carbon neutrality before 2050.

In order to accomplish national and international greenhouse gas reduction objectives, societies and politics are putting new frameworks and rules into place, while businesses are devoted to leveraging even more ambitious reduction goals along their particular value chains. This involves not only suppliers and outside service providers but also their own production facilities and processes. We collaborate with our customers to fulfil their commitment to their employees, customers, and environment through a comprehensive spectrum of corporate sustainability services in order to advance sustainable development. Through our services, we hope to increase consumer confidence in the security of sustainable technologies and the reliability of systems, goods, and business practices.

We provide specialized sustainability solutions for our clients in accordance with current and impending laws, as well as through exchanging best practices to speed up the transition process and leave a lasting impression. By establishing certainty and traceability, this fosters the independent transparency required in the eyes of regulators, internal management, and ultimately the general public.

As psychological processes are frequently involved in environmental decisions and behaviour as well as in developing and establishing a culture of sustainability regarding the natural environment, this is primarily significant in terms of environmental sustainability and sustainable development in relation to the natural environment. In actuality, the majority of the relevant decision- and behavior-related processes are supported by the person's own internal psychological processes. Giving these processes the proper value necessitates more research and comprehension of them. For so, it is crucial to understand the novel psychological research perspective in the psychology of sustainability and sustainable development. This viewpoint might enable one to enhance psychological contributions to each of the 17 UN Sustainable Development Goals (United Nations, 2018), which are crucial for the planet and humanity and have a deadline of 2030.

A recent area of study in psychology is the psychology of sustainability and sustainable development. Answering sustainability questions by including psychological contributions involves expanding sustainability as a concept while also enhancing the trans-disciplinary perspective. In order to increase the quality of life for each individual human being both with and in the environments, it also involves overcoming a worldview that is solely based on the ecological and socioeconomic environment. The three "Es" framework and the traditional concept of sustainability, which focus on "avoiding" something through exploitation, depletion, and irreversible change, are both overcome by this strategy. On the other hand, it introduces a new definition built around "promotion," with the new keywords being "enrichment," "development," and "flexible change."

A new axis of psychological reflection on what is truly sustainable for people in specific surroundings (natural, personal, social, and organizational), as well as for the environment or environments, is also introduced by the psychology of sustainability and sustainable development. The psychology of sustainability and sustainable development improves the resilience of interpersonal relationships and interpersonal talent as well as of groups and communities, including aspects of reflexivity, meaning, purpose, and flourishing for the resilience of projects integrating the various viewpoints in relation to the environment/environments. It requires a broad and intricate perspective, encompassing everything from tasks pertaining to the natural, social, and professional contexts to personal endeavors and life goals. Its goal is to contribute to the advancement of efficient and long-lasting wellbeing for people and the environment from the standpoint of psychological research.

The contribution of this paper is that psychology can offer to the subject of sustainability and sustainable development is the main emphasis of this section. It emphasizes the enhancement of wellbeing and quality of life for people within and in various contexts, as well as safe and healthy environments. Its purpose is to provide a framework for the most cutting-edge ideas at this time, as well as to report research on the novel subject of the psychology of sustainability and sustainable development, which presents new obstacles for both research and intervention. Its goal is to compile and offer original analyses and findings from empirical study on this subject.

By conducting research and interventions from a mainly preventative viewpoint as well as from a secondary prevention and tertiary prevention perspective, the psychology of sustainability and the sustainable development perspective may produce contributions from a preventive perspective. Another significant issue will be to concentrate on critical psychological elements in order to make tangible progress toward sustainability and preventative sustainable development.

We acknowledge that ending extreme poverty and all other types of poverty is the largest global challenge and a crucial component of sustainable development. This plan will be put into action by all nations and parties involved, working together. We are determined to repair and preserve our planet while freeing the human race from the tyranny of poverty and desire. We are committed to taking the risky and transformative actions that the world now needs in order to move toward sustainability and resilience. We promise to leave no one behind as we set out on this trip together. The 169 targets and 17 Sustainable Development Goals that we are unveiling today show the scope and ambition of this new global agenda.

They aim to advance the Millennium Development Goals and finish what they left unfinished. They work for achieving gender equality and the empowerment of all women and girls as well as the realization of everyone's human rights. They balance the three facets of sustainable development—the economic, social, and environmental—and are indivisible and interwoven. In order to ensure that the goal of the new Agenda is achieved, the interconnections and integrated character of the SDGs are of utmost importance. If we achieve our goals across the entire agenda, everyone's life will be significantly improved, and our planet will undergo a positive transformation.

2030 Agenda: A plan of action for people, planet and prosperity

The Goals and targets will stimulate action over the next fifteen years in areas of critical importance for humanity and the planet:

People

We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfil their potential in dignity and equality and in a healthy environment.

Planet

We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.

Prosperity

We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.

Peace

We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.

Partnership

We are determined to mobilize the means required to implement this Agenda through a revitalized Global Partnership for Sustainable Development, based on a spirit of strengthened global solidarity, focused in particular on the needs of the poorest and most vulnerable and with the participation of all countries, all stakeholders and all people.

Commission for Social Development (CSD)

As a preparatory and advisory body of ECOSOC on social development matters, the Commission for Social Development is the only Commission mandated to advise the Council in the fields of social policy development, research in areas affecting social and economic development and policies and programme designed to promote social progress. Consequently, the Commission will provide substantive inputs to thematic reviews of progress on Sustainable Development Goals from social perspectives.

Several years ago, proponents of the Sustainable Development (SD) approach identified four levels of impact of sustainable lifestyles (SLS) and actions on people's well-being. Accordingly, a sustainable society was presumed to positively affect the ecological, social, economic and political-institutional scenarios in which people live and thrive. More recently, a number of government and social institutions have added a psychological dimension to this list of levels of impact of SD. For these governments and institutions, psychological well-being should be a positive consequence of sustainability. Incipient research in environmental psychology reinforces such an idea, demonstrating that people who practice pro-environmental behaviors are happier individuals. Also, psychological restoration (i.e., retrieval from exhausted psychological capabilities and health) is assumed to derive from living in sustainable scenarios. Moreover, sustainability, as practiced in the form of pro-environmental behaviors, not only is linked to their psychological consequences but also to psychological antecedents of sustainable lifestyles. More than forty years of research have demonstrated that SLS are predicted by affective and cognitive determinants of behavior. In this paper I review studies and views encompassing the psychological dimensions of sustainability. The basic idea is that it is human psychology (i.e., environmentally destructive behaviors and propensities) the main cause of the current ecological crisis; but human behavior is also a paramount solution.

Conclusion

The psychology of sustainability and sustainable development is thus focused on different environments from the natural environment, the personal environment, the social environment, the organizational environment, and the inter-organizational environment, to the globalized environment and the virtual environment. Opening the black box of psychological processes in the science of sustainability and sustainable development will be the main aim of the new research area distinguishing this section.

Acknowledgement

First of all, I want to say thanks almighty God, my Guide, all respected teachers, friends and my family members who support and guide me time to time.

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Integrating physical education for Sustainable Development

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Abstract :

Sustainable development emerged as a response to a growing concern about human society's impact on the natural environment. Physical education must find ways of responding to such challenges, taking into account the consideration of different stakeholders of physical education. The present paper was aimed to study physical education for sustainable development with regard to collaboration of different stakeholders of physical education . Besides, it aimed to study role of environmental physical education towards sustainable development and need of integrating physical education with sustainable development. Going beyond content based knowledge to development of motor skills was also studied. The results of the study revealed that different stakeholders and sectors need to be involved to create collective physical education al environment that respond to community needs. It was revealed that important insight should be develop regarding the extent to which their current physical education will equip learners with the necessary worldviews, skills and competencies for a sustainability-oriented society. It was found that integration of environmental physical education would focus on skills development for sustainable development, particularly through promoting learners' skills for social transformation including skills for critical reflection, futures thinking, creativity, innovation, and participatory and problem solving abilities. Besides, this the study revealed that efforts should be made to go beyond content knowledge in order inculcate concept of sustainable development among children.

Key words: *Integrating Physical education, Sustainable Development,*

Introduction :

1.1 : While emerging the impact on the natural environment, the concept of sustainable development emerged as a response to a growing concern. The concept of sustainable development was defined in 1987 by the Brundtland Commission (formally the World Commission on Environment and Development) as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland, 1987). This concept recognizes that while development may be essential to meet human needs and improve the quality of life, it must happen without reducing the capacity of the natural environment to meet present and future needs. The sustainable development movement has grown and campaigned on the basis that sustainability protects both the interests of future generations and the earth's capacity to regenerate. At first it emphasised the environment in development policies but, since 2002, has evolved to encompass social justice and the fight those issues which are badly affecting the society due to least approach towards sustainable development. According to UNECE, projects and initiatives are considered good practice if they are closely related to physical education and sustainable development (ESD), generate ideas and contribute to policy development. They must have some of the following outcomes and characteristics:

a) Focus on physical education al and learning dimensions of sustainable development;

b) Innovative development of new and creative solutions to common problems;

c) Make a difference and have a tangible impact on those concerned;

d) Have a sustainable effect;

e) Have the potential for replication;

f) Support evaluation in terms of innovation, success and sustainability.

Physical education for sustainable development means adopting a more holistic approach to physical education with the view of creating a better world for this generation and future generations of all living things on planet earth. This envisages socio-economic development keeping present and future in mind. This allows every child to acquire the knowledge, skills, attitudes and values necessary to shape a sustainable future. Virtually speaking physical education is considered backbone for inculcating the concept of sustainable development among society. Humans tend to look at development as a needed and normal process, but when this process becomes increasingly dependent on over-exploitation of our natural resources,

the replenishment of these reserves and supplies is affected. Sustainable development has been promoted since its inception over 20 years ago as an effective means to abate the degradation of human and environmental systems. The economic, social, and environmental aspects of sustainable development and policy formation should be equally represented and balanced (Hart, 1997). In 1992, the United Nations and representatives from 178 countries met in Rio de Janeiro to discuss the state of the environment and social/economic development and to craft a political course of action for these topics. The Rio Summit was the result of an identified need to develop more appropriate, sustainable strategies in addressing development. Agenda 21 was an important outcome of the Rio summit, and focused the world's attention on the objectives necessary to reach sustainable development. (Sitarz, 1993). The increased attention of issues-based physical education al concepts is also multidisciplinary, infusing aspects of the biological, physical, social, economic and spiritual environments to strengthen the effectiveness of physical education (Sitarz, 1993). Thus, the review of the related literature suggests a wide gap of research and in the same consonance the researcher studied a problem as:

1.4 Statement of problem: The problem for the present study is as:

Integrating Physical education for Sustainable Development with Special Reference to Role of Environmental Physical education and its Stakeholders.

1.5 Objectives of the study: The present study is based on below mentioned objectives:

1) To study physical education for sustainable development with regard to collaboration of different stakeholders of physical education .
2) To study integration physical education for sustainable development.
3) To study role of physical education towards sustainable development.

1.6 Rationale of the Study

- **Collaboration of different stakeholders of physical education:** Physical education being a tri-polar process involves different stakeholders, like teachers, students and socio-cultural environment. As observed by Robert Laurie, Yuko Nonoyama-Tarumi, Rosalyn Mckeown And Charles Hopkins (2016) conducted a multilateral network research (networks comprising twenty-nine partner organisations) whose work focuses on collaboration between schools and communities to address physical education for sustainability development (ESD) results showed that establishing collaborative networks, including schools and civil society, is crucial for the implementation of physical education for sustainability development. Schools and communities share many challenges including the integration of immigrants, dealing with the consequences of the economic crisis and a loss of cultural identity in a more and more globalised world". So efforts should be made to facilitate better mutual and collaborative understanding among different stakeholders of physical education so that they will work on future leading developments as a crucial for the wellbeing of a local society. Responsibility lies on the shoulders of each stakeholder of physical education to remain inclined towards promoting sustainable development in society through the process of physical education.
- **Integrating physical education for sustainable development:** Physical education for sustainable development is generally explained as 'integrating the principles and practices of sustainable development into all aspects of physical education and learning, to encourage changes in knowledge, values, and attitudes with the vision of enabling a more sustainable in society for all". According to Mc Keown, (2000). Physical education for sustainable development (ESD) is thought of to have four dimensions:

a) access and retention in basic quality physical education ;
b) reorienting existing physical education to address sustainable development;
c) increasing public awareness of sustainability; and
d) providing training for all sectors of the workforce

Thus, the study highlights the need for physical education al programmes that enhance learners critical and reflective thinking, holistic worldviews.

1. **Introducing awareness through environmental physical education:** Contemporary trend and issue in the field of physical education is to introduce environmental physical education al programmes in the field of schools, colleges and universities. Environmental physical education developed from the concern that human development was having profoundly damaging effects on the natural environment and its primary aim is the protection and conservation of the

environment including natural habitats and ecosystems. Promoting physical education 's primary concern is the reduction of poverty, the promotion of social justice and the improvement of quality of life for people and subsequently helps in maintaining of sustainable development. It addresses basic human needs and links local and global actions. Integration of environmental physical education will focus on skills development for sustainable development, particularly through promoting young people's skills for social transformation including skills for critical reflection, futures thinking, creativity and innovation, and participatory and problem solving abilities so that they are better able to manage, needs and demands of sustainable development. Environmental physical education is an essential tool for achieving a more sustainable world. This was emphasised also at the UN World Summit in Johannesburg in 2002 where the reorientation of current physical education systems was outlined as key to sustainable development. Physical education for sustainable development (ESD) promotes the development of the knowledge, skills, understanding, values and actions required to create a sustainable world, which ensures environmental protection and conservation, promotes social equity and encourages economic sustainability. The concept of physical education for sustainable development (ESD) developed largely from environmental physical education , which has sought to develop the knowledge, skills, values, attitudes and behaviours in people to care for their environment. The aim of physical education for sustainable development (ESD) is to enable people to make decisions and carry out actions to improve our quality of life without compromising the planet. It is generally accepted that certain characteristics are important for the successful implementation of physical education for sustainable development (ESD), reflecting the equal importance of both the learning process and the outcomes of the physical education process (adapted from 'UN Decade of Sustainable Development' UNESCO Nairobi Cluster, 2006). According to Elaine Nevin (2008) ESD should include:

a) **Be embedded in the curriculum in an interdisciplinary and holistic manner**, allowing for a whole-institution approach to policy making.

b) S**hare the values and principles** that underpin sustainable development.

c) **Promote critical thinking, problem solving and action**, all of which develop confidence in addressing the challenges to sustainable development.

d) **Employ a variety of physical education al methods**, such as literature, art, drama and debate to illustrate the processes.

e) **Allow learners to participate in decision-making** on the design and content of physical education al programmes.

f) **Address** local as well as global issues, and avoid jargon-ridden language and terms.

g) **Look to the future,** ensuring that the content has a long-term perspective and uses medium and long-term planning.

1.7 Conclusions of the study: Some conclusions of the study are as under:

1) It was found that different stakeholders and sectors need to be involved to create collective learning activities that respond to community needs. School and community members need to be mobilized and teamwork and network building become an essential part of school and community culture. it was revealed important insights regarding the extent to which their current physical education and learning is equipping them with the necessary worldviews, skills and competencies for a sustainability-oriented society.

2) Responsibility lies on the shoulders of each stakeholder of physical education to remain inclined towards promoting sustainable development in society through the process of physical education . Integrating those courses and programmes in the field of physical education which will be fruitful for sustainable development is fundamental requisition.

3) Integration of environmental physical education will focus on skills development for sustainable development, particularly through promoting learners' skills for social transformation including skills for critical reflection, futures thinking, creativity and innovation, and participatory and problem solving abilities so that they are better able to manage, needs and demands of sustainable development.

4) Thus, the study highlights the need for physical education al programmes that enhance learners critical and reflective thinking, holistic worldviews.

5) Efforts should be made to go beyond content knowledge and to inculcate concept of sustainable development among children. It was found that development of motor skills among children is imperative on part of physical education system.

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Environmental Information in Supply-chain Design and Coordination

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Abstract :

The past decade has seen unending stock of improvement in business exercises and technique. Fuelled by the quality surprise during the 1980s, associations began to see their business processes as the essential point of convergence of critical worth creation. Business process improvement bunches initially worked locally on their cycles and a short time later on the idea of interconnecting associations with upstream and downstream cycles. Quality organization progressed into time touchy challenge, then into process reengineering, ultimately into various levelled change and the middle capacity advancement. In all of this, cycle the leaders remained a central fixation for two reasons: first, since business processes gave a depiction of the undertaking that engaged talk at the fundamental level; and second, since bunch based ways of managing constant improvement found their best progressive match when given out to obvious cycles. Emphatically, the two most huge business processes recognized during this period were the store organization and the new-thing progression process. The store network includes the subprocesses of securing, creation, movement, and after-bargains support. The extended store network is the cross-association stock organization coming about as a result of interfacing suppliers and clients (and maybe's suppliers and's clients) to the store organization of a particular collecting or organization association.

Keywords: Business administration, Supply chain management, environment.

Introduction :

Data innovation (IT) could assume a significant part in advancing the ecological and pay benefits of such drives. A couple of examples of potential IT uses assembled information for wellsprings of data and consequences of different cycles, investigating clients and using models to understand natural impacts during thing setup, following thing improvements, upgrading transportation systems, and separating reusing and reuse direct. With data from these sources, associations could chip away at the regular pieces of their things at three huge levels: (1) thing and store network intend to restrict biological impacts, (2) nonstop waste minimization and peril help after the thing has been conveyed, and (3) expressive analysis from creation network individuals to review significant entryways for new things and cycles and to produce future natural drives.

PROMOTING ENVIRONMENTAL EXCELLENCE

Corporate Image

Achieving ecological ability, and the use of IT to this end, isn't simply socially trustworthy approach to acting, it is incredible business. A fundamental thought in an association's image is the occasion of a huge disaster. Perhaps the most striking representation of this is the manufactured business' reaction to the Union Carbide disaster in Bhopal, India, in 1984. Other than the way that Union Carbide expected to paid for remediation, it in like manner lost a ton of its credibility as a skilled association. This drove the association's decline of the degree of its business through divestitures and terminations by practically 90% since the disaster. The setback affected various associations in the business and went probably as a stimulus in lessening perils generally through the business (Kunreuther and Bowman, 1997). In another assessment, Klassen and McLaughlin (1996), using event assessment, measure that adversities in financial backer a motivation for huge public firms from natural events can be on the solicitation for endless dollars per episode.

Regulatory Compliance

Managerial consistence anticipates that associations should follow the usage of hazardous substances and surges of defilements. Though certifiable consistence changes extensively, especially among little firms with less to lose in the event of ecological episodes, critical associations in the substance and deal with adventures have committed tremendous resources all through late seemingly forever to chipping away at natural execution. An associated advantage is the decline of trades and case costs when regulatory surveys allude to workplaces. In ensuring consistence essentially cost, associations utilize state of the art propels, including IT, to ensure best practices. The occupation of IT in the consistence field is in following current approach to acting, including wastes, conveyances, accidents, and "near misses," and arranging new cycles considering this information.

Liability and Negligence

Another variable driving associations to additionally foster their natural display is the bet of being supposed to assume liability, or considered reckless, for accidents or ecological mischief. Right when an association experiences a disaster or an episode with colossal certifiable or saw ecological damage, the association may be held in danger to pay for remediation. This is substantial regardless, when the association is acting sensibly and using top tier development. If corporate movement doesn't meet social requirements, associations also may go up against restorative exercises for their approach to acting. To limit commitment and inconsiderateness ensures, an association could choose to do extreme bet decline instruments.

One more significant figure its utilization in decreasing ecological liabilities is the capacity to set industry principles and mutually characterize best practices. At the point when there are normal practices all through an industry, sticking to these practices is an at first sight safeguard against carelessness. This way of thinking drives organizations to share information on substances and potential results, set joint rules for use, and advance the utilization of industry best practices. Nonetheless, such rules are average just for item items or nonexclusive taking care of practices, since data (even on dealing with and use) for additional exclusive items is generally very delicate and is disseminated exclusively to clients.

Community Relations

Further created relations with neighbourhood organizations and other external accomplices are ending up being dynamically huge for associations, as an issue of both guideline and of best practice (McNulty et al., 1998). This has driven associations to chip away at their natural practices and the information they make available to individuals overall concerning these practices. Subsequently, an association can stay aware of its social foundation while working on its money related foundation. In social class, public-vested parties are logically convincing associations to practice natural prudence and to exhibit those exercises. The availability of really open information on an association's natural targets and quantifiable execution principles consequently can be expected to accept an irrefutably huge part in ensuring accomplices that an association or office is adhering to communicated objectives. Countless these activities similarly decline costs since they require using less virgin resources and creation inputs. Associations like Procter and Gamble (White et al., 1995; Kindle et al., 1996) are making plain in their promoting and progression programs, as well as in their inward practices, their commitment to conveying "more with less." IT expects a critical part in waste diminishing by noticing the information sources and consequences of every single period of the store organization and by giving key commitment to the arrangement of future things and packaging.

Employee Health and Safety

Accentuation on representative H&S likewise straightforwardly affects result and efficiency. Further developed representative wellbeing diminishes costs related with debilitated leave and medical coverage. Specialist relations may likewise be improved when wellbeing concerns are insignificant, and more secure circumstances can lift worker feeling of confidence, at last prompting more prominent efficiency. These variables ought to be valid both for the organizations that advance item stewardship and for their clients.

Customer Relations

Gathering information about an association's thing and its motivations thinks about additional created relationship with shippers and clients. A more significant perception of a thing's motivations and benefits progresses thing improvement and can incite unrivalled plans that cut off waste and futile strategies. Such seeing also enables associations to give their clients contemplations on approaches to lessening their transmissions or thing obligation. In circumstances where accident aversion is of interest learning the explanations behind setbacks engages associations to take the necessary steps to diminish possibilities. To this end, MSDSs are helpful in getting a handle on suitable use. Seeing thing use also helps with killing with wasting by engaging source decline and reuse.

Economic Motivation

As confirmed north of, a couple of critical gadgets have emerged in the past decade to propel stewardship in the creation organization and as a rule viability in the extensive store organization. These gadgets integrate life-cycle examination, switch arranged tasks, and a couple gated "plan for X" screens (where X consolidates factors like environment, security, destroying, and reusing). All of these mechanical assemblies is facilitated toward two corresponding drivers of monetary worth in naturally tricky activities: (1) assessment and assessment of ecological impacts generally through the store organization and (2) decline of one or the other impacts or capital and working expenses by thing and cycle progression.

Reverse Logistics at DuPont: The Petretec Case

An Illuminating inverse facilitated factors drive, brought into the universe of the sensible improvement thinking at DuPont, is the methanolysis of polymers and plastics, broadly named detaching polymers, to recover close virgin material. Petretec, the association's polyester recuperation advancement, detaches film, fibre, and plastics to their raw parts, dimethyl terephthalate (DMT) and ethylene glycol (E6), which then, are used as opposed to virgin resources.1 This licenses DuPont to diminish both the use of oil-decided feedstocks and how much waste shrouded in landfills. By and by, with lacks of DMT, the ability to reuse polyester materials is amazingly invaluable.

ENVIRONMENTAL INFORMATION IN SUPPLY CHAINS

We now understand that the design stage of products and processes determines the major consequences of these, including a large part of a product's environmental impact (Ulrich and Eppinger, 1995). To ensure that proper care is taken, life-cycle analysis and other techniques may be useful. In this analysis, environmental information plays a key role in a number of dimensions including source reduction, transportation optimization, emission analysis, and reverse logistics.

Source Reduction

Utilizing ecological information to reduce the usage of information sources can be accomplished as a piece of material changes merged in life-cycle analysis.14 Collecting information about takes a risk from tantamount things and cycles is critical in getting a handle on the natural impact of another cooperation. Joined with multiplication of elective decisions for thing and stock organization setup (White et al., 1995), the aftereffect of this assessment is things and cycles that limit the usage of raw substances.

The business cooperation for accomplishing source lessening and life-cycle assessment involves overlaying the new thing improvement process with a movement of screens that subject new things and cycles to a point by point assessment. Allenby (1994) states that information should be accumulated on something like four perspectives in breaking down the life-cycle ecological impacts of a thing. These consolidate natural (organic framework), manufacturing, social/political, and hurtfulness/ receptiveness (human) impacts. Information on these impacts then, is joined with the association unequivocal, multiphase thing progression process. This coupling ensures that natural examinations are thought about despite client interest, creating processes, planning plan, and advantage. This method, oftentimes called plan for environment, thinks about ecological factors generally through a thing's life cycle to be overviewed at the arrangement stage. Its fundamental kind used in the arrangement stage is the informational index with information concerning the reasons for different materials. These informational collections recall information for the risks of explicit materials, their toxicological properties, and other appropriate ecological information. With the unique assistance and interest of safety, prosperity, and environment (SHE) subject matter experts and thing stewardship delegates in the new-thing improvement bunch, the showed multiphase support process helps with restricting PBT content of new things as well as to make, during the arrangement stage, an extended store network perspective on the customary monetary impacts of things as well as their greater ecological impacts.

Transportation Optimization

In updating transportation strategies at the arrangement stage, IT expects a huge part. Picking at which stage to complete explicit creation processes chooses the aggregate and kinds of materials to be delivered. The assessment of energy and ecological force of elective creation network plans is in its start, yet this can be expected to foster rapidly as sensible organization practices thrive, especially if stresses over an unnatural weather conditions change heighten. Restricting energy power and natural impacts of elective store network plans is, on a basic level, an immediate entertainment practice if data are open. Dealing with these impacts expects that this assessment be embraced at the arrangement stage. Bar-coding of holders, for example, is huge for following compartments and materials generally through the creation organization. Despite the apparent benefits of vehicle directing and re-energizing updates that such information can engage (Fisher et al., 1983),

holder sensors can give telemonitoring of things, strain, and temperature, which is dynamically huge for both prevalent solicitation fulfilment as well as thing stewardship affirmation. At this point, regardless, such information is gathered essentially for business purposes, and its usage for the ecological evaluation of elective transportation and course structures is assistant.

Emission Analysis

IT expects two huge parts in the arrangement stage regarding release assessment. In any case, information is supposed to appreciate what certain cycles mean for risks and surges, as was communicated in the discussion of life-cycle assessment. Second, means to screen releases ought to be set up while arranging processes generally through the creation organization. These are huge for material changes ex-post. Assessing wellsprings of data and aftereffects of a cooperation are indispensable for individuals who wish to support hypotheses concerning the certifiable approach to acting of cycles. At the present time, industry ecological trailblazers are extremely proactive in diminishing spreads, with unequivocal, quantifiable targets set for each specialty unit and each office. These integrate release diminishes as well as reusing and reuse. Continuously, these are being used by senior organization to review progress toward better natural practices as well as decreasing secret drivers of cost and chance in an association's associations. IT is doubtlessly a foundation for the sum of this activity.

Reverse Logistics

A last use for IT in the plan stage is in the converse strategies' parts of the store network to plan the whole item life cycle from support to grave. Following the area of items and bundling is a significant piece of a converse coordinated factors organization. Reuse of bundling is a significant and financially savvy method for lessening ecological effect. To completely use this technique, it means quite a bit to track of bundling area. This might be utilized to enhance backhaul courses or to improve the transportation of perilous materials. Following items is essential in upgrading the opposite operations process. In numerous areas, reused or reused materials are, or alternately are seen to be, of lower quality than new things, and organizations should have the option to separate between them. This should be possible by bar-coding items or embedding imperceptible impressions. Information on the quantity of reuse cycles that an item has gone through may impact item quality, discernment, or cost. For instance, BMW has a longstanding strategy to reuse and reuse parts from old vehicles. To facilitate the cycle they code each recyclable part (Wu and Dunn, 1995).

Coordination of the store network is worked with by electronic information exchange (EDI). This permits various gatherings in the store network to acquire information about item use, item and bundling area, outflows, stock close by, and client use. Item use can be worked with by making MSDSs electronically accessible. Clients access the MSDSs (and other without a moment to spare learning guidelines) to guarantee the protected and proficient utilization of an organization's items. Stock available at various destinations or at client areas is, obviously, likewise helpful for upgrading shipments of material. The extraordinary benefit of EDI is that it incredibly diminishes the expenses of data move and permits different gatherings, incorporating those with item stewardship obligations, admittance to every pertinent datum.

Feedback from Information Technology Systems

Despite the business execution usages of natural IT noted above, IT is similarly central in allowing senior organization to evaluate progress for its laborers, monetary benefactors, and external accomplices in achieving ecological redesigns. Numerous associations have utilized IT to follow and diminish their TRI and other key natural pointers over the span of ongoing years. For example, Eastman Kodak's top organization has characterized unequivocal execution targets, which consolidate specialist clinical issues and assessment of ecological commitment. The association moreover screens other natural impacts and measures its improvement over an extended time against zeroed in on commitments.17 Similarly, the Brewers of Ontario unreservedly committed in 1991 to recover and reuse 100 percent of its sold ale packaging. At this point, they recover by far most, in light of everything, 83% of all mix containers sold, and 98.4 percent of all ale packaging.18

Analysis

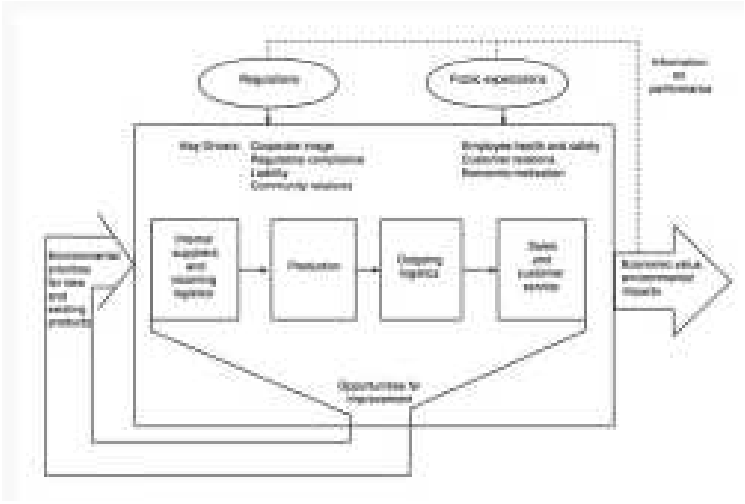
The Environmental Impact of Global Supply Chains

Before exploring how technology can help to reduce environmental damage, we need to understand the scale of the problem. A McKinsey report showed that:

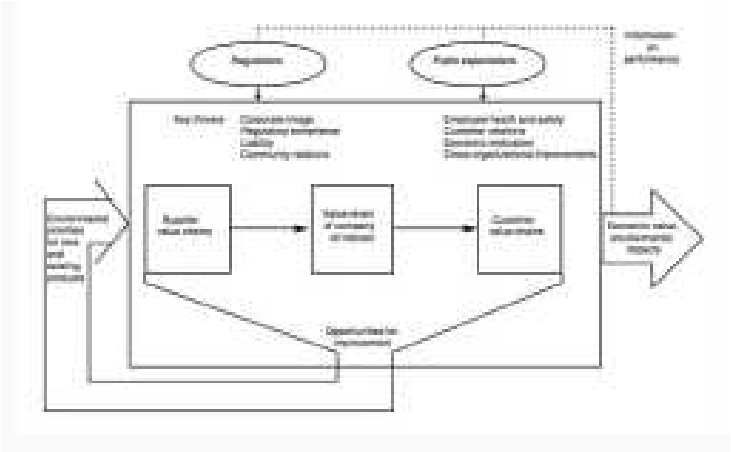
- Very nearly two billion individuals are supposed to become worldwide customers by 2025, a 75 percent expansion north of 2010.
- The shopper area is supposed to develop by 5% every year for the following 20 years.

- To meet environmental change arrangements, purchaser bundled merchandise (CPG) organizations should cut their ozone depleting substance outflows by in excess of 90% by 2050.
- In excess of 90% of the harm caused to the climate by CPG organizations comes from the production network, including 80% of ozone depleting substance discharges.
- Less than 20% of production network chiefs say they have perceivability into manageability rehearses in the production network.

The environmental impact in the supply chain isn't limited to greenhouse gas emissions. Water scarcity, issues with land use, toxic waste, water pollution, deforestation, air quality and energy use are all important considerations.



Internal Supply Chain Management



Extended Supply chain Management

Figures 1 and 2 show the inward and extended supply chains, independently, as per the drivers of money related worth and ecological significance noted in the above discussion. The key information induced over the past decade is that the creation organization, from materials securing to gathering to tasks to reusing and evacuation, should be seen extensively where the environment is concerned. Each stage prompts its own assets, impacts, and entryways for improvement, but convincing natural systems require an examination that encompasses the entire store organization. This not simply reduces wellsprings of possibility and commitment by diminishing tainting, wastes, and dangers, it moreover propels diminished costs and better things. This drawn out viewpoint on thing stewardship and store network the board is gradually moving the standard view

focused in on inside ecological significance and stipulation emptor. Despite the recently referenced unequivocal gadgets to propel this emerging thought of thing stewardship, a huge general limit is practical and powerful IT in the arrangement and coordination of supply chains and as an analysis part to additionally foster assurance and execution furthermore. We at present consider in extra detail the usage and the chiefs of ecological information to add regard in the long store organization.

Conclusion

The natural effect of supply chains will keep on being a significant issue for supply chains, with associations and customers turning out to be more mindful of how products are obtained, made and dispersed. A forward-looking store network methodology joined with the right innovation arrangements will assist associations with building more manageable, dependable and moral stock chains — and that is really great for everybody.

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An Overview of Recent Food Packaging Technologies

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Abstract :

The subject of this exposition is shrewd and dynamic bundling of new merchandise in the food business. There are an assortment of bundling methodologies for safeguarding new food varieties available, as well as various novel innovations made regardless of carbon dioxide safeguards that upgrade the item's quality and, in this manner, broaden its timeframe of realistic usability. Different spectroscopic strategies have been utilized to assess natural product quality. Different cunning bundling has been intended to expand the food's newness. Inks, cements, and the utilization of oxide obstructions are useful nanotechnology procedures for distinguishing food disintegration. In this manner, they are significant for upgrading the purchaser's food handling. Additionally included are non-poisonous and consumable bundling materials. Future developments, like 3mtm screen, may speed up the development of the food bundling industry.

Keywords: Intelligent Packaging, Carbon Dioxide Absorbers, Spectroscopy Techniques, Adhesives, Oxide Barriers

I. *Introduction :*

In earlier many years, the basic role of bundling was to shield the actual food; be that as it may, in later many years, it has come to have a significant impact in different settings, including timeframe of realistic usability, advertising, the security of brands, and the arrangement of nourishing data about items. As a result of the ascent in usage of the bundling, it likewise filled in as a sign of the cultural and financial environment. The bundling of food and refreshments represents somewhere in the range of 55 and 60 percent of the billion dollar worth of all bundling.

II. HISTORY OF PACKAGING

The different sorts of meat things and sugar are set within texture sacks and bundled for appropriation in the papers of the earlier year. Boxes made of paper board are much of the time utilized in the mass showcasing of different things. Canning was first settled during the 1800s for the purpose of giving food to support individuals serving in the military. Along these lines, extra merchandise like cellophane and polyethylene appeared. The multiplication of self-administration retail outlets required the utilization of cellophane, which was an outwardly engaging presentation bundling material. Polyethylene is a specific sort of plastic that was developed around when World War II was going on. During the 1950s, a wide range of kinds of bundling materials, including glass, steel, and paper, filled in as options in contrast to plastic and cardboard. The far reaching utilization of bundling materials might be ascribed to its profitable characteristics, which incorporate lower generally speaking expenses, more straightforward creation processes, lower by and large loads, and lower generally speaking expenses for transportation.

III. IMPORTANCE OF PACKAGING

The essential objective of food bundling is to safeguard the food item from outside defilement to broaden its timeframe of realistic usability and upgrade its general quality. This empowers the item to be consumed securely for a more drawn out timeframe. Auxiliary obligations incorporate the warning of altering, guideline of piece size, and recognizability highlights. Essential capabilities incorporate safeguarding the item from heat, light, dampness, oxygen, pressure, bugs, soil, and other vaporous material, in addition to other things. The most common way of bundling food items in environments that have been modified has arrived at an experienced stage [1]. Nitrogen and carbon dioxide are the two gases that are most frequently utilized during the time spent safeguarding food merchandise like cheddar and espresso.

Be that as it may, the European people group just permits a predetermined number of gases to be delivered into the environment. The reason behind adjusted climate bundling is that gathering the prerequisites of the consumer is planned. The pressing must be planned with an elevated degree of value to forestall the issues that are brought about by transportation. By diminishing the quantity of issues, the item should have an engaging appearance and fulfill the prerequisites of the clients [2]. The main calculate deciding if a client would acknowledge an item is its degree of value. Controlled adjusted climate bundling is one more sort of bundling. This sort of bundling uses oxygen, carbon dioxide, and stickiness to keep up with the item's condition of newness. There is oxygen present in vacuum pressing, which is advantageous since it eliminates air from the

item. Be that as it may, this oxygen additionally accelerates the speed of unfortunate changes, for example, the autoxidation of lipids, which influences the item's flavor and fragrance. Furthermore, they energize the development of molds, which might adversely affect the item's newness. To deliver food of an excellent that isn't dangerous to the soundness of the client, dynamic and insightful bundling, which might incorporate oxygen scroungers, safeguards, and producers, is utilized.

IV. ACTIVE PACKAGING

Since the essential capability of bundling is to safeguard the items in the bundle from outside defilement, this training not just broadens how much time that the items might be put away yet additionally supports the items' general quality. Auxiliary obligations incorporate the warning of altering, guideline of piece size, and recognizability highlights. Essential capabilities incorporate safeguarding the item from heat, light, dampness, oxygen, pressure, bugs, soil, and other vaporous materials, in addition to other things. The most common way of bundling food items in changed environments has arrived at an experienced stage right now [1]. Nitrogen and carbon dioxide are the two gases that are utilized most frequently during the time spent safeguarding food merchandise like cheddar and espresso.

Be that as it may, the European people group has just approved the utilization of a predetermined number of gases. The reason behind adjusted climate bundling is that it fulfills the requests of the client in its own one of a kind way. The pressing genuinely should be of a top notch so that any issues that might emerge during shipment might be stayed away from. The item should have an engaging appearance and fulfill the prerequisites of the market [2] on the off chance that the issues are to be diminished. While attempting to prevail upon a purchaser's endorsement, quality is the main component to consider. One more sort of bundling is known as controlled adjusted climate bundling. This sort of bundling uses oxygen, carbon dioxide, and stickiness to keep up with the item's ideal state. Be that as it may, the speed of troublesome changes, for example, the autoxidation of lipids, which influences the item's flavor and scent, is advanced rapidly by the presence of oxygen in vacuum pressing. This oxygen is useful for the item since it eliminates air from the item. They additionally add to the development of molds, which could affect the item's general newness. Dynamic and shrewd bundling alludes to the work of procedures like oxygen scroungers, safeguards, and producers in the assembling of excellent food that doesn't represent a gamble to the wellbeing of the client.

V. APPLICATIONS OF ACTIVE PACKAGING

A. Oxygen Scavengers

The presence of oxygen in any material used to bundle food might hurry the speed at which food disintegrates and make it turn sour. Oxygen can likewise make food turn sour. It energizes the advancement of molds as well as parasite. This prompts explicit chain occasions, for example, oxidative responses, which might prompt terrible flavors, unseemly variety changes, and a disintegration in the nature of the food generally speaking as well as its nourishing substance. Diminishing the quantity of responses that are instigated by oxidative cycles is one of the advantages of utilizing oxygen scroungers [10].

They might be remembered for the item as sachets that are set in the head space, or they can be tracked down straightforwardly in the material that makes up the bundle. These searching methodology are applied to bring down the quantity of oxidative cycles, and likewise, to diminish the centralization of the corruption. Ferrous oxide is the most predominant sort of oxide that is utilized, however there are numerous different kinds, for example, ascorbic corrosive, nylons, unsaturated hydrocarbons, and catechols. What's more, they comprise of specific compounds, for example, glucose oxides [5]. Specialists have found that oxygen scroungers helpfully affect the method involved with safeguarding food and, as an outcome, increment how much time an item might be kept on store racks. Scroungers are the most widely recognized sort of retentive material and are much of the time bundled looking like sachets, which are then embedded inside the essential bundling with a tension mark on to within surface to give the item underlying scaffolding. Furthermore, iron powder is utilized and afterward changed it up of other dietary parts that fluctuate in their degrees of dampness content. The letters z, fx, e, and g are instances of the run of the mill kinds of sponges. These may for the most part be bought in Asian nations' commercial centers. Furthermore, they can bring down the amalgamation of hexane and other unpredictable synthetic substances in high-fat food varieties, which thusly brings down the pace of rancidity.

B. Atco Absorbers

These are effectively open as sachets across an assortment of retail outlets. How much oxygen in the environment is brought from 2.09 percent down to 001 percent because of its capacity to assimilate oxygen. By bringing down how much oxygen in the climate, it restrains the advancement of microorganisms. Carbon dioxide safeguards will likewise be presented at a high

advantage rate to limit the MICROBIAL development that happens specifically things like cheddar, meat, poultry, and prepared merchandise [4].

C. Antimicrobials

Antimicrobials are added to food handling activities to further develop the item's general quality and wellbeing by diminishing how much defilement that happens on the outside surfaces of handled food varieties. Furthermore, silver particles are utilized in the genuine bundling of the food. In spite of the fact that they travel gradually and respond with organics, they are in direct touch with the food [7]. Coins made of silver and antimicrobials are the two subjects of examination right now. Recently procured repositories for capacity that hold silver The presence of nano particles inside a polypropylene-based material adds to a consistent decrease in the improvement of microscopic organisms. Ethyl liquor, which is additionally utilized, is applied to the silica, where it is assimilated and afterward breathed out; this technique is productive however smells seriously [6].

In spite of the fact that chlorine dioxide is productive against microscopic organisms, it has various secondary effects, for example, changing the shade of meat and becoming green harvests white. Ethylene is an exceptionally magnificent responsive substance that might be utilized in a wide range of ways, including change, adsorption, and retention. This is useful for business applications, which are utilized for the method involved with eliminating ethylene from the climate. Potassium permanganate is one sort of ethylene safeguard. It comes in sachets, which might be found in the capacity offices of the office. These are not promptly included into the item since doing so could expand its poisonousness. It is feasible to assess the nature of the food that is contained inside the pressed material by utilizing insightful and dynamic bundling. Couple with the improvement of the dynamic bundling came the production of this bundle [8]. These are either held straightforwardly or incorporated inside or beyond the materials that make up the bundling. Signs of time and temperature, biosensors, and identification of radio frequencies are a couple of models. Insightful bundling is a framework that is equipped for conveying clever capabilities like detecting, recording, following, imparting, and utilization of logical logo to expand the timeframe of realistic usability of the item, nature of the item, and it gives data and cautioning on the bundling material [9]. Insightful bundling is characterized as a framework that is equipped for conveying shrewd capabilities like detecting, recording, following, imparting, and utilization of logical logo to expand the timeframe of realistic usability of the item and quality.

VI. CONCLUSION

The food business has been effectively consolidating various advancements, which has impelled the bundling area to the bleeding edge of contest in hundred years. These upgrades will eventually bring about an improvement in both the quality and wellbeing of the food material. These developments are continuously advancing to fulfill the needs of different client inclinations. Dynamic and insightful bundling is frequently utilized for the motivations behind dialing back the speed of oxidation, forestalling the development of water inside the food item, restraining the improvement of microorganisms, and bringing down the centralization of unpredictable flavors and scents. Furthermore, nanotechnology has been made to impact the bundling business fundamentally. Expanding the levels of pressing material has required the advancement of new developments like dynamic bundling, the development of obstructions, and the identification of infections. These moderately new advancements have seen critical development, which enjoys brought about superior benefits for the two purchasers and makers. There are scroungers that aid the development of poisonous free and consumable bundling materials that work in a more limited period of time and are significant for the two producers and clients. Ongoing mechanical advances, for example, 3MTM screen packs, have opened up a great deal of entryways in the domain of food bundling, as most would consider to be normal to prompt critical progressions in the business not long from now.

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Effective Teaching Strategies

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Abstract :

Effective teaching is a term used to describe the knowledge, strategies and conduct of a successful educator. It is the ability to make a positive impact on a student's life and academic carrier, including the capacity to teach important skills sets, introduce new concepts and manage any classroom concerns. This paper describes the importance of lesson plan and effective teaching strategies. The main effective teaching strategies are: student – centric discussion, collaborative learning, flipped classroom, VAK Teaching, spaced learning.

Keywords : Effective Teaching Strategies.

Introduction :

TEACHING

According to Gage (1963) "Teaching is a form interpersonal influence aimed at changing the behavior potential another person".

Smith (1963) Further extended the definition of teaching. Teaching is a system of actions involving an agent, an end in view and a situation including two sets of factors those over which the agent has no control (class, size, Characteristics of peoples, physical facilities etc.).

PLANNING FOR TEACHING

Planning is the beginning of teaching and learning process, before a teacher goes to the class to deliver any lesson, he plans such lessons while education administrators make policy and plan the curriculum for the school to implement them.

The first step in effective teaching is effective planning, but the for basic ones we must not forget are:

1. What are the goals to be reached?
2. What educational experiences are to be provide in order to attain the objective.
3. How can these educational objectives be organized?
4. How could these objectives be determined whether they are reached?

LESSON PLAN

Lesson plan is a plan of action implemented by the teacher in the classroom.

According to Green (1987) "Lesson plan is the teachers mental, and emotional visualization of class room activities". A lesson plan is teachers on guide when clear aim of the lesson and then plan it well. So as to provoke productive thoughts and actions among his students.

IMPORTANCE OF LESSON PLANING

1. Achievement of definite goals and objectives.

   While preparing lesson plan the teacher keeps the mind general and specific aims of the lesson.
2. Prevention of wastage.

   Planning a lesson helps in avoiding the wastage of time and energy of both the teacher and the student.
3. Self confidence on the part of the teacher.

   A teacher who has planed his lesson carefully is full of confidence in his class.
4. Thoroughness and effectiveness.

The teacher has spent a lot of energy and time in preparing his lesson plan and he has planed it keeping in views the mental capacities, attitudes, habit, interest and aptitude of pupils to be taught.

5. Evaluation possible.

   A good lesson plan enables a teacher to evaluate his work as the lesson proceeds. Evaluation is the most essential part of the teaching-learning process, which is possible when definite aims and objectives are kept in view.

TEACHINGSTRATEGIES

1. Student-centric discussion.

   Student-centric discussion is a teaching strategy that allows students ti under stand more about topics or concepts via collaboration and co-operation. It involves detailed discussion on topics or ideas that eventually boosts students' confidence productivity and implementation skills. It also improves their comprehension, speaking and skills that reflect in their assessments.

2. Collaborative learning

   Collaborative learning is a teaching strategy that focuses on encouraging team work and partnerships.

3. Flipped class room

   Flipped class room is an innovative teaching strategy that works in contrast to traditional class room learning. In a traditional class room, students are introduced to new concepts as home work.

4. VAK teaching

   VAK teaching stands visual auditory and kinesthetic. It is a very comprehensive teaching strategies that focuses on improved learning experiences using three main sensory receivers.

5. Spaced learning

   Spaced learning is a teaching strategy that makes practicing a skill of retrieving information efficient for students. It involves breaking a long course in to multiple short section or modules and making students understands them with appropriate breaks. This helps students in retaining information better.

CONCLUSION

Using different teaching methods and strategies, teachers can educate students better and inspire them to bring a positive change in society moreover, these strategies make the students learn new concepts and empower them with essential life skills.

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Role of Women as Environment Activist in Environmental Sustentation

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Abstract :

Before 18th and 19th century, it was once seen that young ladies have no capability in natural Sustentation and advancement, as appropriately as they had been deflected in all most significant circle of public activity. Be that as it may, in the wake of spreading consideration about their limitations and taking acknowledgment of their encompassing they deliberately attempted to hoist voice towards environmental factors debasement. Ladies had launched numbers of motion in annoying of higher safety of herbal assets and surroundings Sustentation. Like in India, Amrita Devi had sacrificed their lifestyles for safety of the bushes that was once going to fell down by means of industrial logger in Uttarakhand. Other female like Vandana Shiva have additionally contributed in surroundings Sustentation and protection. They had equipped female and human beings via the Navdanya movement of 1982. Developing people and mechanical improvement are continuously embedding a weight on the environmental elements and on country's natural assets. Over-double-dealing of the country's resources like land, water, gas and so on has brought about corruption of resources as a rule because of modern contamination, soil disintegration, deforestation and urbanization.Therefore, Sustentation of herbal assets and advertising of surroundings can't be executed barring involving the ladies in planning and education for merchandising the values for Sustentation and promoting of climate. Consequently, endeavor has been made to check the capability of young ladies in Sustentation and advancing of environmental elements close by with suitable methodology for the equivalent.

Keyword: Growing population, Strain, Degradation, Enhancement, Sustentation.

Introduction :

A ton of exploration on women and environmental elements have demonstrated that young ladies are sizeable entertainers in natural guide organization and they are basic supporters of ecological restoration and Sustentation. In resolving a few vital natural issues, female assume a prevailing part. Ladies, through their jobs as ranchers and as gatherers of water and kindling, have a closed association with their local environmental factors and much of the time go through most immediately from ecological issues. Ladies' immediate contact with environmental elements has delivered them profound data about the climate. Along these lines, female have filled in as agriculturalists, water valuable asset administrator, and standard researchers, among others. Ladies are not generally exclusively instructed about the climate, however they are additionally shielding and caring. Women, being mainly accountable for home and family management, have interaction greater seriously with the home grown environmental elements and build the environmental elements extra than men. Thusly, they are additional plausible to go through from a debased home, neighborhood, and town environmental elements and to bear more noteworthy of the weight that goes with staying in horrible lodging and networks with lacking private and wellness foundation, because of the way that they invest more noteworthy energy at homegrown and its quick area (Etta, 1999).

States are presently seeing the global element of an amount of ecological issues, like nearby weather conditions change, ozone consumption, unloading of unsafe squanders, obliteration of natural resources and of woods, and they have an impact on of desertification (Tolba, 1992). Therefore, the want to shield the surroundings turns into imperative. Women have recorded successes in fixing environmental troubles all over the world. In India, the ladies realized that degradation of productive land has led to the erosion of pinnacle soil; the choking of water drainage was once inflicting salinity and loss of meals crops. They together rent degraded land and revived them thru standard farming. In three years, seven-hundred acres of land have been restored to productive use (Ress, 1992). They are extra involved about environmental safety and ecological preservation. A lot has been stated about female things to do in surroundings enchancment and protection. Moser (1991) recognizes three jobs for ladies:

i. As chiefs or maintainers of the common habitat

ii. Rehabilitators of the regular habitat in the feeling of manageable turn of events, and

iii. As trailblazers in the utilization of proper innovation in the production of new conditions.

Dankelman and Davidson (1998) found that young ladies play a critical situation in dealing with their herbal environment and undertake various components to manage the sorts of ecological catastrophe they face. They, in any case, concentrate on that the reactions of states have never again been huge and as an outcome ladies, men, and youngsters continue to confront issues which incorporate contamination, negative administrations, human waste contamination, exhaust from family fuel, and the punishments of soil disintegration and flooding. As properly expressed by way of Dashe (199l), except the more desirable grasp of a gendered assessment to data into the future ecological organization programs, an accident is unavoidable. Hence, there is the need to apprehend the a number methods female have actively participated in environmental safety and administration with a view to combine them into environmental administration programs. Ladies and the environmental elements are eagerly sure and interconnected. Since forever ago, young ladies have been deified as powerful images of nature: Mother Earth, Earth Goddess, and Artemis in the Greek folklore, and Mother River (the Yellow River) in Chinese history. Ladies have exemplified nature and given nature its limitless which means .Therefore, female as bearers and conservers of life, as these who first information children, have to be principal in dedication to the environmental cause.

Role of Women in Environmental Sustentation

Over 70% of the Indian people is rustic based. Biomass plays out a basic situation in gathering consistently endurance needs of the goliath larger part of the rustic families. Water is integral for survival and its availability is associated to biomass. The biomass-based subsistence financial system is ordinarily non-monetized. Production and processing of biomass agriculture, forestry, and minor woodland produce and village crafts primarily based on biomass as uncooked substances are additionally the largest sources of employment. Development imperatives have inevitably prompted some obliteration of the biomass through deforestation and natural debasement. Customarily, young ladies have been responsible for resource and endurance for water, food, fuel, grain and living space, despite the fact that they not frequently get the investment funds for supporting these presence help frameworks. Added to these natural obliteration, compounds ladies' issues in a way extremely hard from that of men. The task is to re-establish the symbiosis between communities, girls and herbal sources and reverse the fashion of the bad affect of current developmental paradigms. Ladies have continually been the transcendent conservers of bio-variety. Indeed, even these days they work commitments like seed choice, duplication and Sustentation. The on ranch Sustentation customs of provincial and ancestral ladies, concerning agro-biodiversity are appropriately known.

Though the Government of India is working closer to an ecologically strong and feasible fine of life, the issues, difficulties and issues are complex. Notwithstanding, young ladies in India are partaking in a basic capability in security and Environmental Sustentation. Ladies in our have presented a novel point of view to the surroundings debate, due to the fact of their distinctive journey base. Poor female in our us of a have delivered a one-of-a-kind viewpoint to the surroundings debate, due to the fact of their one of a kind ride base. Poor women's lives are no longer compartmentalized and they see the difficulties in a broad and all encompassing viewpoint. They catch essentially that financial matters and environmental elements are viable. Their outing presentations to them that dirt water and vegetation, key for their regular living, requires, care and exact administration. Natural debasement is related never again exclusively to the biosphere alone, but to the social circle also. Keeping in view the inherent competencies of ladies in a variety of spheres like administration as nicely as the want for female entrepreneurship, development, instructional and vocational training, verbal exchange skills, creativity and innovation, fine of administration and control, stock and manufacturing administration want to be bolstered at some stage in the size and breadth of the country. To gain this, sources and electricity of ladies want to be channelized to improve their full viable so as to take their rightful location as equal companions in all sphere. Further, there are possibilities for cost addition in all agricultural commodities at the submit harvest phase. Often creating nations sells their essential produce besides price addition.

Chipko movement

One of the first environmentalist actions which have been stimulated by using female was once the Chipko motion (Women tree-huggers in India). "Its title comes from a Hindi phrase that means to stick" (as in glue). The motion was once an act of defiance in opposition to the country government's consent given to a business for business logging. Ladies of the town opposed, embracing brambles to thwart their felling, to protect their life which had been founded on the woods. It began

when Maharaja of Jodhpur wanted to build another castle in Rajasthan which is India's Himalayan foot slopes. While the hatchet folks have been cutting the trees, saint Amrita Devi embraced one of the trees. This is because of the reality in Jodhpur each newborn child had a tree that should discuss to it. The axe guys overlooked Devi and after taking she off they cut down the tree.

Green Belt movement

Another development, which is quite possibly of the biggest in young lady and environmental elements history, is the Green Belt development. Nobel Prize victor Wangari Maathai established this movement on the World Environment Day in June 1977. The starting service was once extremely straightforward a couple of female established seven shrubs in Maathai's lawn. This war began due to the fact guys desired to reduce the timber to use them for industrial functions whilst female desired to hold them seeing that it used to be their meals useful resource and deforestation used to be a survival rely for nearby people.

Relevant legal provision on environment

India is one of a handful of the global areas of the world that have made a one of a kind reference in the sanction of to the need for natural security, oversee and safeguarding. The sanction (42nd Amendment) Act of 1976 has made it a Fundamental obligation to safeguard and upgrade the home grown climate. Article 51 (a) manages the cost of that it will be the commitment of every single resident of India to safeguard and improve the home grown environmental elements like woods, lakes, waterways and wild presence and have sympathy for dwelling animals. Article 21 of Constitution confirmation the legitimate to life; a ways of life of pride, to be lived in a positive climate, liberated from chance of sickness and disease. Other than there are assortment of Directive Principles which give sideways accentuation to somewhere safe of environmental elements. Notwithstanding Indian Constitutional viewpoint, certain extraordinary regulations are additionally accessible in India for Environmental security, for example,

i. The Air (Prevention and control of contamination) Act, 1981
ii. The Water (Prevention and control of Pollution) Act, 1974
iii. The Wildlife (Protection) Act, 1972
iv. The India Forest Act, 1927
v. The Forest (Sustentation) Act, 1980 and the exhaustive regulation
vi. Environmental insurance Act, 1986

RECOMMENDATIONS

To enhance women's participation in environmental administration for sustainable improvement the following tips are proffered: Women must be influenced to take part in committees on environmental safety projects, programs, and insurance policies to tackle gender imbalances in choice making. Women's get admission to to land and different sources must be ensured and no longer undermined. The authorities will have to come in, in this respect, to make certain gender fairness concerning get entry to to and manipulate of resources. Environmental training is required for the each and every citizen for sustainable improvement Environmental schooling will produce alternate in mind-set of the people, as nicely as have an effect on specific skill on the every single resident. Detachment of plastic from civil stable squanders and reusing of plastic will help to limit the commitment of plastic to the steady waste issue, as appropriately as dispose of the unsavory littering. "Biodegradable plastic" ought to moreover be utilized (Pryde1973). Which will finally decompose. Women training and get entry to to training for ladies must be viewed as a coverage priority. Educated girls will make contributions greater appreciably to crossing over the opening among environmental factors and improvement. Strengthening of female in manageable human improvement and comparable to the security of the surroundings need to be diagnosed and sustained.

CONCLUSION

This paper has discussed the various ways women have participated actively in environmental protection and natural resource management in order to ensure sustainable use of environmental resources. Recommendations are proffered, especially those that can help the goal of women empowerment. The basic job of ladies, as asset chiefs, as local area activists, as natural promoters, should be perceived when systems for the security of the climate are being created. Ladies ought to be permitted to take part at the nearby, local, public, and global levels on ecological issues. In the expressions of Maye (1994), this cooperation, to be significant, ought to go past posturing. To go with a huge effect on choice making,

ladies ought to be available in equivalent numbers to men (or if nothing else on a 40:60 corresponding split of sexes). As asset chiefs, ladies ought to be counseled and upheld in how they are now safeguarding the climate. In particular, more ladies ought to be associated with decision making concerning approaches projects, or financing of climate.

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Current Status of Indian Textile Industry and the Challenges

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Abstract :

Textile industry in India plays a significant role in the economy by contributing to production of cloth, employments, tax revenue, and exports and so on. The industry is the oldest and the largest industry employing 45 million people directly.India is self-sufficient in textile and clothing and also a major exporter in the Global market with about 5% market share. The present paper focuses on the current status of the textile industry and challenges it faces today. The finding of the research revealed that the industry has 5.35 million spindles and 291000 rotors. The number of spinning mills has increased from 2568 in 2001 to 3155 mills in 2017. However, there is a decline in the number of composite mills from 281 to 205 in the organised sector. Fabric production has increased from 40233 square million metres in 2001 to 64776 square million metres in 2017. This fabric is produced by the mill sector, power loom sector, handloom sector, the hosiery sector etc. However, the power loom sectors contributes maximum to the cloth production accounting for 56% of the total. There has been rapid rise in the export of textile and clothing from Rs. 52876 crore to Rs. 245751 crores. However, the industry faces various challenges like obsolete Technology, financial problem, low efficiency and productivity, limited skills, lack of free trade agreement, fragmented industry and so on. Hence efforts should be made to overcome these challenges so that the industry can capture sizable global market share like China and Bangladesh.

Keywords: Spindles, Rotors, Power loom, Apparel, Export.

1. *Introduction :*

Indian textile industry is one of the oldest and largest textile industries. The first textile mill was established by Mr. Kavasj Davar in 1854. India ranks second in the world in textile manufacturing and exports. The industry contributes 12% to export earnings and 13% to industrial production. The industry employs 45 million people directly in different sectors. India has 5% global market share in textile and Apparel. The industry contributes to about 3% to country GDP. The size of the domestic textile and Apparel market is about 100 billion USD in the year 2019.

The unorganised sector contributes 94 percent to the fabric production. While the mill sector contributes only 6 percent.The government has taken various initiatives for the development of textile industry such as Technology up-gradation fund establishment of textile parks establishment of textile cluster 100% FDI under automatic route, National technical textile mission, New Textile policy 2020, new skill Development Scheme, make in India and Atmanirbhar Bharat.

2. Literature Review

[1] **Dr G Yoganand (2016)** elaborated on the Indian textile industry. It is highly varied with hand spun as well as hand woven textiles, with mill sector as well as decentralised powerlooms. India ranks second in the world in production of cotton yarn and fifth in the production of synthetics. The industry is mainly cotton based accounting for 65 percent of the total production.

[2] **Pankaj Dixit (2019)** reviewed the current status of textile industry in the country. The research found that the industry is important source of employment and a source of inclusive development. The total employmentprovided by the industry is 118.57 million in different segments like spinning, weaving, .processing,knitting,garment, sericulture, jute, textile machinery and so on. The readymade garment sector employs 12.62 million while handloom sector employees 7.88 million, power looms sector 5.71 employees and so on.

[3] **Yash Sanjay Trivedi (2022)** focused on the opportunities for Indian textile industry and the challenges faced by it. The opportunities are in the technical textiles, apparel manufacturing and e commerce. Major challenges faced by the industry are stiff competition from China and Bangladesh, rise in labour cost, access to latest technology environmental challenges and the taxes.

[4**] Kasiviswanathan (2021)** analysed the competiveness of the Indian textile industry in the world. India's share in global Textiles and clothing is about 5 percent but China's share is 38 percent. Hence India is far behind China in global market. India

has advantage in the exports of cotton yarn while lack clear cut advantage in garment and fabrics. 95 percent a fabric is manufactured by small scale decentralised units. China has dominant position in the exports of cotton fabrics with a global market share of 69 percent while India's share is only 9%. Similar condition prevails in man-made fabrics.

[5]**Prof.Tushar C Patil (2019),** founded India has the potential to capture global in textile and apparel share from present 4% to 8% by 2020. This requires changes in the level of technology, level of textile education and skill imparted to the youth, quality in textile education is essential to maintain quality in textiles. This can be done by curriculum Development, faculty development, Industry Institute interaction, Research and development and networking among industry and educational institutions.

3. Research Methodology

The details of the research methodology can be seen as below:

Objectives: The major objective of the present research are:

[1] To review the growth of Indian textile industry from 1950 to 2020

[2] To assess the contribution of this sector to Indian economy

[3] To find out the current challenges faced by the industry

[4] To suggest measures to overcome this challenges

Research Design: The research design used for the present research it descriptive Research Design as it describes the current status of the textile industry.

Sources of Data: there are two sources of data namely primary data and secondary data. Primary data is the first hand data used in the search while secondary data is the available published data on the subject of the research. In the present research only secondary data has been used which was easily available from the industry sources.

Data Analysis: The secondary data was collected through the reliable sources. The data was presented in the form of simplified tables and Pi diagrams or bar diagrams. On the basis of the tables and charts the influences were drawn. Simple trends in different variables were analysed and on that basis the interpretations were carried out.

Limitations:

1. The research has extensively covered quantitative data but does not cover the qualitative data.

2. The research is mainly based on available secondary data and does not cover the primary data.

3. The research has analysed the current status of the Textiles industry from macro point of view and not from micro point of view.

4. Figures and Tables

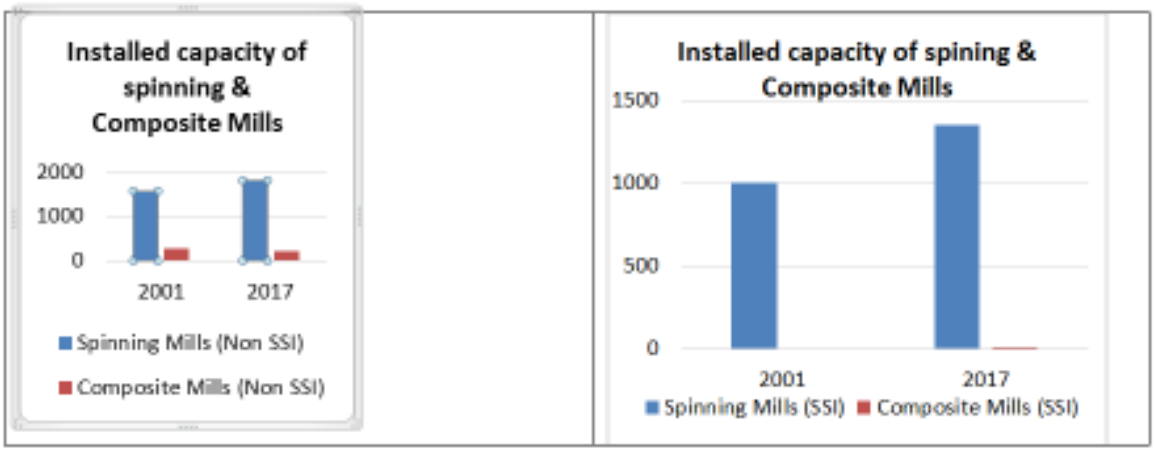
The details like the current status of textile industry can be seen from the following data analysis.

1. **Installed capacity of spinning and composite Mills:**The detail regarding the installed capacity of spinning and composite Mills can be seen from the following table.

Table No. 1

Sr. No.	Description	2001	2017
1	Spinning Mills (Non SSI)	1565	1803
2	Composite Mills (Non SSI)	281	205
	Total	**1846**	**2008**
		2001	**2017**
1	Spinning Mills (SSI)	1003	1352
2	Composite Mills (SSI)	0	7
	Total	**1003**	**1359**
	Grand Total	**2849**	**3367**

Source: Confederation of Indian Textile Industry, Annual Report – 2016-17.

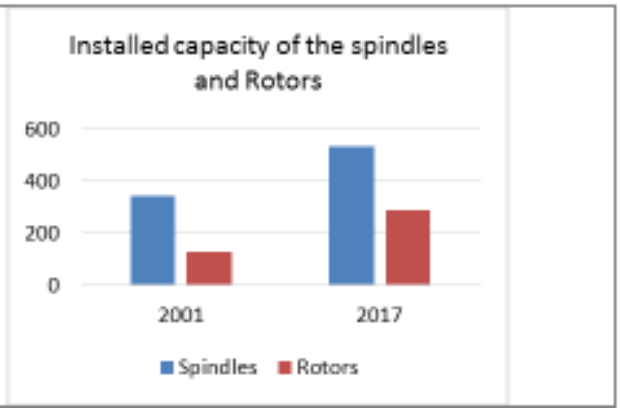


Inferences: It can be seen that the number of spinning mills increased from 1565 in 2001 to 1803 in 2017, while the number of composite mills declined from 281 in 2001 to 205 in 2017. Thus there was expansion of spinning sector (both non SSI and as well SSI) but contraction in the composite mill sector.

2. **Installed Capacity of spindles and Rotors:** The details regarding installed capacity of the spindles and Rotors can be seen from the following table.

Table No. 2

Sr. No.	Description	(Million) 2001	(Million) 2017
1	Spindles	344	535
2	Rotors	130	291



Inferences: It can be seen from the about table that the number of spindles installed increased from 3.44 million in 2001 to 5.35 million in 2017. On the other hand the number of Rotors installed increase from 130 thousand in 2001 to 291 thousand in 2017.

3. **Fabrics Production by different sectors:** The detail regarding fabric production by different sectors can be seen from the following table.

Table No. 3

Sr. No.	Sectors	2001	Percentage	2017	Percentage
1	Mill	1670	4	2251	3
2	Handloom	7506	19	8008	12
3	Power loom	23803	59	36055	56
4	Hosiery	6696	17	17541	27
5	Khadi, Wool, Silk	558	1	921	2
	Total	**40233**	**100**	**64776**	**100**

Inferences: It can be seen from the above table that the fabric production of the mill sector as increased marginally from 1670 millions square metres in 2000 - 2001 to 2251 million square metres in 2016-17. Its share has decline from 4% to 3%. On the other hand power loom sector has contributed maximum to the fabric production according for 56% share in the total production.

4. Production of Cotton/Blended/Manmade Fabric: The details regarding the Production of Cotton/Blended/Manmade Fabric can be seen from the following table.

Table No. 4

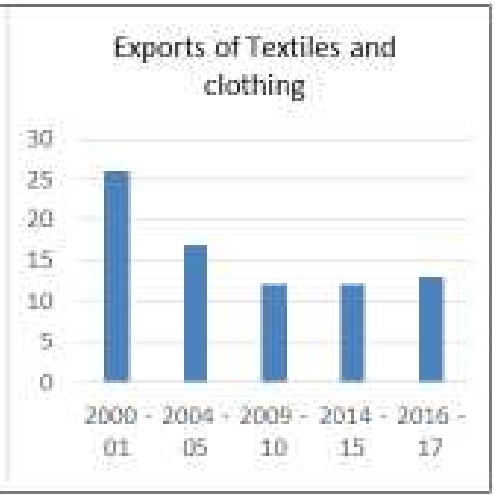
Sr. No.	Sectors	2001	Percentage	2017	Percentage
1	Cotton	19718	49	38853	60
2	Blended	6351	16	11039	17
3	Man-made	13606	34	13963	22
4	Others	558	1	921	1
	Total	**40233**	**100**	**64776**	**100**

Inferences: It can be seen from the above table that the share of cotton fabrics has increased from 49% in 2000-01 to 60% in 2016-17. On the other hand the share of blended fabric has gone from 16% to 17% while the share of synthetic or man-made has declined from 34% to 22%.

5. **Exports of Textiles and Clothing:** The regarding exports of textiles and clothing can be seen from the following table.

Table No. 5

Sr. No.	Year	Textiles and Clothing (RS./Crore)	Overall Exports (Rs. / Crore)	Percentage Share
1	2000 - 01	52876	203571	26
2	2004 - 05	63024	375340	17
3	2009 - 10	104793	845534	12
4	2014 - 15	230293	1896348	12
5	2016 - 17	245251	1852340	13



It can be seen that the textiles and clothing exports have increased from Rs. 52876 crore in 2000 – 01 to Rs. 245751 crore in 2016-17. The share of textile exports in overall exports has declined from 26 percent to 13 percent.

5. Results and Discussion

Challenges Faced: Some of the challenges faced by the textile industry are:

1 **Obsolete Technology**: Majority of the small units use old and outdated machinery which contribute to low productivity and high cost of production. Only 4 percent of the looms are shuttle less looms.

2 **High Cost of Raw Materials and Capital:** As a result of shutting down some plants in China there is sudden rise in the price of imported raw material and dyes. Even the cost of capital in India is much higher than other countries.

3 **Low focus on product development**: There is lack of focus on product development. This has affected the marketing as there is continuous change in the demand for products.

4 **Fragmented Industry:** About 95 percent of the weaving units are small and unorganised. Even garment units are small and unorganized. The industry is highly fragmented into different processes and places.

5 **Lack of Free Trade Agreement:** There are very few free trade agreements between India and other countries. This has restricted the exports of the product.

6 **Raw Material challenge**: There is no regular supply of raw material and the price of raw material keep on fluctuating which adversely affect the business of small units.

7 **Low efficiency and productivity:** Due to small size of the units and lack of automation, textile units are mainly labour intensive. This results in higher cost of production and low efficiency or productivity.

8 **Limited skill availability:** Majority of the textile workers are unskilled and not trained.

Suggestions: Some of the suggestions for improving the competitiveness of the Indian Textile Industry are:

1. The government must reduce duties on foreign technology and provide higher capital subsidy to weaving units on par with garment units.
2. Trade associations must regularly organise training and skill development programme for textile workers, supervisors and managers.
3. The small scale units must be expanded to achieve the optimum size and operate under one roof like textile clusters or textile parks.
4. Textile education must be revamped to make it more practical and suitable to the changing needs of the industry and market.
5. Exports should be focused to countries where the growth potential is maximum.
6. There should be single window schemes for all textile schemes, policies, government support and government schemes should be popularised among the industries.

6. Conclusion

1 Textile Industry is one of the oldest and largest industries in India. The government has taken various initiatives for the development of the Industry such as Textile Up-gradation fund, textile cluster scheme, Textile Park, 100% FDI, Technical textiles, and National Textile policy 2020, New Skill Development etc.

2 The textile and apparel Industry is about 100 billion USD in the year 2019. The Industry consist of the organized sector as well as unorganized sector. The unorganized sector account for 94 percent of the total fabric production while the organized sector accounts for only 6 percent of the total fabric production.

3 The total fabric production in the country increased from 40233 sq. million meters in 2000-01 to 64776 sq. million meters in 2016 -17. Power loom sector contributes maximum to the fabric production accounting for 56 percent of the total. It is followed by Hosiery sector (27 %) and handloom sector (12%).

4 The exports of textiles and clothing have increased from Rs. 52876 crore in 2000 – 01 to Rs. 245751 crore in 2016-17. The share of textile exports which was 26 percent in overall exports declined to 13 percent in 2017.

5 The composition of exports includes fibres, filaments, yarns, fabrics, apparels, home textiles, technical textiles etc. However, apparel accounts for a major share of 39.8 percent followed by home textiles (18.5 percent) and fabric (13.3 percent).

6 The major challenges faced by the textile industry are obsolete machinery, High cost of capital and raw materials, low focus on product development, fragmented industry, lack of free trade agreement, raw material challenges, low efficiency and productivity, lack of sufficient skills etc.

7. Acknowldegements

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Holistic Approach towards Environment: That's the Way to Future

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Abstract :

As long as we overlook the effects on the environment, we can discover great achievement in many areas of human endeavor. When we examine various fields, we analyze some of the qualities of our decision-making to comprehend why human decision-making in non-mechanical domains of human activity has led to degraded surroundings, societal breakdown, and detrimental economic repercussions. It is discussed how to create an environment that will support civilization using a new framework for making decisions. Decision-making should be within a holistic management framework. The essential components of this new framework for making decisions are described, and a holistic picture has been painted.

Keywords : Holistic, Development, Environment, Sustainable

Introduction :

Holism, which was first put forth by Jan Smuts, is traditionally understood as a philosophical theory that holds that the determining elements of nature are wholes that cannot be reduced to the sum of their parts and that the universe's evolution is a record of the activity and creation of such wholes. In a broader sense, it refers to the idea that wholes cannot be broken down into identifiable parts or reduced to them without leaving behind residuals that cannot be explained. Holism may also be defined by what it is not: it is not synonymous with organicism; holism does not require an entity to be alive or even a part of living processes. And neither is holism confined to spiritual mysticism, un-accessible to scientific methods or study.

Holism's proponents contend that by putting an emphasis on community, processes, networks, participation, synthesis, systems, and emergent qualities, the "ills" of reductionism will be remedied. It is crucial to understand that holism does not require any other biological comparison outside organisms themselves in order to analyse any whole or the entirety of any individual in all its ramifications. Even in its most extreme version, a holistic approach on its own is unrealistic and would doom scholars to a life of fruitless wallowing in unmanageable complexity. For accessing and comprehending a reality that is getting more and more complicated, both holism and reductionism are necessary.

A system is said to be sustainable when it only consumes resources that it can naturally regenerate. The presentation of a holistic management implementation process in an organization. With this approach, special consideration must be given to human interactions, resource consumption, and environmental impacts. It is necessary to identify areas where recycling and renewable energy sources can be used.

What is Holism?

The new paradigm of holism, which serves as the foundation for the Holistic Management decision-making process, can guide us toward a sustainable civilization. Allan Savory struggled to comprehend why natural resource management practices were failing (despite the largest number of scientists the world has ever known and were in fact leading to massive environmental degradation, social collapse, and failing economies), but he eventually found that human decision-making was the common cause of the massive loss of biodiversity and the symptoms associated with this loss. His more than 35 years of work to create a procedure for making decisions that are simultaneously socially, economically, and environmentally sound led to the creation of holistic management (Savory, 1988)

The definition of holistic management

The principle of holism is the foundation of holistic management. A fresh perspective on the world is holism. We need to start thinking in terms of wholes, which are the only functional units in nature. As an illustration, the oxygen and hydrogen atoms that make up the water molecule. If we only examine the characteristics of oxygen and hydrogen, we will remain in the dark

regarding the characteristics of water. The water molecule must be studied as a whole since it is more than the sum of its component parts. When we start thinking and acting holistically, we can clearly see how each of our choices affects the ecosystem and how our entire existence as humans depends on it.

By describing the entire being managed, the holistic management decision-making process is started. Every whole consists of the following: 1) the individuals in charge of managing the whole—these are the decision makers; 2) the resource base—this entails all of the resources available, such as land, machinery, skills, knowledge, etc.; and 3) individuals who influence or are influenced by the decision makers. If you wish to manage a "farm," for instance, the whole might include the family who lives there and runs it, the land, the structures and equipment on it, and the money the family has on hand or can make from the farm. The minimum whole comprises not only the land but also the associated human values, culture, and financial resources. This is thought of as a single entity for management.

The group as a whole then decides on a comprehensive objective. The holistic goal is a description of what the collective is managing in terms of the quality of life desired based on collective values, what must be produced to create this quality of life, and a description of the resource base as it must be far into the future in order to sustain what the collective produces. The motivation comes from human values. Here, we specify the level of prosperity and how the resource base will provide the income required to maintain the desired standard of living, such as through the sale of animals, crops, or any other business that does not go against our beliefs. In this case, we are merely outlining what we desire and not how to get there. The foundation of the holistic aim is sustainability of the resource base, which is required to support the profit and values outlined in the holistic objective. The hardest and most effective part of the holistic decision-making process is the holistic aim.

Sustainable development

Scholars and concerned scientists around the world, particularly in developed countries, came to grasp the limited ability of natural resources and the environment to maintain life for a long time after many years of following the carefree management scheme mentioned above. They began to value and respect nature more. They suggested the phrase "sustainable development," which refers to the utilization of natural resources in such a way that future generations will be able to maintain their current standard of living. Many industrialized countries have created and implemented legislation to use natural resources more prudently, decrease waste, and lessen environmental degradation as a result of public awareness of this reality and concern. These efforts, however, have been incredibly meagre and insufficient.

Sustainability is increasingly being incorporated into the practice of managing the world's resources, and the key strategy for doing so involves conducting an accurate input, output, and life-cycle analysis that includes several stages of verification and can be attained through environmental audit. A methodical, recorded, and objectively focused process called an environmental audit is used to confirm the evidence relating to various environmental aspects. Finding and regularly checking the environmental factors is a useful management technique for making an environment eco friendly. Conducting an audit can also assist in facilitating the interim procedure (Owoeye and Okojie, 2013).

Green audit is a holistic perspective of looking into the totality of the actions taken towards greening the place and is foremost reflected in its policies alongside the actions taken by the government towards protecting the environment. It can be done by Water quality analysis, soil quality analysis, noise quality analysis and air quality analysis. Thus by keeping a track of various parameters prescribed by various legislations ie. Under the "Environment Protection Act 1986", "Air (Prevention and Control) Act 1981," Water (Prevention and Control) Act 1974" and Noise Pollution control Rules 2000".

India has a complex and well-organized mechanism in place for environmental clearance. An Environmental Impact Assessment Notification that resulted from the "Environmental Protection Act of 1986" serves as its clearly defined legal framework. There are checks and balances in place, ostensibly to "improve openness and accountability," such as evaluation panels, expert committees, environmental information systems, and public hearings. Additionally, the National Environmental Appellate Authority, a judicial tool to supports it.

National Environment Policy (NEP) The National Environment Policy does not seek to replace, but build on the earlier policies—the National Forest Policy 1988, National Conservation Strategy and Policy Statement on Environment and Development 1992, Policy Statement on Abatement of Pollution 1992, National Agriculture Policy 2000, National Population Policy 2000, National Water Policy 2002. Across the political spectrum of the country there has been a recognition of the vital role natural resources play in providing livelihoods, and securing life support to ecological services. In this perspective a need for a comprehensive policy statement has been evident for some time in order to infuse sectoral and cross-sectoral, including fiscal approaches to

environmental management. The NEP is intended to be a guide to action in regulatory reform, programmes and projects for environmental conservation and the review and enactment of legislation, by agencies of the Central, state, and local governments. The policy also seeks to stimulate partnerships of different stakeholders, i.e. public agencies, local communities, academic and scientific institutions, the investment community, and international development partners, in harnessing their respective resources and strengths for environmental management. The principle objectives of the policy relate to current perceptions of key environmental challenges. They include: to protect and conserve critical ecological systems and resources, the invaluable natural and man-made heritage, which are essential for life support; to ensure equitable access to environmental resources and quality for all sections of society, and in particular, to ensure that poor communities, which are most dependent on environmental resources for their livelihoods, are assured secure access to these resources; to ensure judicious use of environmental resources to meet the needs and aspirations of the present and future generations; to integrate environmental concerns into policies, plans, programmes, etc. The policy has been evolved from the recognition that only such development is sustainable, which respects ecological constraints, and the imperatives of justice. The present policy marks a paradigm shift in the sense that, for once, liabilities have been fixed. 'The polluter pays" is the mainstay of NEP whereby responsibilities are fixed either on the individual or a government agency. Secondly, environmental clearance for any developmental activity has become mandatory. Strict liability imposes an obligation to compensate the victim for harm resulting from actions or failure to take action, which may not necessarily constitute a breach of any law or duty or care. The National Environmental Policy (NEP) is meant to serve as a guide for action in regulatory reform, programmes and projects for environmental protection, and the evaluation and enactment of laws, by agencies of the Central, State, and Local Governments. The policy also aims to encourage collaborations between various stakeholders, including public agencies, local communities, academic and scientific institutions, the investment community, and international development partners, in order to leverage their individual assets and competitive advantages for environmental management. The main goals of the policy are related to how important environmental issues are now perceived. Protecting and preserving vital ecological systems and resources, as well as the priceless natural and human-made heritage, which are necessary for maintaining life on Earth; ensuring equitable access to environmental resources and quality for all segments of society, and in particular, The strategy was developed as a result of the realisation that only development that complies with ecological restrictions and the demands of justice can be considered sustainable. Insofar as obligations have now been settled, the current approach represents a paradigm shift. The foundation of NEP is "the polluter pays," whereby accountability is placed either on the person or a government organisation. Second, it is now required for all development activities to receive environmental clearance. Strict liability imposes an obligation to pay damages to the victim for injuries brought on by actions or inaction, which may or may not be considered a violation of the law, a breach of a duty, or a failure to exercise reasonable care.

THE VIABLE MODEL

Now that the term "sustainable development" has been defined, it is crucial to pinpoint some of the components of an eco-development model and design an integrated approach. The suggested model's six components, which also shows how they are connected. Nowadays, any development plan is thought to have as its ultimate goal the improvement of human welfare or the quality of life. In order to neutralise the dynamics that cause deprivation and marginalisation of the weaker sectors of society, it entails generating income and employment, reducing poverty, and promoting public involvement and self-reliance. Motivating these groups might also be aided by decentralising government and bolstering local organisations and authorities. So following things should be considered for a viable sustainable development-

(i) The eradication of rural poverty via focused economic and social development initiatives.

(ii) Access to natural resources like land, water, and other resources.

(iii) Participation

(iv) Women's participation in rural development.

(v) Access to resources for production, markets, and services

(vi) The growth of non-agricultural jobs in rural areas.

(vii) Services in education, training, and extension

Ecological Education

Environmental education refers to the educational process dealing with man's relationship with his nature and cultural surroundings. As such, it includes the relationship between population, resource allocation and depletion, conservation, energy and technology, and urban and rural development and planning to the overall biospheric system. As a result,

environmental education is now a crucial component of eco development, environmental protection, and environmental betterment. Truly described, environmental education serves as a vehicle and a method of raising knowledge of the interaction between man and his natural environment, as well as his social surroundings and man-made environment. One of the fundamental goals of environmental education is to enable people and communities to comprehend the complexity of the natural and built environments that results from the interaction of their biological, physical, social, economic, and cultural aspects, as well as to acquire the knowledge, values, attitudes, and practical skills to participate in these processes responsibly and effectively. It necessitates a comprehensive strategy that takes into account each element individually and as a whole. Environment takes on the dual roles of style and subject in teaching. Regarding the style, it refers to using the environment as a tool for teaching and learning as well as an educational strategy. In terms of the subject content, this entails instructing students about the elements and constituents of the environment.

Conclusion

For environmental planning and control of economic development, governments' development programming and sectoral agendas are essential. Environmental decisions have always required making difficult trade-offs between the needs of the public good and individual wants, as well as between the preferences of the current generation and the hazy needs and aspirations of future generations. Any environmental protection system must, as a fundamental prerequisite, participate in the planning process as early as possible so that it can offer alternatives rather than oppose a specific course of action. Therefore, all administrators must contribute. Additionally, it can be challenging to police some environmental rules, and the enforcement that has been done thus far has largely been very subpar. Environmental laws are typically enacted piecemeal, not in (kuhn, 1970)accordance with a general strategy but rather in reaction to pressing needs. Public awareness and public opinion must be raised for environmental law to be effective, which can be done very easily by academic institutions like schools, colleges, and university research foundation through their emphasis on tailor-made curricula, their proper implementation, research findings, and ultimately the dissemination of knowledge and moral policing to inculcate the conducive culture in the students' minds from childhood wherein their teachers, mothers play an important role in imbibing these values in them.

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Water Management's Requirement in Haryana State for Removing Agricultural Disparity across Regions

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Abstract :

Regional disparity in every level across the world is big threat towards the path of overall socio-economic development. There are regional level disparities with in the country or within the state; these types of disparities are also found in different sectors of the economy. In the present paper we only analyze the agricultural disparity exists in Haryana state's agriculture special focused will be given on water management which is essential for balanced and sustainable agricultural development of state agriculture and also helps to eliminate regional imbalances in agriculture. Some initiatives taken by the state government to conserve water in the state are also discussed in the paper and necessary steps which should taken in near future also included in this. Regional imbalances should be removed from each and every sector is primary requirement for balanced and sustainable agricultural development or the whole Haryana state. Some past reviews also focus on water conservation as well as water management because water is essential for growing crops, quality or quantity of water have much importance in agriculture sector.

Keywords: Water management, Ground water, Logging, Disparity.

Introduction: Agriculture has arguably been very successful in capturing the major part of state's exploitable water sources. Agricultural production is highly depends on water and increasingly subject to water risks. The sector is largest user and polluter of water. Improving agriculture's water management is therefore essential to a disparity free, sustainable and productive agro-food sector in the state or the country as a whole. Irrigated agriculture remains the biggest water user globally, a trend increased by the fact that farmers in most countries do not pay for the full cost of water they use. The analysis revealed that as against the total water demand and water availability in the state, there is a gap of 1.65 million ha.m. Concentration of high water requirement crops like rice in Ambala, Kurukshetra, Karnal and jind. The total water deficit of water in the state can be reduced by reducing the area under rice crop and sugarcane, as well as other improved water management practices.

Methods of Irrigation:

Irrigation can be carried out by two different methods:

- Traditional Methods
- Modern Methods

Traditional Methods of Irrigation

In this method, irrigation is done manually. Here, a farmer pulls out water from wells or canals by himself or using cattle and carries to farming fields. This method can vary in different regions. The main advantage of this method is that it is cheap. But its efficiency is poor because of the uneven distribution of water. Also, the chances of water loss are very high. Some examples of the traditional system are pulley system, lever system, chain pump. Among these, the pump system is the most common and used widely.

Modern Methods of Irrigation

The modern method compensates the disadvantages of traditional methods and thus helps in the proper way of water usage.

The modern method involves two systems:

- Sprinkler system
- Drip system

Sprinkler System: A sprinkler system, as its name suggests, sprinkles water over the crop and helps in an even distribution of water. This method is much advisable in areas facing water scarcity. Here a pump is connected to pipes which generate pressure and water is sprinkled through nozzles of pipes.

Drip System: In the drip system, water supply is done drop by drop exactly at roots using a hose or pipe. This method can also be used in regions where water availability is less. Haryana state have adopted modern methods of irrigation early, however, water is extremely used in agriculture sector of the state.

Irrigation in Haryana:

Agriculture is the main task in Haryana state for this huge amount of water needed to meet the irrigation's demand for growing crops. Water scarcity is faced by the state; the system of Yamuna & Bhakra is principal water provider of the state. The irrigation network in the state is old and as a consequence reactivating of equal becomes most significant to fulfilling the aim of decreasing losses in water satisfaction also develop the cannel system has been taken step by step. Around twenty channels with different structures of canals have been reintegrating at the cost of Rs. 20 crore approximately in the year of 2013-14. Work on modification as well as a settlement of water paths has been made retrained at much distance along with work on 114 water paths are under improvement. During 2014-15 water shortage in rivers is noted because of few rainfalls although the Department of Irrigation and Water Resource administered the water supply of canals in such manner that without facing any difficulty by the peasants for growing the crops on their land. For acquiring the vision of state government i.e. 'Har Khet Pani' along with all other required steps will be taken. The state government organized a campaign 'Hmara Jal Hmara Jeevan' in collaboration with Ministry of Water Resources, Government of India, for awakening about sustainable development of water in all districts of the Haryana state.

On 6th may, 2020 the state government of Haryana announced the "Mera Pani, Meri Virasat" project. Here eight major agricultural blocks Ismailabad, Sewan, Gulha, Shabad, Pipli, Ratiya, Babain and Sirsa were banned to cultivate any type of water stressed crop in any new farm. The project mainly focused on shifting from paddy to crops, like pulses, maize, and all those vegetables which needs comparatively less amount of water. The state government helps the farmers with financial support of Rs. 7,000 per acre for branching out in other crop cultivation. The state government of Haryana adopts significant steps for huge grants for accelerate schemes of irrigation. The total organized along with unorganized Irrigation facilities are according to Water Resource Depart., during 2020-2021 was Rs. 5,081 crores. The chief minister Sh. Manohar Lal focused on conservation and economic use of water is the governments top priority and realizing the same in next two years will be dedicated as "WATER BIENNIAL 2021-23" to bring focus on conservation, management, reuse, recharge, and recycling of water. The state government also take commitment to make a sincere and concerted effort to built the Satluj-Yamuna link Canal to provide a fair part of Haryana from the Ravi-Beas rivers, the chief minister also announced to allocate an outlay of Rs. 100 crore for the year 2021-22. And if there is any additional demand for fund for this motive, the state government is committed to provide them. Thus, the state government of Haryana is really concerned about the declining quantity of water availability in the state, and also trying to conserve water and make possible to sustainable use of water in the state and help to the country as a role model in this field of water management.

TABLE: 1.1

Changes in Relative Share of Irrigated Area by Different Sources

(000 Hectares)

Years	Government Canals	Wells & Tube wells	Other Sources	TotalSources
1966-67	991 (76.64)	289 (22.35)	13 (11.00)	1293 (100.00)
1980-81	1161 (54.40)	967 (45.31)	06 (0.28)	2131 (100.00)
1985-86	1191 (52.98)	1052 (46.79)	05 (0.22)	2248 (100.00)
1990-91	1337 (57.42)	1248 (48.00)	15 (0.57)	2600 (100.00)
1995-96	1375 (49.89)	1352 (48.98)	33 (1.19)	2760 (100.00)
2000-01	1476 (49.89)	1467 (49.58)	14 (0.50)	2958 (100.00)
2004-05	1396 (47.01)	1561 (52.57)	12 (0.40)	2969 (100.00)

2005-06	1331 (45.33)	1591 (54.18)	14 (0.47)	2936 (100.00)
2008-09	1274 (44.82)	1600 (55.61)	2 (0.06)	2877 (100.00)
2009-10	1282 (41.77)	1783 (58.09)	2 (0.06)	3069 (100.00)
2010-11	1236 (42.8)	1650 (57.15)	1 (0.03)	2887 (100.00)
2015-16	1162 (38.55)	1850 (61.38)	2 (0.07)	3014 (100.00)
2016-17	1181 (37.17)	1996 (62.83)	A	3177 (100.00)
2017-18	1208 (37.04)	2053 (62.96)	A	3261 (100.00)
2018-19	1215 (37.02)	2067 (62.98)	-	3282 (100.00)

Source: Statistical Abstract of Haryana 2019-20.

A= Less than 500 hectares.

The table shows the percentage of government cannels are decreasing from 1966-67 to 2018-19 whereas the percentage share of tube wells is increasing at the same time. The percentage share of other sources in irrigation was increasing in early 1990s and then decline in early 2000, in remaining time it is approximately same. The share of government cannels in 1966-67 was 76.64% which is decline to 37.02% in 2018-19 and the share of tube wells was 22.35% which is increase to 62.98% in 2018-19.

Water Availability in Haryana:

The following table shows availability of ground water in various areas of the state because water availability considered as most needed thing for the development of agriculture sector. Difference in water availability in different districts of the state are mentioned below clearly as per the water development report.

TABLE: 1.2

District Wise Categorization of Ground Water Development in Haryana

Sr. No.	Districts	Draft Ham	No. of Blocks			Districts
			Dark	White	Grey	
1	Panchkula	13.307	01	1	1	G
2	Ambala	33,108	01	1	1	G
3	Yamunanagar	69,770	02	01	02	G
4	Kurukshetra	75,385	-	-	04	D
5	Karnal	151,672	-	-	06	D
6	Panipat	58,617	-	01	03	D
7	Sonipat	51,003	04	03	-	W
8	Faridabad	45,699	03	01	01	W
9	Kaithal	69,449	03	-	02	G
10	Jind	51,537	05	02	-	W
11	Rohtak	68,449	07	02	01	W
12	Gurugram	46,156	03	02	04	G
13	Rewari	34,739	-	01	04	W
14	Sirsa	41,989	05	01	01	W
15	Hisar	95,577	13	-	02	G
16	Bhiwani	37,725	03	01	03	D
17	Mahendergarh	34,064	-	-	05	G

Source: Development of Haryana State Water Plan (2017)

In the table, six districts of Haryana are assigned White, seven are Grey and five states are named Dark. These three identification points are pointers of the ground water level. Dark territories show the zones where the pace of water extraction far surpasses the pace revive, suggesting reducing the over-misuse. "White zones present the pace of water extraction is still altogether beneath the pace of energies and further abuse is attainable. Grey area shows where water extraction is in large extent, however not yet basic." This classification indicates lack of water in many districts of the Haryana state.

Initiatives for Water Management: State government focused on water management and specially focused on conservation of ground water. Water saving irrigation methods also promoted in state agriculture at subsidized rate. Drip irrigation also promoted by the state government. Reduce, reuse and recycle or 3R formula adopted by the state. Some districts are strictly banned to pr

By applying the above water use formula is best for conserving water in the state. State should take some models for their implementation.

Conclusion: from the above deep analysis it is clear that there is big difference in water availability among different regions of Haryana state. This is also a big reason of agricultural production as well as productivity differences in various regions or districts of the state. Irrigation is essential for increasing agro-productivity and eliminating productivity disparities among regions. Government should also try to take some initiatives for conserving water or better water management in the state for removing agricultural disparity and also achieving the goal of sustainable and balanced agricultural development in the state. Water regulation authority also required better management for conserving water or promoting rain water harvesting in Haryana state.

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A Preliminary Survey of Ethno-medicinal Plants Being Used by Local People in Coimbatore City

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Abstract :

A preliminary survey work was done in various areas in Coimbatore city. The study was carried out on medicinal plants being used by the local people of the city in their day to day life not only as for medicinal purposes but also as various recipes of regular food in their homes . Coimbatore is known for being commercial capital of Tamil Nadu state, however, various naturopathy centres and research centres on Ayurvedic treatments are available in the city. Nevertheless, the use of some medicinal plants/herbs by the local people have been observed in a very noticeable manner. Information was collected by visiting various local vegetable shops and Sabji-Mandis in the city where such medicinal plants were being commonly sold and purchased by the masses for their use to cure various diseases as well as making common home recipes. Mostly leaves and some roots are being used for the preparation of folk medicine.

Keywords : Medicinal plants, Coimbatore city, Sabji-Mandi and folk-medicine.

Introduction :

The city of Coimbatore also Known as Covai or Kovai is one of the major metropolitan cities in the Indian state of Tamil Nadu. It is located on the banks of the Noyyal River and surrounded by the Western Ghats. Coimbatore is the second largest city in Tamil Nadu after Chennai and the 16th largest urban agglomeration in India as per Census 2011. It is administered by the Coimbatore municipal Corporation and is the administrative capital of Coimbatore district. Being a hub of textile industry in South India the city is sometime referred to as the 'Manchester of South India'. It was ranked the seventh best city in India in the case of living index 2020. The northern part of the city has a rich tropical evergreen forest with commercially significant trees such as teak, sandalwood , Rosewood and bamboo. The soil is predominantly black which is suitable for cotton cultivation but some red Loamy soil is also found (Wikipedia as on 03 Jul 2022).

As we evidently know and study through numerous historic literatures, engravings and folktales prevailing from generations to generations that since inception of the human race survival techniques have been utilised by them in various ways. Therefore, the flora of a particular region not only support the livelihood of the masses but also their healing values have been discovered by various erstwhile geniuses and Siddhas in the historical times for the welfare of the people. Use of certain herbs have become so common that they are being used on a very large scale by the local people of the city and their availability have been regularly noticed even in the vegetable shops for their day-to-day use of the same not for only therapeutic purposes but also being used as food items for their daily needs.

People in different areas of the world have been using medicinal plants for the remedy of numerous diseases for thousand of years (Sofowora 1982, Hill 1989). It has been estimated that about 64% of the total global population still remain dependent on traditional medicine for their healthcare (Cotton 1996). From the ancient period man has been using plants as a main source of medicine (Iqbal 1993, Walter 2001, Rao and Arora 2004). It has been observed that a number of modern medicines have been derived from plants used by the indigenous people (Balic and Cox 1996). According to the World Health Organisation (WHO), it has been estimated that about 65-80% population of the world is dependent on traditional medicine for their primary healthcare (Chopra et. al.1956 and Sharma et. al. 2010).

Therefore, to establish the fact as cited above by the WHO, my endeavour has been to substantiate that most of the population of a particular place like people of Coimbatore are still dependent on traditional medicinal plants for curing and managing their primary healthcare issues. Moreover, the same can be apparently witnessed at various vegetable shops Sabji-Mandis in the Coimbatore city where certain types of medicinal plants and herbs are being sold to the common people at such a large scale on daily basis. Besides, these plants are also being used for making plethora of recipes of their tastes in the kitchen. The Ethno-botany or the interaction between plants and people involves traditional use of medicinal plants by

indigenous communities, however, against the trend where it is said that the indigenous knowledge about the use of medicinal plants is on sharp declining due to development of better communication, availability of modern medicines, lack of awareness of indigenous medicines, also lack of interest by young generation and reducing the extent of forest areas due to urbanisation and forest land encroachment, the current study of mine and the use of indigenous knowledge of medicinal plants by common people of the city through a ray of hope towards preserving the legacy of our ancestors in proliferation of the ibid Ethno-botanical knowledge of plants having medicinal values. The objective of the study was to conduct an ethno-medicinal survey among city people so as to highlight the essential ethno-botanical use of medicinal as well as aromatic plants and onwards furtherance of such knowledge from indigenous communities of the region to common public living in the city thereby ensuring propagation and dissemination of such an important aspect of our herbal science to the people of our country which in long run would be helpful to one and all.

Methods used

My study was conducted based on survey come collection of the data as well as materials from various parts of the Coimbatore city over a period of two months (**Figure-1**). The extent of the area was from East to West and North to South regions of the Coimbatore city covering a wide area of population and dispersion of vegetable shops of all sizes and capacities besides visiting various Sabji-Mandis at early hours of the day around 0500 to 0700 hours when these Mandis operate preferably early in the morning hours only. **Figure-1&2** below elucidates the extent of area of the city where numerous visits were organised at all hours of the day in order to gather maximum information on the topic. The information on use of medicinal & aromatic plants by the local people was collected based on the questionnaire method which was prepared in advance considering socio-economic structure of the population. The Questionnaire was also prepared giving due impetus to the appropriate techniques to be utilised in order to obtain optimum factual information without having any exaggeration whatsoever. During each visit extensive discussions carried out with all individuals present at the site so as to extract maximum input on the subject.

Thus, all the information which have been mentioned in this article are first hand information on extensive use of certain medicinal and aromatic plants by the local population of the city for maintaining their healthcare requirements as well as using these as recipes in their homes as food substitutes. The medicinal plant species were not only collected from the vegetable shops and Sabji-Mandis but also visited certain villages in the outskirts of the city

where the crops of these plants are being grown by the farmers and traders in their own or hired fields and homestead gardens. Records of each medicinal plant was made for their Local name in Tamil, Botanical name, English name, Hindi name, Being used as recipe or culinary uses, Being used as medicine, Purpose for which the specific parts of plant like flower, leaves, roots, fruits etc. are being used, Mode of preparation of particular medicinal

FIGURE -1 COIMBATORE CITY

FIGURE -2 COIMBATORE CITY

ingredients as per requirement for treating various diseases were recorded. Also the name of diseases being cured out of these preparations from the ingredients of the particular medicinal plants were also noted systematically.

Simultaneously, plant specimens so collected from various places were properly pressed, dried and being made ready for mounting on herbarium sheets using standard technique of herbarium preparation. The specimens were further identified by organising consultations with experts located in the city at various institutes especially Bharathiyar agricultural University, Coimbatore and with the Herbaria of Botanical Survey of India (BSI), Southern Circle, Coimbatore. Certain photo clips of my survey works are shown in **Figure-5** below:

Figure-5 Survey Works Carried Out AcrossCoimbatore City at various Vegetable Shops & SabjiMandis

Results and Discussions.

The present survey of my study was confined to only those medicinal and aromatic plant species which are most commonly being used by the local population for their regular use to cure various diseases through traditional methods or techniques as well as for making various recipes as additional use of the same in kitchens of their homes. Hence, the number of plant species studied were less and limited in number. A total of 11 plant species were studied which are belonging to 10 orders and 11 families as cited at **Table-1**. There are certain ones which are used externally for curing the skin diseases, hair loss,as face wash, muscle and joint pains and heel cracks etc. Moreover, these plants are also found being used by people as many important recipes in their kitchen with variety of dishes like poriyal, chutney, kootu, thoriyal, dosai, thoram, rasam, sambhar, soup, thovaiyal etc. besides, giving a therapeutic effect to the body in curing a specific ailment. Thus, the total plants that have been studied are 46 % herbs, 0 % shrubs, 36 % trees and 18 % climbers. Accordingly, the efficacy of the type of plants and its growth habits falling in the category of medicinal and aromatic plants have also been tabulated as in **Table 1** and their percentage have been depicted in **Figure 3** as under:

Figure-3 Percentage of plants Growth Habits Used by the People of Coimbatore

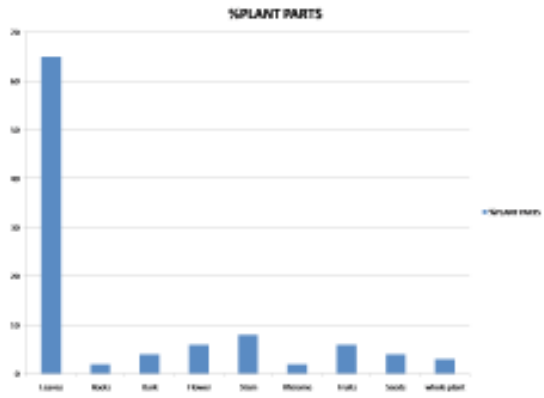

Figure-4 Percentage of various parts of the plants for medicinal use

On detailed scrutiny and deliberate enquiries it was revealed that most common forms of preparing the medicine from these medicinal plants are fresh juice, paste, vegetable, powders and decoction etc. During the study it is found that the parts of plant used are leaves, roots, barks, stems, flowers, seeds, fruits and sprout/ roots/rhizomes and plant as a whole for curing different diseases. Thus, the percentage wise data arrived at on the collected medicinal and aromatic plants under study survey were 65% leaves, 2% roots, 4%bark, 6% flowers,8% stem, 2% rhizome, 6% fruits, 4% seeds, and 3% whole plant. The ibid data is represented as in **Figure 4**.

This way the declining trend of disappearance or little use of traditional healers in the remote areas and suburb region of the district/ state will get a fresh recognition in the days to come. This study will further enhance the scope of dissemination of such valuable information on local use of medicinal and aromatic plants for health care issues of common citizen thereby paving the way towards more propagation of this knowledge among the population. Moreover, this knowledge can further be the source readily available to the scholars, pharmaceutical companies/ agencies and modern researchers to enable them to carry out discovery of new drugs and encash upon the socio-economic gains for better health and nutrition to the mankind besides, ensuring sustainable development of human society at large.

Conclusion

The present study substantiate the fact that traditional Ethno-medicinal practises play a vital role in curing a vast range of ailments of people in Coimbatore district. The overwhelming response of the people towards use of some of these medicinal plants at such a large scale which is very commonly available in the market at the retail vegetable shops, further, inspires the botanist, natural healers, herbal therapist and government agencies to introduce some more medicinal plants into the environment for common people to enable their maximum use in order to alleviate many of the diseases. This way we can be able to observe the phyto-diversity and cultural diversity of the land.

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A review paper on Waste Management: Plastic – Curse or Boon?

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Abstract: Artificially produced plastic was a globally revolutionary invention that emerged in the 19th century. It was and is a worldwide phenomenon. One born out of the answer to a crisis of war. It set off a revolution in manufacturing and especially packaging. The question to ask is, is it a curse or a boon?

Keywords: plastic, waste management, packaging, manufacture

Introduction

Plastic was first intended to be a solution to natural resource limitations. The use of natural resources like metal and stones were not easy to obtain and process. Scientists were constantly looking for alternatives that could be mass-produced, inexpensive, durable, and not entirely dependent on natural resources. World War II caused mass disruptions in obtaining natural wool, silk, and latex sources. The war started the boom in producing synthetics on a mass scale. Synthetic rubber needed for tyres was in high demand, and nylon for parachutes- ultimately replacing silk used before. This started the revolutionary use of plastic globally. Industrialization and plastic go hand in hand. For these practical and economic reasons, plastic was initially the solution to maintain the earth's resources. It became one of the fastest-growing industries in the Western world.

The boon of plastics for progression

To understand plastic's impact on the world, we need to understand it.

The Science History Institute defines plastic as synthetically manufactured or occurring naturally (Freinkel, 2011). Plastics are made of many units like a paper clip chain, making them polymers. They can be moulded in a peaceful state or hardened to give their shape. Naturally occurring polymers are things like shellac, tortoiseshell, and latex from tree sap. Synthetic or artificially produced plastic are polystyrene (styrofoam cups), polyethene (plastic bags), Teflon, polyvinyl (food wrappings, drain pipes), and polypropylene (bottles). Polymers contain sulfur, phosphorus, silicon, chlorine, fluoride, oxygen, and nitrogen.

The first artificially produced plastic emerged in 1907. It was called Bakelite (Meikle, 1997). In 1911, the first semi-synthetic fibre, rayon, was produced. It was developed from cellulose. These were the original examples of chemically modifying natural polymers of cellulose and latex (Avalle & Belingardi, 1997). Plastics were seen as a multi-faceted solution (Symonds & Neal, 1951). The polymers used most in the world today, polyester and polypropylene, were introduced in this decade. Polysulfone was introduced in 1965. This was used on the gold-film visors of Apollo-era space suits. From the 1970s and beyond, plastic manufacturers shifted their focus to biobased and biodegradable plastics. The concern for the environment was a pressing one and out of economic necessity with the oil embargoes of that decade (Symonds & Neal, 1951). In the 1980s and 1990s, bioplastics manufacturing addressed the latter concerns. There was also a downturn in interest for bioplastics in these decades when consumer expectations were not met. Bioplastics, research, and development have re-emerged in the last 20 years to meet consumer needs and develop sustainable polymers (Avalle & Belingardi, 1997).

Plastic revolutionized the world by creating convenience and affordability. It has constantly been developing with technology like computers and mobile phones. It has also achieved significance in aiding medical advancements. However, while creating a solution not to burden the earth's natural resources, it made the dire problem of plastic pollution. It is also not easily compostable and can take 500 years to decompose (Meikle, 1997).

Plastic has a long lifespan. According to National Geographic (Parker, 2019), plastic has an average lifespan of 450 years to forever. It does not need to be a single product and can be reused. For example, a PVC pipe can be used for over a century without faulting. It instantly promotes a lesser waste rate than single-use plastic.

Plastic production is more eco-friendly than some other materials, such as aluminium. Plastic space in landfills is minimal when compared to other materials. For example, paper products take up seven times more volume. According to The Environment Protection Agency (Plastics: Material-Specific Data, 2022), papers take longer to degrade than plastic.

Definition from National Geographic (Parker, 2019). Methane is a simple gas released into the atmosphere mainly from farming. Methane's most significant effect is that it traps heat. Thus, it has a substantial role in Global Warming. It takes almost ten years to cycle out once it is in the atmosphere. Luckily, plastic, when degrading, does not release methane. It is, therefore, easier to calculate its impact on the environment.

One of the most significant advantages of thermoplastic is that it is a safe way to transport items. It is the main reason we use plastic for bottles or food containers. The beverage is safe for travel in plastic bottles (Pan, Su, Liu, & Guo, 2020).

Plastic is affordable and valuable for packaging purposes. More than a third of the food sold in the EU now comes packaged in plastic. It takes less material to make drink bottles out of plastic, for example, than it does to make one out of glass (Parker, 2019).According to Susan Selke, director of the School of Packaging at Michigan State University, "Plastics are cheap, lightweight, and adaptable in ways many alternatives are not (Gray, 2018)."

The plastic industry contributes a lot to the global economy. Plastic products were worth $ 1.1 trillion in 2016 (resource-recycling.com). In terms of employment, the plastic industry in the United States employs at least 1.76 million citizens (Environmental Protection Agency, 2022).

Plastic waste is easy to process or recycle. Heat, pyrolysis, and gasification are the best ways to process plastic without causing too much harm to the environment. Plastic can be made into different items after its first purpose (Gray, 2018).

The environmental problem of plastic

According to the United Nations Environment Programme (Andersen, 2022), plastic pollution is a crisis that needs systemic transformation. The Organisation for Economic Co-operation and Development (OECD) reported the following findings in its 2022 report on global plastic use (OECD iLibrary, 2022):

- Global plastic manufacturing doubled from 2000 to 2019 to reach 353 million ton. These numbers are 40% packaging, 12% consumer goods and 11% clothing and textiles.
- Plastic waste numbers have similar numbers, 9% gets recycled, 19% is incinerated, 50% ends up in landfills, and 22% ends up in aquatic environments and uncontrolled dumpsites
- In 2019 6.1 million ton of plastic waste ended up in aquatic environments, and 1.7 million flowed directly into oceans. One hundred nine million ton ended up in rivers.
- An estimated 25 billion euros has been estimated to help low and middle-income countries globally help mitigate waste management infrastructure.

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2022) reported in 2019 that Asia is the largest plastic producer and consumer globally at a whopping 47%. Followed by North America 19%, Europe 16%, the Middle East and Africa 7%, South America 4%. A disturbing statistic is that half of all plastic waste in oceans comes from five countries: China, Indonesia, the Philippines, Thailand, and Vietnam. This has had disastrous consequences for Asia and especially Southeast Asian countries dealing with plastic waste imports in and outside of their borders (UNESCAP, 2022).

Plastic pollution of oceans

In 2021, the International Union for Conservation of Nature (IUCN, 2022) reported that plastic makes up 80 per cent of all marine debris globally found from the shore to sea. Marine species are adversely affected by ingesting the debris, injuring and killing them. Plastic pollution intersects all areas of life, from food safety and quality human health to coastal tourism, and contributes to climate change. The source of this debris is land-based. It comes from "urban and stormwater runoff, sewer overflows, littering, inadequate waste disposal and management, industrial activities, tyre abrasion, construction and illegal dumping" (IUCN, 2022).

The ocean-based plastic pollution is mainly from the fishing industry and other nautical activities. The natural sea weather, solar radiation, and other weather factors break the plastic down into micro/nano plastics. This makes it easier for marine life to ingest. There is a lack of infrastructure in many countries to prevent this pollution. They don't have sufficient sanitary landfills, incineration facilities, and proper disposal of waste systems. Ultimately 'plastic leakage' into rivers and the ocean occur (IUCN, 2022).

Plastic pollution of the land

In the same year, UNEP reported that plastic pollution of the world's oceans and rivers occurs with the same effects on land. Plastic pollution threatens plants and animals based on the ground just as severely. The slow decomposing time of plastic leads to toxic substances seeping into the soil. These micro/nano plastics end up in soil, sediments and freshwater ecosystems, threatening long-term adverse effects. According to scientists, terrestrial microplastic pollution could be much higher than marine pollution. Despite the research being minimal so far, the present data is concerning. A 2018 study on land-based pollution estimated that a third of all plastic waste ends up in soils or freshwater (Andersen, 2022).

Sewage also contains microplastics. Sewage sludge is used in fields as fertiliser. This results in several thousand tons of microplastics ending up in our soils and even tap water each year. The microplastics interact with soil ecosystems like earthworms which function differently with these plastics in their environment. They affect the soil's condition and the earthworm's fitness (UNESCAP, 2022).

A first-ever field study exploring the presence of microplastics affecting soil fauna was published in the Proceedings of the Royal Society in 2020. It noted that terrestrial microplastic pollution decreases species that live below the surface, such as mites, larvae and other tiny creatures that keep land fertile. The harmful chemicals released into the soil seep into groundwater and can cause harmful effects on the species consuming this water (Parker, 2019).

Solutions and the way forward

Responses to land and marine pollution have come from all sectors. In 2018, the Food and Agriculture Organization (FAO) and its Global Soil Partnership, the World Health Organization, the Secretariats of the Basel, Rotterdam and Stockholm Convention, and UNEP organised the Global Symposium on Soil Pollution (GSOP18) to merge science and policy in understanding the causes, impacts and solutions to soil pollution. This symposium implemented a coordinated set of actions to Stop Soil Pollution. Subsequently, the FAO and UNEP launched the Global Assessment of Soil Pollution, detailing the risks and impacts of soil pollution on human health, the environment and food security (UNESCAP, 2022).

The World Wildlife Fund (WWF) launched its ReSource: Plastic initiative to act as a hub for companies committed to fighting the plastic pollution crisis. The WWF'S goal is to prevent 10 million metric tons of plastic waste from entering nature by 2030 (WWF, 2022).

In 2002, Bangladesh became the first country to implement a ban on thin plastic bags 6 In 2018 UNEP reported that 127 out of 192 countries reviewed its legislation to address the problem of plastic bags. In 2019 the European Union's (EU) Directive on single-use plastic products took effect, with the EU committing to lead the fight against plastic pollution on land and sea (WWF, 2022). In 2020, China also recognised its enormous waste problems by improving national plastic pollution control.

Reusing and recycling plastic

From a very young age, we learned to follow the 3Rs – Reduce, Reuse, and Recycle. Food containers such as peanut butter jars can be used to store snacks or other food. It does not have to be used once and then thrown away. Water bottles can be transformed into small planters. There are many different ways to reuse plastic materials (UNESCAP, 2022).

Five ways to reduce the overuse of plastics

I. Carrying a reusable bottle, preferably a stainless steel one, instead of buying plastic water bottles. It contributes to environmental protection, but it also saves you money.

II. Carrying your shopping bag. Many countries have banned the sale of plastic bags or have introduced a fee to be paid by consumers. It has been the case in Greece and one month after it was implemented, plastic bag use dropped by 75-80%.

III. Never throw your plastic products in rivers, oceans, sewage systems, or streets. Instead, you should dispose of them according to their properties; biodegradable or non-biodegradable.

IV. Avoid taking plastic straws when ordering a drink. Use a paper straw when possible Several companies, such as McDonald's, have already adopted paper straws.

V. Visit farmer's market where all fruits and vegetables are placed in crates and not plastic packed. It is also much cheaper. So, protect the environment and your wallet!

Conclusion

Is plastic a curse or boon? It is both. Its origins as the solution to ease the burden on natural resources have turned against it. With every technological advancement, synthetic plastic creates tons of imaginable waste and damaging effects. The solutions must come from cooperation between consumers and big corporations that produce plastic. The commitment by the world's governments is a nominal step in the right direction. The only question left is, will it be enough to mitigate the present and future damage?

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