Volume 5, Issue 3 (VIII)
July - September 2018

ISSN 2394 - 7780

UGC
University Grants Commission
Journal No.: 63571

International Journal of
Advance and Innovative Research

Indian Academicians and Researchers Association
www.iaraedu.com

International Journal of Advance and Innovative Research

Volume 5, Issue 3 (VIII): July - September 2018

Editor- In-Chief **Dr. Tazyn Rahman**

Members of Editorial Advisory Board

Mr. Nakibur Rahman
Ex. General Manager (Project)
Bongaigoan Refinery, IOC Ltd, Assam

Dr. Alka Agarwal
Director,
Mewar Institute of Management, Ghaziabad

Prof. (Dr.) Sudhansu Ranjan Mohapatra
Dean, Faculty of Law,
Sambalpur University, Sambalpur

Dr. P. Malyadri
Principal,
Government Degree College, Hyderabad

Prof.(Dr.) Shareef Hoque
Professor,
North South University, Bangladesh

Prof.(Dr.) Michael J. Riordan
Professor,
Sanda University, Jiashan, China

Prof.(Dr.) James Steve
Professor,
Fresno Pacific University, California, USA

Prof.(Dr.) Chris Wilson
Professor,
Curtin University, Singapore

Prof. (Dr.) Amer A. Taqa
Professor, DBS Department,
University of Mosul, Iraq

Dr. Nurul Fadly Habidin
Faculty of Management and Economics,
Universiti Pendidikan Sultan Idris, Malaysia

Dr. Neetu Singh
HOD, Department of Biotechnology,
Mewar Institute, Vasundhara, Ghaziabad

Dr. Mukesh Saxena
Pro Vice Chancellor,
University of Technology and Management, Shillong

Dr. Archana A. Ghatule
Director,
SKN Sinhgad Business School, Pandharpur

Prof. (Dr.) Monoj Kumar Chowdhury
Professor, Department of Business Administration,
Guahati University, Guwahati

Prof. (Dr.) Baljeet Singh Hothi
Professor,
Gitarattan International Business School, Delhi

Prof. (Dr.) Badiuddin Ahmed
Professor & Head, Department of Commerce,
Maulana Azad Nationl Urdu University, Hyderabad

Dr. Anindita Sharma
Dean & Associate Professor,
Jaipuria School of Business, Indirapuram, Ghaziabad

Prof. (Dr.) Jose Vargas Hernandez
Research Professor,
University of Guadalajara,Jalisco, México

Prof. (Dr.) P. Madhu Sudana Rao
Professor,
Mekelle University, Mekelle, Ethiopia

Prof. (Dr.) Himanshu Pandey
Professor, Department of Mathematics and Statistics
Gorakhpur University, Gorakhpur

Prof. (Dr.) Agbo Johnson Madaki
Faculty, Faculty of Law,
Catholic University of Eastern Africa, Nairobi, Kenya

Prof. (Dr.) D. Durga Bhavani
Professor,
CVR College of Engineering, Hyderabad, Telangana

Prof. (Dr.) Shashi Singhal
Professor,
Amity University, Jaipur

Prof. (Dr.) Alireza Heidari
Professor, Faculty of Chemistry,
California South University, California, USA

Prof. (Dr.) A. Mahadevan
Professor
S. G. School of Business Management, Salem

Prof. (Dr.) Hemant Sharma
Professor,
Amity University, Haryana

Dr. C. Shalini Kumar
Principal,
Vidhya Sagar Women's College, Chengalpet

Prof. (Dr.) Badar Alam Iqbal
Adjunct Professor,
Monarch University, Switzerland

Prof.(Dr.) D. Madan Mohan
Professor,
Indur PG College of MBA, Bodhan, Nizamabad

Dr. Sandeep Kumar Sahratia
Professor
Sreyas Institute of Engineering & Technology

Dr. S. Balamurugan
Director - Research & Development,
Mindnotix Technologies, Coimbatore

Dr. Dhananjay Prabhakar Awasarikar
Associate Professor,
Suryadutta Institute, Pune

Dr. Mohammad Younis
Associate Professor,
King Abdullah University, Saudi Arabia

Dr. Kavita Gidwani
Associate Professor,
Chanakya Technical Campus, Jaipur

Dr. Vijit Chaturvedi
Associate Professor,
Amity University, Noida

Dr. Marwan Mustafa Shammot
Associate Professor,
King Saud University, Saudi Arabia

Prof. (Dr.) Aradhna Yadav
Professor,
Krupanidhi School of Management, Bengaluru

Prof.(Dr.) Robert Allen
Professor
Carnegie Mellon University, Australia

Prof. (Dr.) S. Nallusamy
Professor & Dean,
Dr. M.G.R. Educational & Research Institute,Chennai

Prof. (Dr.) Ravi Kumar Bommisetti
Professor,
Amrita Sai Institute of Science & Technology, Paritala

Dr. Syed Mehartaj Begum
Professor,
Hamdard University, New Delhi

Dr. Darshana Narayanan
Head of Research,
Pymetrics, New York, USA

Dr. Rosemary Ekechukwu
Associate Dean,
University of Port Harcourt, Nigeria

Dr. P.V. Praveen Sundar
Director,
Shanmuga Industries Arts and Science College

Dr. Manoj P. K.
Associate Professor,
Cochin University of Science and Technology

Dr. Indu Santosh
Associate Professor,
Dr. C. V.Raman University, Chhattisgath

Dr. Pranjal Sharma
Associate Professor, Department of Management
Mile Stone Institute of Higher Management, Ghaziabad

Dr. Lalata K Pani
Reader,
Bhadrak Autonomous College, Bhadrak, Odisha

Dr. Pradeepta Kishore Sahoo
Associate Professor,
B.S.A, Institute of Law, Faridabad

Dr. R. Navaneeth Krishnan
Associate Professor,
Bharathiyan College of Engg & Tech, Puducherry

Dr. Mahendra Daiya
Associate Professor,
JIET Group of Institutions, Jodhpur

Dr. G. Valarmathi
Associate Professor,
Vidhya Sagar Women's College, Chengalpet

Dr. Parbin Sultana
Associate Professor,
University of Science & Technology Meghalaya

Dr. M. I. Qadir
Assistant Professor,
Bahauddin Zakariya University, Pakistan

Dr. Kalpesh T. Patel
Principal (In-charge)
Shree G. N. Patel Commerce College, Nanikadi

Dr. Brijesh H. Joshi
Principal (In-charge)
B. L. Parikh College of BBA, Palanpur

Dr. Juhab Hussain
Assistant Professor,
King Abdulaziz University, Saudi Arabia

Dr. Namita Dixit
Assistant Professor,
ITS Institute of Management, Ghaziabad

Dr. V. Tulasi Das
Assistant Professor,
Acharya Nagarjuna University, Guntur, A.P.

Dr. Nidhi Agrawal
Assistant Professor,
Institute of Technology & Science, Ghaziabad

Dr. Urmila Yadav
Assistant Professor,
Sharda University, Greater Noida

Dr. Ashutosh Pandey
Assistant Professor,
Lovely Professional University, Punjab

Dr. M. Kanagarathinam
Head, Department of Commerce
Nehru Arts and Science College, Coimbatore

Dr. Subha Ganguly
Scientist (Food Microbiology)
West Bengal University of A. & F Sciences, Kolkata

Dr. V. Ananthaswamy
Assistant Professor
The Madura College (Autonomous), Madurai

Dr. R. Suresh
Assistant Professor, Department of Management
Mahatma Gandhi University

Dr. S. R. Boselin Prabhu
Assistant Professor,
SVS College of Engineering, Coimbatore

Dr. V. Subba Reddy
Assistant Professor,
RGM Group of Institutions, Kadapa

Dr. A. Anbu
Assistant Professor,
Achariya College of Education, Puducherry

Dr. R. Jayanthi
Assistant Professor,
Vidhya Sagar Women's College, Chengalpattu

Dr. C. Sankar
Assistant Professor,
VLB Janakiammal College of Arts and Science

Dr. Manisha Gupta
Assistant Professor,
Jagannath International Management School

Copyright @ 2018 Indian Academicians and Researchers Association, Guwahati
All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, or stored in any retrieval system of any nature without prior written permission. Application for permission for other use of copyright material including permission to reproduce extracts in other published works shall be made to the publishers. Full acknowledgment of author, publishers and source must be given.

The views expressed in the articles are those of the contributors and not necessarily of the Editorial Board or the IARA. Although every care has been taken to avoid errors or omissions, this publication is being published on the condition and understanding that information given in this journal is merely for reference and must not be taken as having authority of or binding in any way on the authors, editors and publishers, who do not owe any responsibility for any damage or loss to any person, for the result of any action taken on the basis of this work. All disputes are subject to Guwahati jurisdiction only.

Journal - 63571

UGC Journal Details

Name of the Journal :	International Journal of Advance & Innovative Research
ISSN Number :	
e-ISSN Number :	23947780
Source:	UNIV
Subject:	Multidisciplinary
Publisher:	Indian Academicians and Researchers Association
Country of Publication:	India
Broad Subject Category:	Multidisciplinary

International Journal of Advance and Innovative Research

Volume 5, Issue 3 (VIII) : July – September 2018

CONTENTS

Research Papers

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018

ISSN 2394 - 7780

STRATEGIES FOR IMPROVING TEACHERS' WORK-LIFE BALANCE IN SECONDARY SCHOOLS IN EDO STATE

Nwogu, Uzoma J.[1], and Unuigbe, Bernadette Iziengbe[2]
Department of Educational Management[1], Faculty of Education, University of Port Harcourt, Rivers State
Department of Educational Management[2], Michael Okpara University of Agriculture, Umudike, Abia State

ABSTRACT
The study investigated the strategies for improving teachers' work-life balance in secondary schools in Edo State. Descriptive survey design was adopted for the study, and population of the study consisted of 276 public senior secondary school principals in Edo-State. A sample of 110 principals was randomly selected using a stratified proportionate sampling technique. Two research questions and two null hypotheses guided the study. The instrument for the study was a questionnaire titled: Strategies for Improving Teachers' Work-Life Balance in Secondary Schools Questionnaire (SITWLBSSQ). Mean and rank order statistics were used to analyze the research questions, while Z-test statistics was used to test the null hypotheses at 0.05 alpha level of significance. Findings revealed that leave policies and work-life benefits are strategies for improving teachers' work-life balance in secondary schools in Edo State. The study recommended that additional benefits should be implemented to attract intelligent people into the profession and encourage those who are already teaching to raise up their heads anywhere with pride.

Keywords: Strategies, Teachers' Work-Life Balance, Secondary schools

INTRODUCTION
Secondary education is an important factor to be considered in order to achieve the philosophy and goals of education in Nigeria and overall development of the nation whether scientifically, politically, technologically and otherwise. Teachers are the key determinants of educational standard; hence the improvement in the conduct and condition of teachers will translate into a higher level of job satisfaction, which will result to improved work-life balance. Nwogu and Kaegon (2013) defined work-life balance as the provision of opportunities for employees to balance actual work conditions with the responsibilities and interests which they hold for themselves outside work schedule. Work-life balance does not mean an equal balance between work and life. It involves proper prioritizing between work and family development. Work-life balance is essential to combat stress and ensuring the success of both teachers and the school. The stress associated with unbalanced lifestyles is costly; it damages productivity and increases teachers' health risk. Teachers with improved work-life balance are happier, healthier and more productive. When teachers' work and family life are out of balance, stress level is likely to soar. Maintaining work-life balance is no simple task. Poor work-life balance can lead to stress, mental illness, low productivity and high blood pressure.

Work-life balance is a practice that is concerned with providing scope for teachers to balance their work with the responsibilities and interests they have outside work. It enables them to reconcile the competing claims of work and home by meeting their own needs as well as the school. One way of improving teachers' work-life balance is through leave policies. Leave is granted to teachers' with the good intention of providing rest, recuperation of health, study and a balance between work and family life. The general aim of leave policies is to strike a balance between employment and domestic commitments that is equitable and beneficial to both the teachers and schools. Specialized leave policies include; maternal leave, paternal leave, parental leave, annual leave, study leave, casual leave and emergency leave. Maternity leave is gender-specific, and it is generally available to mothers only (except in a few cases where part of the leave can be transferred to other careers under certain circumstances). Maternity leave refers to the period of time when a woman takes time off from work to have and take care of her baby. When a working mother is pregnant, she is entitled to a maternity leave, and school administrators cannot legally deny a woman maternity leave, however, different schools have different requirements as far as how long a teacher must legally be allowed for maternity leave. Frans, Mortelmans and Masquilier (2011) opined that maternity leave is a health and welfare measure, intended to protect the health of the mother and newborn child, to be taken just before, during and immediately after childbirth. The research on maternity leave is rare because the entitlement is so well established and widely accepted. Paternity leave is generally available to fathers only, usually to be taken soon after the birth of a child, and intended to enable the father to spend time with his partner, new child and older children. Paternity leave is an entitlement for working fathers, and it enables them to take a short period of leave immediately following the birth of a child, often associated with providing help and support to the mother. In this review, Paternity leave is narrowly defined as a short period immediately after the birth of a child and it is only available to fathers. Mckay and Doucet (2010)

ISSN 2394 - 7780

defined annual leave as paid time off work granted by employers to employees to be used for whatever the employee wishes. Annual leave can also be seen as the amount of leave that an employer grants an employee on an annual basis. Annual leave is an establishing entitlement for employees. This policy should recognize the difficulties teachers face because they do not have the same flexibility to take annual leave as other employees. School administrators can then use their discretion to grant additional unpaid or paid leave.

Secondary Schools are increasingly expanding and diversifying their work-life benefit programmes in an attempt to help teachers' improve their work and non-work demands facing them. Kossek and Lambert (2005) defined work-life benefits as the explicit support policies and procedures provided by organizations in helping teachers achieve a better work-life. Also, it plays an important role in the level of work-life balance experienced by teachers. Work-benefit programs involve a variety of practices that help teachers' to balance the demand of work and personal life, by assisting teachers to deal with family obligations and issues. Work-life benefit programmes can be interpreted as a signal that the school cares about the wellbeing of its teachers, thereby strengthening the employer-employee bond. Work-life benefits will enable teachers' combine work with their personal commitments and interests. Lambert (2000) opined that the provision of childcare can be viewed as a remedy or positive initiative for three different reasons: firstly, it would enhance gender balance in workplace by relieving women of the burden of childcare; second, it would provide educationally beneficial circumstances for the development of the child through educative care; and third, it would relieve the pressure on working parents by providing facilities that match their employment responsibilities. The provision of such benefits promotes teachers' obligation and interest in schools by serving as symbols of special treatment and organizational concern for workers. Igwe (2004) reiterated that an improvement in teachers' welfare will help halt the brain drain phenomenon in the school, which has put secondary education in Nigeria in jeopardy. Good work-life benefit programme is an essential factor in teachers' effectiveness and satisfaction, which in turn leads to quality secondary education. It is therefore, in the interest of school administrators to adopt policies that allow teachers to balance their working lives with their personal needs, interests, and caring responsibilities. Poor work-life benefits can lead to stress and absenteeism, and low output. Rhoades and Eisenberger (2002) stated that commitment and performance serve as means for employees to reciprocate favourable treatment from their employer. The use of work-life benefits satisfies teachers' needs, contributing to their well-being and therefore can positively influence the teacher–principal relationship and contribute to teachers positively evaluating their commitment and attachment to the school. Teachers can reciprocate the benefits they have utilized with greater psychological attachment to the school. Medical service for teachers is also an important factor in work-life benefits. It is an indisputable fact that without sound health, teaching will be greatly impaired. A healthy teacher is the one who looks and feels well, has no illness or disease and has energy for his/her daily work and play (Arikewuyo, 2006). Arikewuyo and Adegbesan (2009) corroborates some of the benefits that could be provided by an organization to safe guard its workers as including childcare, medical service for teachers and their dependants, a crèche or nursery school for staff children, official cars, end of year bonus, and so on. Effective work-life benefits encourage teachers to work harder and discourage them from quitting their jobs. School principals should improve their work-life benefits and communicate them to teachers.

Leave policies and work-life benefits eliminate unlawful discrimination and harassment, promotes equality of opportunity between men and women, provides opportunities for male and female teachers to balance their work with other aspects of their life, and will help reduce the disadvantage experienced by women working within the teaching profession and it improves outcomes of students where classroom teachers are not affected by ill health absence. When teachers receive support from school, they tend to perceive that their school is concerned about their work-life issues, and ultimately affect their work related attitudes. Helping teachers achieve work-life balance is integral to their general health and well being, increasing their work satisfaction and motivation. Teachers are likely to be more committed, more flexible and more responsive to their job. Leave policies and work-life benefits should be implemented to attract intelligent people into the profession and encourage those who are already teaching to raise up their heads anywhere with pride.

STATEMENT OF PROBLEM

Teachers are flooded with work such as writing of lesson notes, filling of school diary, marking scripts and classroom management. They wind up the day without the work being done and go home where there are various pending domestic chores to be completed. Besides, they have children and elderly parents to look over in many cases. Balancing time for work, parents, children, spouse, friends, health and spiritual development is a great challenge teachers are faced with. Hence, sacrificing family time has long been regarded as a major pitfall of professional success. Women-teachers are disadvantaged to a greater degree because women cite workload in teaching as incompatible with raising their family as they struggle to discharge caring responsibilities. In the

ISSN 2394 - 7780

light of the above, the statement of problem put in question form is: How can leave polices and work-life benefits help in improving teachers' work-life balance in secondary schools in Edo State?

PURPOSE OF THE STUDY

1. Investigate the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State.
2. Highlight the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State.

RESEARCH QUESTIONS

1. What are the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State?
2. What are the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State?

HYPOTHESES

HO_1: There is no significant difference between the mean response of experienced and less experienced principals on the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State.

HO_2: There is no significant difference between the mean response of rural and urban principals on the available work-life benefit for improving teachers' work-life balance in secondary schools in Edo-State.

METHODOLOGY

The study adopted a descriptive survey design. The population of this study consisted of 276 public senior secondary schools in Edo State and their serving principals respectively. A sample size of 110 representing 40% served as study participants. This sample size was drawn using stratified proportionate sampling. The instrument for the study was a questionnaire titled: The instrument consisted of 16 items and was structured using a rating scale of Strongly Agree (SA), Agree(A), Disagree(D) and Strongly Disagree(SD) and their scale was rated as follows: SA=4 points, A=3 points, D=2points and SD=1 point respectively. Crombach Alpha statistics was used to get the reliability coefficient of 0.73. Cronbach Alpha was used because the questionnaire was multi-chotomously scored. The data collected were analyzed using mean and rank order statistics to answer the two research questions and z-test statistics to test the two null hypotheses at 0.05 alpha level of significance. All items with the criterion mean of 2.50 and above were accepted while items below the criterion mean were rejected.

RESULTS

Research Question 1: What are the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State?

Table-1: Weighted mean and rank order scores on the available leave policies for improving teachers' work-life balance.

Sr. No.	Statement	Experienced Principals N = 73		Less Experienced Principals N = 37		Mean Set	Rank	Decision
		$\overline{X}_1$	Rank	$\overline{X}_2$	Rank	$\overline{X}_1$ $\overline{X}_2$ X ½		
1	Granting of maternity leave	2.97	1st	3.08	1st	3.03	1st	Agreed
2	Granting of paternity leave	2.41	6th	2.51	6th	2.46	6th	Disagreed
3	Granting of parental leave	2.33	7th	2.19	7th	2.26	7th	Disagreed
4	Granting of annual leave	2.77	3rd	3.00	2nd	2.89	3rd	Agreed
5	Granting of sick leave	2.90	2nd	2.92	4th	2.91	2nd	Agreed
6	Granting of study leave	2.70	5th	2.73	5th	2.72	5th	Agreed
7	Granting two or three days leave of absence.	2.74	4th	2.96	3rd	2.85	4th	Agreed
	Aggregate mean	18.82		19.39		19.12		
		2.69		2.77		2.73		

ISSN 2394 - 7780

Table 1 indicated that items 19, 22-25, had weighted mean scores above the criterion mean of 2.50, and thus, were agreed as the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State. Conversely, items 20-21 had weighted mean scores below the criterion mean of 2.50 and thus were disagreed as the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State

Research Question 2: What are the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State?

Table-2: Weighted mean and rank order scores on the available work-life benefits for improving teachers' work-life balance.

Sr. No.	Items	Rural Principals N = 65		Urban Principals N = 45		Mean Set	Rank	Decision
		$\overline{X}_1$	Rank	$\overline{X}_2$	Rank	$\overline{X}_1$ $\overline{X}_2$ X ½		
8	Provision of child care	2.95	3rd	3.16	1st	3.06	1st	Agreed
9	Providing a well furnished common room for teacher-relaxation	2.86	6th	2.50	6th	2.68	6th	Agreed
10	Providing a canteen facility where teachers can feed from at least once in a day.	1.94	9th	2.04	7th	1.99	9th	Disagreed
11	Provision of pension scheme	2.90	5th	2.71	5th	2.81	5th	Agreed
12	Provision of free medical services for teachers and their dependents.	3.08	1st	2.87	3rd	3.00	3rd	Agreed
13	Providing teachers with official car	2.14	8th	1.93	8th	2.04	7th	Disagreed
14	Payment of teachers' [illegible]	2.95	3rd	2.82	4th	2.89	4th	Agreed
15	Prompt payment of salaries	2.98	2nd	3.10	2nd	3.04	2nd	Agreed
16	Allowing at least one child of a teacher to enroll in the school and learn for free.	2.20	7th	1.82	9th	2.01	8th	Disagreed
	Aggregate mean	**24.0**		**22.95**		**23.52**		
		2.67		**2.55**		**2.61**		

Table 2 indicated that items 26-27, 29-30 and 32-33 had weighted mean scores above the criterion mean of 2.50, and thus were agreed as the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State. Conversely, items 28, 31 and 34 had weighted mean below the criterion mean of 2.50 and thus, were disagreed as the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State.

HO_1: There is no significant difference between the mean response of experienced and less experienced principals on the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State.

Table-3: Weighted mean, standard deviation and z-test of difference between the mean response of experienced and less experienced principals on the available leave policies for improving teachers' work-life balance.

Sr. No.	Categories of Principals	N	X	SD	DF	Z-observed	Z-critical	Sig. level	Decision
1.	Experienced principals	73	2.69	1.12					
2.	Less experienced principals	37	2.77	1.05	108	0.37	1.96	0.05	Not significant

ISSN 2394 - 7780

Table 3 shows the z-test of difference between the mean response of experienced and less experienced principals on the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State. The z-test statistics calculated and used in testing the hypotheses stood at 0.37 while the critical z-value stood at 1.96, using 108 degree of freedom at 0.05 alpha level of significance. Since the calculated z-value is less than the critical z-value, the null hypothesis was therefore not rejected. By implication, there is no significant difference between the mean response of experienced and less experienced principals on the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State.

HO_2: There is no significant difference between the mean response of urban and rural principals on the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State

Table-4: Weighted mean, standard deviation and z-test of difference between the mean response of urban and rural principals on the available work life benefits for improving teachers work-life balance

Sr. No.	Categories of Principals	N	X	SD	DF	Z-observed	Z-critical	Sig. level	Decision
1.	Urban principals	65	2.67	1.01					Not
2.	Rural principals	45	2.55	1.03	108	0.6	1.96	0.05	significant

Table 4 shows a summary of mean, standard deviation and z-test of difference between the mean response of urban and rural principals on the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State. The z-test statistics calculated and used in testing the hypothesis stood at 0.6 while the critical z-value stood at 1.96, using 108 degree of freedom at 0.05 alpha level of significance. Since the calculated z-value is less than the critical z-value, the null hypothesis was therefore not rejected. By implication, there is no significant difference between the mean response of urban and rural principals on the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State.

DISCUSSION OF FINDINGS

Findings from the results as presented in table 1 identified the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State. These include: granting maternity leave, granting sick leave, annual leave, two or three days leave of absence and granting study leave. This finding conforms to the findings of Frans, Mortelmans and Masquiler (2011) who asserted that maternity leave is a health and welfare measure intended to protect the health of the mother and new born child, to be taken just before, during and immediately after childbirth. Others include. In support of the above, Mckay and Doucet (2010) stated that leave policies should recognize the difficulties teachers face because they do not have the same flexibility to take annual leave as other employees. Hence school administrators should use their discretion to grant additional unpaid or paid leave.

Findings from the results as presented in table 2 identified the various available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State. They are; provision of childcare, prompt payment of salaries, payment of teachers' bonuses, provision of pension scheme and providing a well furnished common room for teachers' relaxation. This conforms to the findings of Lambert, (2000) who opined that the provision of childcare can be viewed as a remedy or positive initiative for three different reasons: firstly, it would enhance gender balance in workplace by relieving women of the burden of childcare; second, it would provide educationally beneficial circumstances for the development of the child through educative care; and third, it would relieve the pressure on working parents by providing facilities that match their employment responsibilities. The provision of such benefits promotes teachers' obligation and interest in schools by serving as symbols of special treatment and organizational concern for workers. Igwe (2004) reiterated that an improvement in teachers' welfare will help halt the brain drain phenomenon in the school, which has put secondary education in Nigeria in jeopardy. The finding also agrees with the findings of Arikewuyo and Adegbesan (2009) who corroborates some of the benefits that could be provided by an organization to safe guard its workers as including childcare, medical service for teachers and their dependants, a crèche or nursery school for staff children, official cars and end of year bonus.

Findings from the tested hypothesis as revealed in table 3 indicated that there was no significant difference between the mean response of experienced and less experienced principals on the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State. The reason for the no significant difference could be that these principals do not have divergent but the same views on the available leave policies for improving teachers' work-life balance in secondary schools in Edo-State. This conforms to the findings of Frans, Mortelmans and Masquiler (2011) and Mckay and Doucet (2010) in their independent studies.

ISSN 2394 - 7780

Findings from the tested hypothesis as revealed in table 4 revealed that there was no significant difference between the mean response of urban and principals on the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State. The reason for the no significant difference could be that these principals do not have divergent but the same views on the available work-life benefits for improving teachers' work-life balance in secondary schools in Edo-State. This finding conforms to the findings of Arikewuyo (2006) who asserted that medical service for teachers is also an important factor in work-life benefits. It is an indisputable fact that without sound health, teaching will be greatly impaired.

CONCLUSION

From the findings of the study, the researchers concluded that leave policies and work-life benefits will improve teachers' work-life balance schools in Edo State.

RECOMMENDATIONS

Based on the findings of the study, the researchers recommended that:

1. Principals should adopt leave policies and work-life benefits as strategies for improving teachers' work-life balance in secondary schools in Edo State.
2. Educational administrators should organize seminars, conferences and workshops for teachers on work-life balance.
3. Additional benefits should be implemented to attract intelligent people into the profession and encourage those who are already teaching to raise up their heads anywhere with pride.

REFERENCES

- Arikewuyo, M. O. & Adegbesan, S. O. (2009). Practicum on administration of personnel in education. In J. B. Babalola & A. O. Ayeni (eds). *Educational management: theories and tasks.* Lagos: Macmillan. 323-337.
- Arikewuyo, M. O. (2006). Elements of personnel management. In J. B. Babalola, A. O Ayeni (eds). *Educational management thoughts and practice*. Ibadan: Codat.
- Frans D., Mortelmans, D. & Masquilier C. (2011). *Financial consequences of career breaks. A latent growth model on register data (WSE-Report).* Leuven: Retrieved from www.steunpuntwe.be.
- Igwe, L. E. B. (2004). *Introduction to educational administration.* Port Harcourt: Global Link International.
- Kossek, E. E. & Lambert, S. J. (2005*). Work and life integration: Organizational, cultural and individual perspectives*. Mahwah, New Jersey: Erlbaum.
- Lambert, S. (2000). Added benefits: The link between work-life benefits and organizational citizenship behavior. *Academy of Management Journal.* 43, 801–815.
- McKay, L. & Doucet, A. (2010). 'Without taking away her leave': A Canadian case study of couples' decisions on fathers' use of paid leave. *Fathering, Work and Parenting*. 8(3), 300-320.
- Nwogu, U. J. & Kaegon, L. E. S (2013). Work-life balance preferences of academic staff of tertiary institutions in Rivers State. Journal of Studies in Education. 1, 147-154.
- Rhoades, L. & Eisenberger, R. (2002). Perceived organizational support: A review of the literature. *Journal of Applied Psychology*. 87, 698–714.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

MANAGEMENT OF TEACHERS' WORK-LIFE BALANCE FOR QUALITY SECONDARY EDUCATION IN EDO STATE

Unuigbe, Bernadette Iziengbe[1] and Nwogu, Uzoma J.[2]
Department of Educational Management[1], Michael Okpara University of Agriculture, Umudike, Abia State
Department of Educational Management[2], Faculty of Education, University of Port Harcourt, Rivers State

ABSTRACT
The study was carried out to examine the management of teachers work-life balance for quality secondary education in Edo-State. The design of the study was a descriptive survey. The population of the study comprised all the 276 public senior secondary school principals in Edo-State. A sample of 110 principals was randomly selected using a stratified proportionate sampling technique. Two research questions and two null hypotheses guided the study. The instrument for the study was a questionnaire titled: Managing teachers' work-life balance for quality secondary education questionnaire (MTLWBQSEQ). Crombach Alpha statistics was used to get the reliability coefficient of 0.73. Mean and rank order statistics were used to analyze the research questions, while Z-test statistics was used to test the null hypotheses at 0.05 alpha level of significance. Findings revealed that flexible working arrangements and work family culture helps in managing teachers' work-life balance for quality secondary education. The study recommended that principals should adopt flexible working arrangements and work-family culture in managing teachers' work-life balance. Also, there should be regular training of teachers to develop their professional competence, confidence and knowledge about work-life balance.

Keywords: Work-Life Balance, Quality Secondary Education

INTRODUCTION
One of the most important institutions in the society is the educational institution. This is because education is the springboard for socio, political, economic and cultural development. The pivot of meaningful development of any nation lies in the quality of education it is able to propagate and maintain for its citizenry. Thus, good education is the broom that sweeps away illiteracy, ignorance and even poverty. This same education ushers in salient philosophy that transforms and uplifts a nation in terms of viable economic status, technological advancement and good life (Obasi, 2004). Secondary education is the second rung of the Nigerian education ladder, and also, a stepping-stone to higher education. It provides an opportunity for primary school leavers to acquire more knowledge, develop skills and prepare them to leave effectively in our changing society. The Federal Republic of Nigeria (2012) defined secondary education as 'the education children receives after primary education and before the tertiary stage'. It stated that the need for secondary education is to prepare the individual for; Useful living in the society, and Higher education.

The principal is the head of administration in secondary school education and it is his/her duty to ensure quality management of the school to attain educational goals and objectives (Esobhawan, 2012). Quality is concerned with how good or bad a product is. It is about the standard of something when compared with other things. Quality secondary education is a measure of excellence, totality of features and characteristics of a school. Nwogu (2014) contends that, while the industries produce goods and services, the education industry refine illiterate citizens to literate and educated citizens. No wonder, the Nigeria Union of Teachers in its slogan stated 'if you can write your name—thank your teacher'. Teachers are professionals, and they comprise probably the most important agency through which the schools achieve their goals. In order to achieve these goals the teachers engage in the act of teaching. It is obvious that teachers occupy a prime position in the education enterprise, they are responsible for shaping the destinies of nations and individuals, without them, there would be no pharmacists, architects, agriculturalists, engineers, accountants, doctors, administrators and even themselves teachers. Teachers have generated an increasingly diverse workforce and a greater need to balance work and home. Work-life balance is a topical issue in Nigeria. Unlike, Britain, and other super powers, where organizations increasingly recognize the need for its inclusion as a vital human resource practice, Nigerian institutions, particularly education sector fails to appreciate its worth. While the European philosophy to labour is "work to live", many Nigerians "live to work". A pragmatic compulsion to make ends meet leaves them, "sacrificing" not maximizing decisions. Teachers' tend to "sacrifice", when their decisions are not necessarily optimal, but sufficient to suit requirements. Despite the worldwide quest for work-life balance, very few have found an acceptable definition of the concept. However, it does appear that the 'right' balance for one person may differ from the next. Balance is achieved in different ways for different people and has a different purpose for people.

ISSN 2394 - 7780

Today, work is no longer viewed solely as a means of survival, but also, as a sense of satisfaction. Work-life balance is perceived as one such tool by which organizations ensure job satisfaction while reaffirming concern for teachers' non-work demands. Work-life balance in its broadest sense is defined as a satisfactory level of involvement or 'fit' between the multiple roles in a person's life. Hudson (2005) defined work-life balance as the effective management of multiple responsibilities at work, at home, and the other aspects of life. Nwogu and Kaegon (2013) opined that work-life balance deals with the provision of opportunities for employees to balance actual work conditions with the responsibilities and interests which they hold for themselves outside work schedule. The difference between office and home is not distinguished as many carry office work home in order to meet up with deadlines. Flexible working arrangements have, in general, become very common in collective agreements, since they offer a win-win situation to both principals and teachers, which will also help to promote productivity gains and to encourage better work-life balances of teachers. Chitra and Sheela (2012) asserted that another way of preventing the loss of experienced teachers is for the principal to promote flexible working arrangement and be supportive of reasonable requests for time off. The term flexible working is very important for teachers' retention and productivity, and it covers a wide range of practices, these includes; flex-time, flex place, job sharing, time off for family and domestic reason, part-time working and telecommuting. Brown (2012) reiterated that teachers with disabilities and progressive medical conditions should engage in job share arrangements. Job share arrangement increases balance between work and family, enhances more energy and less stress, ensure more flexibility with schedule, keeps skills current, enhances a higher level of job satisfaction, develops team skills, promote chances to ease into retirement, retain the skills and expertise of teachers and protect the school's investment in recruitment and in service training. This will lighten teaching loads, reduce stress and also will enable teachers to remain in employment longer.

Balance between work and other domains of life has been made difficult by the rapid changes in technology. It has become a challenge for teachers to achieve work-life balance without jeopardizing their well-being and satisfaction with aspects of their lives and overall quality in life. Rau and Hyland (2002) write that technological advancements such as E-mails, laptops, PDAs, blackberries, webinars, videoconferencing and other technology tools allow teachers to work remotely and remain connected 24 hours a day, 7 days a week. Teachers should make arrangements to telecommute. This arrangement requires the approval of the principal and department head. Ruvarashe (2010) stated that work-family culture is an available option for managers in facilitating work-family balance. Work–family culture is defined as the shared assumptions, beliefs, and values regarding the extent to which an organization supports and values the integration of employees' work and family lives. Poelman, (2012) asserted that a supportive family-work culture makes an organization a more pleasant place to work. Family-Friendly programmes acknowledges and responds to the work and personal/family responsibilities of teachers by developing and implementing policies and practices that allow teachers to balance work and personal/family responsibilities effectively (Grywacz & Carlson, 2007). Flexible work schedule and work culture are important because it has the ability to accommodate teachers who have trouble balancing their jobs and their families. Nasurdin and Hsia (2008) opined that administrators through their provision of work- related support help in mitigating the stress that a teacher may experience at work. Managing teachers work life balance has emerged as a strategic issue and a key element of an organization's employee retention strategies. School administrators need to be aware of the changing needs of teachers and provide flexible work-life balance strategies in order to retain their teachers' morale, commitment and satisfaction, and reduce sources of stress and problems at work. Given the above, there is need therefore, to examine the management of teachers' work-life balance for quality secondary education in Edo-State.

STATEMENT OF PROBLEM

In the current economic scenario, secondary schools are hard pressed for higher productivity and need teachers with improved work-life balance since an employee with better work-life balance will contribute more meaningfully towards quality education delivery, organizational growth and success. Teaching is challenging, at times exhausting profession to work in, combining it with parental responsibilities or any other kind of caring responsibilities can be too much for some teachers. Teachers generally perform maximally when they are refreshed, balanced, trained and have a conducive atmosphere for performance. Everyday life of the Nigerian teacher is full of emotional stress, burnout, fear, tension, anger, frustration and mental exertion. There are increasing number of students to handle in the classroom that is ill-equipped and overcrowded, ill-equipped offices, increasing numbers of scripts to mark in the midst of teachers' personal need for prospects of promotion, family and societal expectations and responsibilities. However, managing teachers' work-life balance for quality secondary schools in Edo State is yet to be properly investigated. Therefore, the problem of the study put in question form is: what are the strategies for managing teachers' work-life balance for quality secondary education in Edo State?

ISSN 2394 - 7780

PURPOSE OF THE STUDY

The purpose of the study was to examine the management of teachers' work-life balance for quality secondary education in Edo-State. Specifically it seeks to:

1. Examine the available flexible-working arrangements in managing teachers' work-life balance for quality secondary education in Edo-State.
2. Determine the available work-family culture in managing teachers' work-life balance for quality secondary education in Edo-State.

RESEARCH QUESTIONS

The following research questions guided this study

1. What are the available flexible working arrangements in managing teachers' work-life balance for quality secondary education in Edo State?
2. What are the available work-family cultures in managing teachers' work-life balance for quality secondary education in Edo State?

HYPOTHESES

The following hypotheses tested at 0.05% alpha levels of significance guided this study

HO_1: There is no significant difference between the mean perceptions of male and female principals on the available flexible working arrangements in managing teachers' work-life balance for quality secondary education in Edo-State.

HO_2: There is no significant difference between the mean perceptions of rural and urban principals on the available work-family culture in managing teachers' work-life balance for quality secondary education in Edo-State.

METHODOLOGY

The design adopted for this study was a descriptive survey. The population of this study consisted of 276 public senior secondary schools in Edo State and their serving principals respectively. A sample size of 110 representing 40% served as study participants. This sample size was drawn using stratified proportionate sampling. The instrument for the study was a questionnaire titled: Managing teachers' work-life balance for quality secondary education questionnaire (MTWLBQSEQ). The instrument consisted of 18 items and was structured using a rating scale of Strongly Agree (SA), Agree(A), Disagree(D) and Strongly Disagree(SD) and their scale was rated as follows: SA=4 points, A=3 points, D=2points and SD=1 point respectively. Crombach Alpha statistics was used to get the reliability coefficient of 0.73. Cronbach Alpha was used because the questionnaire was multi-chotomously scored. The data collected were analyzed using mean and rank order statistics to answer the two research questions and z-test statistics to test the two null hypotheses at 0.05 alpha level of significance. All items with the criterion mean of 2.50 and above were accepted while items below the criterion mean were rejected.

RESULTS

Research Question One: What are the available flexible working arrangements in managing teachers' work-life balance for quality secondary education in Edo State?

Table-1: Weighted mean and rank order scores used in computing result on the available flexible working arrangements in managing teachers' work-life balance.

Sr. No.	Statement	Male Principals N = 61		Female Principals N = 49		Mean Set	Rank	Decision
		$\overline{X}_1$	Rank	$\overline{X}_2$	Rank	$\overline{X}_1\ \overline{X}_2$ $X\ ½$		
1	Adjust work time to suit teachers	2.12	7th	2.04	9th	2.08	8th	Disagreed
2	Not extending work hours	2.85	5th	2.57	6th	2.71	6th	Agreed

ISSN 2394 - 7780

3	Granting teachers permission to leave school to attend to other pressing matters when necessary	3.21	1st	3.04	1st	3.13	1st	Agreed
4	Finding out from teachers the time that is most suitable for them in preparing time table	2.11	8th	2.08	7th	2.10	7th	Disagreed
5	Allowing teachers to organize classes for students' off-school days.	2.80	6th	2.92	5th	2.86	5th	Agreed
6	Allowing teacher with disabilities to engage in job share arrangements.	3.05	2nd	3.02	2nd	3.04	2nd	Agreed
7	Allowing teachers with progressive medical condition to engage in job share arrangements.	3.03	3rd	3.00	3rd	3.02	3rd	Agreed
8	Provision of technological advancements for teachers to conduct work outside the office.	2.90	4th	2.98	4th	2.96	4th	Agreed
9	Allowing well engaged teachers to work on part time basis	2.02	9th	2.06	8th	2.04	9th	Disagreed
	Aggregate mean	**24.09**		**23.71**		**23.94**		
		2.68		**2.63**		**2.66**		

Table 1 indicated that items 2-3, 5-8 had weighted mean scores above the criterion mean of 2.50, and thus, were agreed as the available flexible working arrangement in managing teachers' work-life balance for quality secondary education in Edo State. Conversely, items 1, 4 and 9 had weighted mean scores below the criterion mean of 2.50, and thus, were disagreed as the available flexible working arrangements in managing teachers' work-life balance for quality secondary education in Edo State.

Research Question 2: What are the available work-family cultures in managing teachers' work-life balance for quality secondary education in Edo State?

Table-2: Weighted mean and rank order scores on the available work-family culture in managing teachers' work-life balance.

Sr. No.	Statement	Rural Principals N = 65		Urban Principals N = 45		Mean Set	Rank	Decision
		$\overline{X}_1$	Rank	$\overline{X}_2$	Rank	$\overline{X}_1\ \overline{X}_2$ $X\frac{1}{2}$		
10	Ensuring a friendly school climate	2.89	4th	3.10	2nd	3.00	2nd	Agreed
11	Developing a good interpersonal relationship	2.78	6th	2.71	5th	2.75	5th	Agreed
12	Avoiding work-family conflict.	2.65	7th	2.50	7th	2.60	7th	Agreed
13	Providing work-related support for teachers.	2.94	3rd	2.80	4th	2.90	4th	Agreed
14	Willing to discuss family-related problems with	2.84	5th	2.62	6th	2.73	6th	Agreed
15	Provision of family friendly programmes	3.08	1st	3.16	1st	3.12	1st	Agreed

ISSN 2394 - 7780

16	Allowing rules and regulations to be flexible in case of family crisis and illness	2.97	2nd	2.87	3rd	2.92	3rd	Agreed
17	Imposing policies on teachers	2.14	8th	1.82	9th	1.98	9th	Disagreed
18	Provision of family	2.12	9th	2.31	8th	2.22	8th	Disagreed
	Aggregate mean	**24.41**		**23.89**		**24.22**		
		2.71		**2.65**		**2.70**		

Table 2 showed that items 10-16 had weighted mean scores above the criterion mean of 2.50, and thus were agreed as the available work-family culture in managing teachers' work-life balance for quality secondary education in Edo State. Similarly, items 17 and 18 had weighted mean scores below the criterion mean of 2.50 and thus, were disagreed as the available work-family culture in managing teachers' work-life balance for quality secondary education in Edo State.

HYPOTHESES

HO_1: There is no significant difference between the mean perceptions of male and female principals on the available flexible working arrangements in managing teachers' work life balance for quality secondary education in Edo State.

Table 3: Mean, standard deviation and z-test of difference between the perceptions of male and female principals on the available flexible working arrangement in managing teachers' work-life balance

Sr. No.	Categories of Principals	N	X	SD	DF	Z-observed	Z-critical	Sig. level	Result
1.	Male principals	61	2.68	1.06	108	0.26	1.96	0.05	Not significant
2.	Female principals	49	2.63	1.00					

Table 3 shows the z-test of difference between the mean perceptions of male and female principals on the available flexible working arrangements in managing teachers' work life balance for quality secondary education in Edo State. The z-test statistics calculated and used in testing the hypothesis stood at 0.26 while the critical z-value stood at 1.96, using 108 degree of freedom at 0.05 alpha level of significance. Since the calculated z-value is less than the critical z-value, the null hypothesis was therefore not rejected. By implication, there is no significant difference between the mean perceptions of male and female principals on the available flexible working arrangements in managing teachers' work-life balance for quality secondary education on Edo State.

HO_2: There is no significant difference between the mean perceptions of urban and rural principals on the available work-family culture in managing teachers work life balance for quality secondary education in Edo State.

Table-4: Weighted mean, standard deviation and z-test of difference between the perceptions of urban and rural principals on the available work-family culture in managing teachers' work-life balance.

Sr. No.	Categories of Principals	N	X	SD	DF	Z-observed	Z-critical	Sig. level	Result
1.	Urban principals	65	2.71	1.04	108	0.3	1.96	0.05	Not significant
2.	Rural principals	45	2.65	1.01					

Table 4 shows the z-test of difference between the mean perceptions of urban and female principals on the available work-family culture in managing teachers work life balance for quality secondary education. The calculated z-value was 0.3 while the z-critical stood at 1.96 using 108 degree of freedom at 0.05 alpha level of significance. Since the calculated z-value is less than the critical z-value, the null hypothesis was therefore not rejected. By implication, there is no significant difference between the mean perceptions of urban and rural principals on the available work-family culture in managing teachers' work-life balance for quality secondary education.

ISSN 2394 - 7780

DISCUSSION OF FINDINGS

Findings from the results as presented in table 1 identified the various available flexible working arrangements in managing teachers' work-life balance for quality secondary education. They include: Granting teachers permission to leave school to attend to other pressing matters when necessary, Allowing teacher with disabilities to engage in job share arrangements, allowing teachers with progressive medical condition to engage in job share arrangements, provision of technological advancements for teachers to conduct work outside the office and allowing teachers to organize classes for students' off-school days. This finding agrees with the findings of Chitra and Sheela (2012) who asserted that another way of preventing the loss of experienced teachers is for the principal to promote flexible working arrangement and be supportive of reasonable requests for time off. This finding is in line with the findings of Nwogu and Kaegon (2013) who reiterated that work-life balance deals with the provision of opportunities for employees to balance actual work conditions with the responsibilities and interests which they hold for themselves outside work schedule. This finding conforms to the findings of Brown (2012) who opined that teachers with disabilities and progressive medical conditions should engage in job share arrangements. This will lighten teaching loads, reduces stress and also will enable teachers to remain in employment longer. This finding is also in line with Rau and Hyland (2002) who stated that technological advancements such as E-mails, laptops, PDAs, blackberries, webinars, video conferencing and other technological tools allow teachers to work remotely and remain connected 24hours a day, 7days a week. Taking advantage of these technological tools will enable teachers' gain a few extra hours at home or a more flexible work schedule.

Findings from the results as presented in table 2 showed the different available work-family culture in managing teachers' work-life balance for quality secondary education in Edo-State. They are; Provision of family friendly programmes, ensuring a friendly school climate, allowing rules and regulations to be flexible in case of family crisis, providing work-related support for teachers, developing a good interpersonal, willing to discuss family-related problems and avoiding work-family conflict. The finding agrees with the findings of Poelman (2012) who asserted that a supportive family-work culture makes an organization a more pleasant place to work. This finding also conforms to the findings of Ruvarashe (2010) who stated that work-family culture is an available option for managers in facilitating work-family balance. The finding is also in line with Grywacz and Carlson (2007) who reiterated that family friendly programmes acknowledges and respond to the work and personal family responsibilities of teachers, by developing and implementing policies and practices that allow teachers to balance work and family responsibilities effectively. This family friendly programmmes will enable the boundary between work and family domains to be more permeable. This will make the school a more pleasant place to work. Nasurdin and Hsia (2008) opined that administrators through their provision of work- related support help in mitigating the stress that a teacher may experience at work.

Findings from the result of the tested hypothesis as presented in table 3 revealed that there was no significant difference between the mean perceptions of male and female principals on the available flexible working arrangements in managing teachers' work-life balance for quality secondary education. The reason for the no significant difference could be that these principals do not have divergent but the same views on the available flexible working arrangement in managing teachers' work-life balance for quality secondary education in Edo-State. This finding conforms to the findings of Nwogu and Kaegon (2013); Brown (2012) and Rau and Hyland (2002) in their independent studies.

The result of the tested hypothesis as presented in table 4 indicated that there is no significant difference between the mean perceptions of urban and rural principals on the available work-family culture in managing teachers' work-life balance for quality secondary education. The reason for the no significant difference could be that these principals do not have divergent but the same views on the available work-family culture in managing teachers' work-life balance for quality secondary education in Edo-State. This finding conforms to the earlier findings of Poelman (2012); Ruvarashe (2010); Grywacz and Carlson (2007) and Nasurdin and Hsia (2008) in their independent studies.

CONCLUSION

From the findings of the study, it was concluded that managing teachers' work-life balance will enhance quality secondary education through the use of flexible working arrangements and work-family culture.

RECOMMENDATIONS

Based on the findings of the study, the researchers recommended that:

1. Principals should adopt flexible working arrangements and work-family culture in managing teachers' work-life balance for quality secondary education.

ISSN 2394 - 7780

2. There should be regular training of teachers to develop their professional competence, confidence and knowledge about work-life balance.
3. Principals should create an environment in which teachers can become emotionally, cognitively and physically engaged.

REFERENCES

- Brown, H. J. (2012). *Creating job satisfaction*. Retrieved November 2, 2012, from www.mindtools.com
- Chitra, A. D. & Sheela, S. R. (2012). Relationship between organizational support, work-life balance and organizational commitment. *European Journal of Scientific Research*. 92(3), 357-365.emp_au_Hudson_Work-Life_A4_Std
- Esobhawan, B. I. (2012). Time management strategies for administrative effectiveness of principals in public senior secondary schools in Edo-state. (Unpublished Master's Degree Serminar). University of Port Harcourt.
- Federal Republic of Nigeria (2012). National Policy on Education. NERDC.
- Grzywacz, J.G. & Carlson, D.S. (2007). Conceptualising work-family balance: implications for practice and research. *Advances in Developing Human Resources*, 9, 455-471.
- Hudson, R. (2005). *The case for work/life balance: Closing the gap between policy and practice*, Hudson Retrieved May 7, 2008, from http://au.hudson.com/documents/
- Nasurdin, A. M. & Hsia, K. L. (2008). The influence of support at work and home on work-family conflict: Does gender make a difference? *Research and Practice in Human Resource Management*, 16, 18-38.
- Nwogu, U. J. & Kaegon, L. E. S (2013). Work-life balance preferences of academic staff of tertiary institutions in Rivers State. Journal of Studies in Education. 1, 147-154.
- Nwogu, U. J. (2014). *Achieving qualitative universal basic education through the application of quality circle management techniques.* In S.N. Maduagwu(Ed). *Administration of universal basic education*: *The basic facts*.113-124. Owerri: Springfield.
- Obasi, F. N. (2004). Nature and scope of educational management. In P.O.M, Nnabuo, N. C. Okorie & O. G. Agabi (Eds). *Fundamentals of educational management*. (pp1-3) Owerri: Nigeria. Versatile Press.
- Poelman, A.Y. (2012). *Work and family: An international perspective.* Westport, CT: Quorum press.
- Rau, B. L. & Hyland, M. M. (2002). Role conflict and flexible work arrangements: The effects on applicant attraction. *Personnel Psychology* 55, 111-136.
- Ruvarashe, S. (2010). *Work-family culture and border permeability in the context of work-family border theory.* University of the Witwatersrand, Johannesburg.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

NEED OF IRRIGATION IN SOLAPUR DISTRICT OF MAHARASHTRA

Kadam Dattatraya Maruti

ABSTRACT
Irrigation is identified as a decisive factor in Indian agriculture due to high variability and inadequacy of rainfall. Irrigation is essential for successful agriculture particularly in the area, where rainfall is inadequate uncertain, and unpredictable. Irrigation is necessary in traditional agriculture to overcome droughts scarcity of rainfall. Irrigation constitutes one of the most effective technical means of the raising agricultural production in the developing countries. So the present research paper, 'A Economical analysis on need of irrigation in Solapur District of Maharashtra.' Solapur district is located in drought prone area of Maharashtra state. For the present study, the secondary data are used which is collected from socio-economic abstract of Solapur district. Such type of study represents real situation of irrigation and need of irrigation in Solapur District and helps to planners, agricultural scientists and research scholars.

Keywords: Traditional agriculture, agriculture productivity, Rainfall inadequacy, coefficient of index

INTRODUCTION
Irrigation constitutes one of the most effective technical means of the raising agricultural production in the developing countries. Where irrigation by gravity is possible, much work of installing facilities can be carried out by manual labour, through there is an obvious economic advantages, even in countries with very low wage level, in using technical aids in the constructional and earth moving works where the water necessary. Cannot be brought to the land to be irrigated slowly by the force of gravity, it is necessary use pumping installation. Mechanical source of power has considerably increased the efficiency of water pumping and have extended the use of irrigation by making. It possible to use ground water located at considerable depth and with the aid of sprinkling arrangement, to bring irrigation to areas that could otherwise not have been brought under cultivation except at uneconomically high cost. There is still a very large potential field for development by means of this system. It is identified as a decisive factor in Indian agriculture due to high variability and inadequacy of rainfall. Irrigation is essential for successful agriculture particularly in the area, where rainfall is inadequate uncertain, and unpredictable. Irrigation is necessary in traditional agriculture to overcome droughts scarcity of rainfall.

OBJECTIVES
The main objective of the study is to showing the need of irrigation in Solapur district and analysis the regional disparities in need of irrigation in study region.

DATA BASE AND METHODOLOGY
Basically the entire research paper is based on secondary data. The secondary data and information have been taken from the Director, District Irrigation Department of Solapur, District Superintendent Agricultural office, Solapur Socio-economic review and district statistical abstract of Solapur district. For the present investigation, District is selected as in general and tahsils in particular.

In order to assess the need of irrigation, the following formula has been adopted.

$$\text{Need of Irrigation} = \frac{Pr \times Ac}{R}$$

Where_ Pr = Percentage of rural population in a areal unit

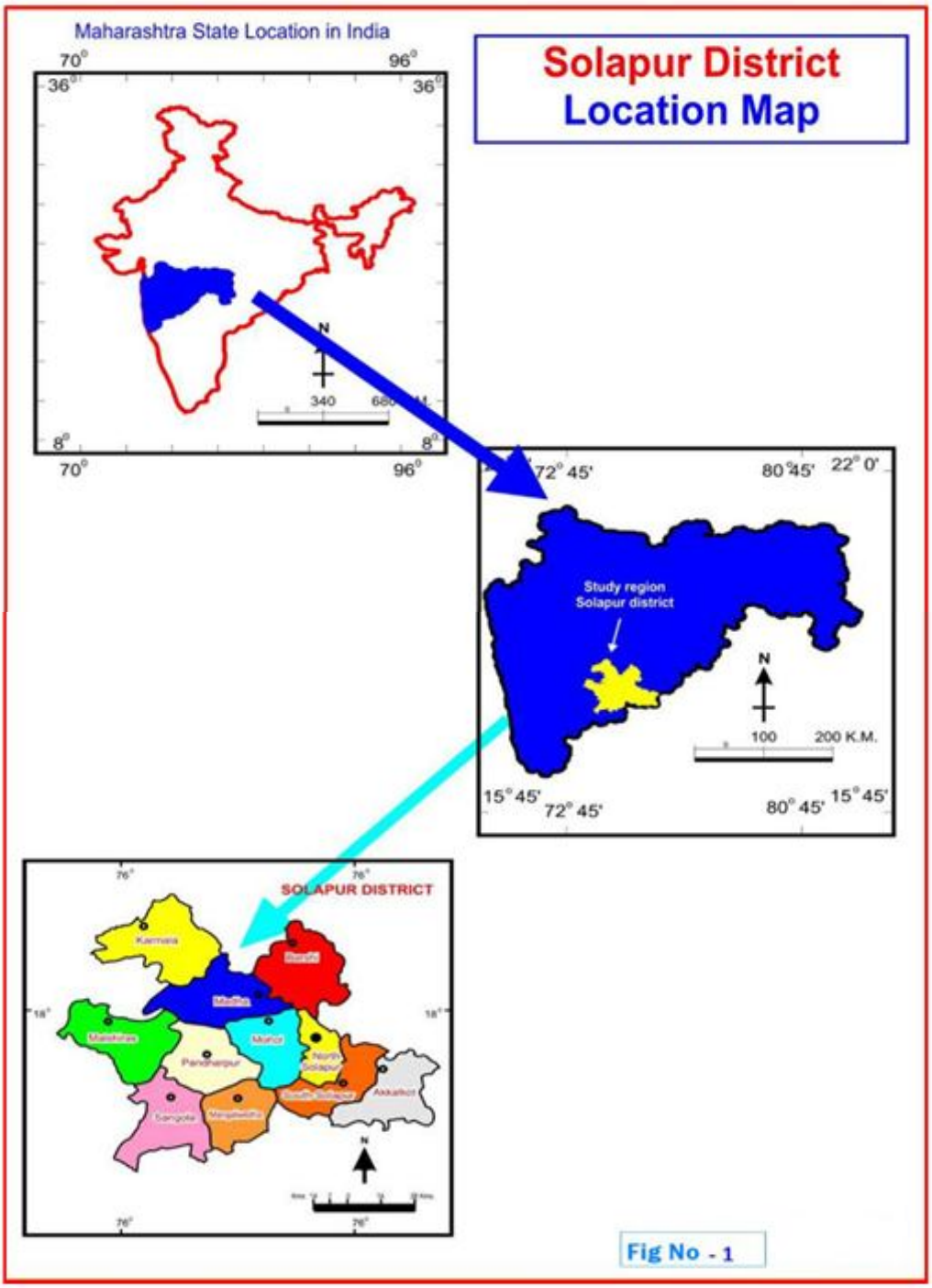
Ar = Percentage of cultivated area in a areal unit

R = Average annual rainfall

STUDY AREA
The present study deals with the geographical perspectives of the agriculture in Solapur district. The Solapur district is bounded by $17^0$05' North latitudes to 18^0 32' North latitudes and 74^0 42' East of 76^0 15' East longitudes. The total geographical area of Solapur district is 14895 squre K.m. divided into eleven tahsils. The Population is 43.18 lakhs in elven tahsils of District. (Censes 2011). It is bounded from the North by Osmanabad district and Ahmednagar district, on the North-East by Satara district and at the South & East it has common boundary of Karanataka state. Temperature is high in summer season. Rainfall varies from East to West between ranges of 200 to 1200 millimeters. The rivers like Bhima, Sina, Man, Nira, Bhogawati and many

ISSN 2394 - 7780

other smaller tributaries drain in the district. The soil of the district is mainly of Deccan Trap Volcanic origin. It is underlined by partially decomposed Basaltic rock material locally known as "murum".



EXPLANATION

Irrigation is essential for successful agriculture particularly in the area, where rainfall is inadequate uncertain, and unpredictable. Irrigation is necessary in traditional agriculture to overcome droughts scarcity of rainfall. Irrigation has played an important role in transforming the crop cultivation and better yield. There are various any other type of irrigation such as in their well irrigation, rivers, tanks and canal etc. But there are additional factors such as their location, their topography, geological aspect and height, hilled area depending on various elements. In the region under study mainly two types of irrigation are practiced namely well and canal irrigation. For the present investigation, District is selected as in general and tahsils in particular.

A. Need of Irrigation in Solapur District

There are imbalances in need of irrigation in Solapur district. The need irrigation in Solapur District is 6.16. The highest need of irrigation is observed in Madha tahsil (13.08) and lowest in North Solapur Tahsil (01.38). This coefficient of need irrigation is divided into three groups.

ISSN 2394 - 7780

Table No-1: Need of Irrigation in Solapur District

Sr. No.	Need of irrigation	Number of tahsil	Name of tahsil High
1	High (above 10)	07	Karmala, Madha, Mohol, Pandharpur, Malshiras, Mangalwedha, South Solapur
2	Moderate (05 to 10)	03	Barshi, Sangola, Akkalkot
3	Low (below 05)	01	North Solapur

Source: Compiled by Researcher

1. **High need of irrigation:** The value of tahsil above 10 is called high need of irrigation in study region. The seven tahsils of study region are required high need of irrigation. These tahsils are Karmala, Madha, Mohol, Pandharpur, Malshiras, Mangalwedha and South Solapur. It is suggested that the natural environment are unfavorable for agriculture which means that it is essential to provide irrigation facilities for better agriculture.
2. **Moderate need of irrigation:** The moderate need of irrigation is observed in three tahsil i.e. Sangola, Barshi and Akkalkot. The average rainfall in Sangola and Akkalkot is low but the agriculture area is low due to huge fallow land compare to other tahsil of district.
3. **Low need of irrigation:** The low need of irrigation is observed in North Solapur. It is happen due to the very few population lived in rural area. The district head quarter Solapur is located in this tahsil, that's why the need of irrigation is low according to this formula.

B. Actual irrigated area in Solapur District

The Solapur district is located drought prone area, therefore irrigated area is low. After the development of Ujani dam, Nira – Siana canal and Kolhapur pattern dam, the irrigated area increased. The high irrigated area is observed in Pandharpur tahsil (86.87 percent to NSA) and lowest area is in Sangola (14.56 percent to NSA). The spatial pattern of irrigation is show in following table.

Table No-2: Irrigated area in Solapur District

Sr. No.	Irrigated area	Number of tahsil	Name of tahsil
1	High (above 70 % to NSA)	02	Pandharpur, Malshiras
2	Moderate (30 to 70 % to NSA)	03	Madha, Mohol, Karmala
3	Low (below 30 % to NSA)	06	South Solapur, Akkalkot, Mangalwedha, North Solapur, Barshi, sangola

NSA- Net Sown Area

Ref:- Socio-Economic review and district statically abstract of Solapur District 2017.

1. **High Irrigated Area:-** High proportion of irrigation is observed in Pandharpur (86.87%) taluka, where canal and well irrigation has been developed during the last two decades. This has been followed by Malshiras (77.73%). Bhima River lies in their area. Nira right & left canal and Ujani canal provide more water in this area.
2. **Moderate Irrigated Area:-** Relatively moderate land under irrigation between 40 to 70 percent is found in Madha, Mohol and Karmala tahsil. The small water tanks and wells are playing more important role in this area.
3. **Low Irrigated Area:-** Relatively low land under irrigation below 30 percent is found in South Solapur, Akkalkot, Mangalwedha, North Solapur, Barshi, and sangola tahsils of the study region.

FINDING AND SUGGESTION

The research paper analyze that the high need of irrigation in study area is in seven tahsil. It is clear that it is essential to provide irrigation facilities for agriculture. It is also observed that the actual low irrigation area is observed in six tahsils. So it is necessary to achieve the growth of irrigation is the district. Few suggestions have to be suggested to individual level, institutional level and administrative level. They are

1. Carried out research work to achieve innovative technology and methods of water management.
2. Give incentives to proper propaganda of irrigation management.
3. Projects should be planned at micro level as poor peasant will be the major beneficiaries.
4. Watershed development program should be scientifically planned.

ISSN 2394 - 7780

5. Drip irrigation, sprinkler irrigation like measures should be adopted by the people. To encourage people give incentives in proportion.
6. Use media for propaganda of irrigation management.
7. Raise funds on local levels to complete small watershed programs.
8. Rain harvesting is essential measure in drought prone areas.
9. Repairing of canals to avoid seepage essential.
10. Think globally act locally, to achieve sustainable water management.
11. People participation should be give vital importance.
12. The fund can rise through strong co-operative sector of the district.
13. Rules, regulation and charges on irrigation water should be restructured.
14. Administration should take care of completion of uncompleted projects in the district.
15. Set local level committees to look after the progression of small project in the area.

REFERENCES

1. Socio-Economic review and district statically abstract of Solapur District 2017.
2. Ambedkar's Contribution to Water Resources Development, A Research Project by Central Water Commission, Second Edition- 2016.
3. Pawar C. T. (1989): Impact of Irrigation on Agriculture. Himalaya Publishing House Bombay.
4. Solapur District booklets of all Irrigation Schemes progress and indicate to current status, Solapur District Jun 2016.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

CAUSES OF SCHEDULE DELAY AND COST OVERRUN IN AFGHANISTAN INFRASTRUCTURE PROJECTS

Zekrullah Kochai[1] and Dr. Mohammad Shakil Malek[2]
Student[1], Department of Civil Engineering, Parul University[1], Vadodara
Campus Director[2], FD (Mobin) Technical Campus Bahiyal Tal, Dehgam, District Ghandinagar

ABSTRACT
The recent history of Afghanistan Construction industry is a complete transformation and change of this industry toward improvement. Hundreds of Billion USD have been injected for relief and Reconstruction of the country by the Government of Afghanistan and foreign donors specially USA government and its allies. The large amount of funds have been spend on construction of Dams, Military bases and facilities, school buildings, hospitals, highways and other infrastructure projects. These rebuilding activities faced many challenges including schedule delay and cost overrun. This research has been undertaken to find the causes of schedule delay and cost overrun in Afghanistan Construction projects. A detailed questionnaire has been designed to conduct the survey from the respondents including contractor, client and consultant throughout the country to find and rank the factors causing schedule delay and cost overrun in Construction projects. The questionnaire has been structured in main four phases including causes of overruns, responsible parties for overruns, impact of overruns and suggested resolution measures to minimize the overruns. In order to analyze collected data, Descriptive statistical method has been chosen to rank the factors and to find the main causes of overruns as per the perception of the respondents.

Keywords: Afghanistan-Infrastructure projects-time delay and cost overrun-resolution measures-recommendations

INTRODUCTION
The Construction industry is one of the forerunner industries which provide important ingredient for the developing of the nation's economy. However, across the globe many Construction projects have experienced schedule delay and cost overrun which endangers the profitability of the overall Construction business and weaken GDP growth of the nation which is highly related to the Construction activities all over the world.

Construction schedule delay and Cost overruns beyond the contracted cost is one of the biggest and recurring problems today. The schedule delay or overrun can be defined as an issue where a Construction project gets delayed beyond its expected completion time due to some uncertainties and Cost overrun is a term where the owner has to spend more budgets for the completion of a contract than the original estimated cost. This problem is more evident in developing countries including Afghanistan that have experienced huge schedule delay and Cost overrun in its major infrastructure projects particularly since last 15 years. After year 2001, when civil war ended and the country entered to a new relief and reconstruction phase, Afghan government and foreign donors especially US government have spent billion of USD on stability and reconstruction activities in the country.

As per Special Investigation Agency for Reconstruction of Afghanistan (SIGAR)'s Report published on 30/June/2017, the cumulative appropriations funds in different category between 2002 and 2017 by USA is $119.74 Billion where major part of this funds have been spent for maintaining security through constructing the military bases and providing facilities for Afghan national security forces. These Construction contracts have not been completed without their problems. Schedule delay and cost overrun in these contracts were the main concern among all Construction firms in the country including local and international Construction companies who were responsible for execution of these contracts.

Despite no survey has been conducted in the country to show the status of completed/ongoing projects between a specified time frame experienced schedule delay and cost Overrun, still some reports prepared by some agencies indicate that there is a large numbers of Construction projects experienced overruns which consequently leaded to the disputes among projects participant so far. The following table shows some projects have been delayed and their budged have been increased to complete the contract:

ISSN 2394 - 7780

Table-1: Some Projects in Afghanistan experienced overruns

Schedule delay and cost overrun projects in Afghanistan							
No	**Project Description**	**Client**	**Project Duration**	**Planned completion**	**Actual completion**	**Estimated cost**	**Actual cost**
1	Kajaki Hydroelectric Power Dam-Helmand Province	USAID	1 YEAR	2005	2015	150$M	500$M
2	105 MW Kabul Power Plan project	USAID	16 Months	Mar-2009	Mar-2010	300$M	340$M
3	Salma (AIFD) 42 MW Hydroelectric Dam Project	India Gov	4 Years	June-2010	June-2016	275$ Million	290$ Million
4	Khost-Gardiz highway Project	USAID	6 Years	Dec-2007	Dec-2015	200$ Million	N/A
5	Ministry of Defence HQ building Project	AFCEE	18 Months	Oct-2010	April-2015	48.6$ Million	154.7$ Million
6	Parliament house building Project	India Gov	2 Years	Dec-2011	Dec-2015	45$ Million	90$ Million
7	Andkhoy-Qaisar Ring road Project	ADB	2 Years	Sep-2007	Sep-2010	80$ Million	N/A
8	Ministry of Interior HQ building project	USACE	2 Years	May-2013	Nov-2015	36.6$ Million	46.2$ Million

In order to overcome this problem, it's necessary to find the causes of overrun and take steps to mitigate this problem in time.

RESEARCH OBJECTIVES

Despite with the accessibility and use of different project management tools and techniques, a large number of Construction projects still face schedule delay and cost overrun. Therefore, it's quite important for any party involved in the Construction production activities to understand the causes of overruns and take required steps to eliminate the causes and finish the project on contracted time and specified budget. The following points are main outlines of our research objective:

- To identify factors causing time delay and cost overrun in Afghanistan's Construction industry
- To analyze the level of significance and level of severity on project objectives referred to any party and rank the factors as per findings
- To evaluate and find the affects of overrun on Construction business
- To recommend solutions measures based on research findings to minimize overruns

LITERATURE REVIEW

The inability of the construction industry to complete the projects on time and within budget has become the major concerns of the clients. Cost overrun is a common problem worldwide, but it is a significant challenge in developing countries. The construction industry is a significant contributor of economic and social development in developed and developing countries. (Ghulam Abbas.N & Neol Painting, 2017) ¬¬¬¬

The United Arab Emirates (UAE) construction industry has reached its maximum position in the last decade. Construction Industry started to grow to meet the increasing demand for shelter, offices, electricity, roads among others, but these activities still facing the major and critical problems which are time and cost overruns. The famous Burj Khalifa completed in year 2009, which was constructed with the most advanced and highest construction technology and project management techniques, yet took nine months longer to complete than its original contracted time and costs 71% higher than anticipated. (ARSHI SHAKEEL FARIDI & SAMI MONIR EL-SAYEGH, 2006)

In Saudi Arabia, most of the contractors (76%) indicated that average time overrun is between 10% and 30% of original contract duration, while about 56% of the consultants specified the same percentage. 25% of the consultants indicated from 30% to 50% average time overrun in Construction contracts. (Shabbab Al Hammadi1 & M. Sadique Nawab, 2016)

ISSN 2394 - 7780

Construction industry in Qatar showed second largest growth in 2013 by contributing 2.7% to the GDP growth of the country. While large number of mega projects is under construction in Qatar, majority of these projects are suffering of time delay and cost overrun. New projects are currently experiencing 54% of cost overrun and 72% of time delay. (Ahmed Senoucia et.al, 2016)

Abdullah Aljohani et.al,2017) stated that one of the most famous Construction projects which experienced cost overrun was the Channel Tunnel project where Construction cost increased from £2600 million to £4650 million (80% higher than planned cost), Humber bridge in the UK (175% overrun) and the Paris Nord TGV in France (25% overrun).

Infrastructure projects are globally calculated to have 86% probably of experiencing cost escalation with their average cost overrun of 45% for rail projects, 34% for bridge projects, and 20% for road project implemented recently. Also he stated that cost and time overrun could sometimes average 70% and 183% over the initial planned estimate respectively. (Paul Terna et.al, 2017)

(Prof. Pankaj P. Bhangale,2016) found in his research work conducted on a 39 floor high rise building that total 9 main factors that are causing cost overrun and he grouped all these factors as following: project group, owner group, contractor group, consultant group, design group, equipment group, material group, labour group and external group, further he found that project and material group are more responsible for cost overrun and the external group is less responsible group for cost overrun in his case study.

(Wa'el Alaghbari et.al,2007) categorized the responsible parties in his study on factors causing time and cost overrun in Malaysian Construction industry namely: Contractor, consultant, owner and external factors. As far as causes which are related to contractor and causing overruns are financial problems, shortage of materials and poor site management were ranked among the top three. Owner causes included delayed payments, slow decision making and contract scope changes. The top three consultant causes were poor supervision, slowness to give instructions and lack of experience. Finally, external factors causes of delay and cost overrun included shortage of materials, poor site conditions and lack of equipment and tools in the market.

RESEARCH METHODOLOGY

The methodology used in this study has been illustrated in the following flowchart. Both qualitative and quantities research strategies have been considered since the analyzed data will be in structured and unstructured forms. The population for this survey is construction companies including contractors, clients and consultants. Based on confidence level of 95%, the respondent's samples size has been selected as 100 respondents for this survey purpose including all three groups. The questionnaire has been design of experts' validated factors compiled from literature review and sent to the respondents individually.

The following is research design flow chart:

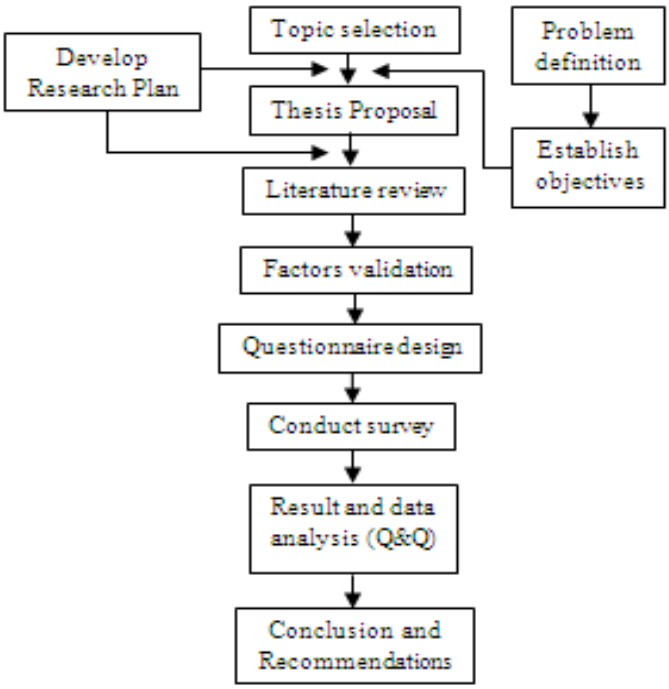


Figure-1: Research methodology flowchart

ISSN 2394 - 7780

Descriptive statistical method has been conducted for analyzing collected data to rank the factors collected in questionnaire. Research data measurement undertaken by interval measurement scale using a 5 likert scales started from higher weight (extremely significant) to the lower weight (no significant) expressed from 5 to 1 respectively as shown in the following table:

Level of significance	Extremely significant	Very significant	Moderately significant	Less significant	Not significant
Scale	5	4	3	2	1

Response rate is 50%, or in other words the ratio of response is 0.5 which is an acceptable range estimated from the questionnaire distributed to the responses and the responses received back. Since economical, political environmental, geographical conditions are almost same for the country, thus the research location is all over the country and this research is application to almost all areas. The following figure is general information about research respondents participated in this survey:

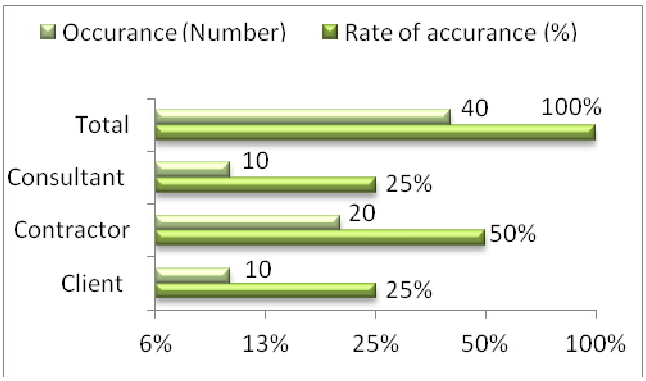


Figure-2: Rate of Response from all three groups

A total of 80 questionnaires have been sent to the respondents to investigate the topic of study, 40 answers have been received as shown in above figure. Further in the questionnaire, job status or respondent positions were asked including managing directors, managers, experts, team leaders, site supervisors and other positions related to the study. The following figure shows this information of the research stated here:

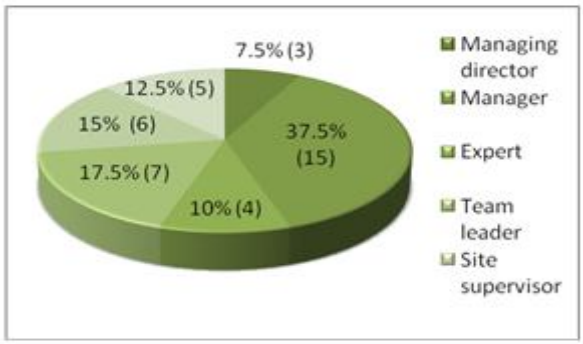


Figure-3: Respondents' job status in their organizations

In order to have further information about the respondents, their working experience which categorized between 1-5, 5-10, 10-15 and over 15 years were asked in the questionnaire where majority of the respondents working experience were 5-10 years. Furthermore the respondent's educational qualification was asked in the questionnaire which was bachelor and master degree as shown in the following figure:

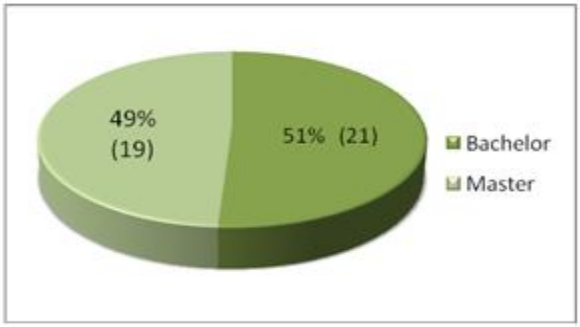


Figure-4: Respondents' educational qualification

ISSN 2394 - 7780

DATA ANALYSIS AND RESULTS

Collected data has been analyzed further using descriptive statistical method like mean, standard deviation and normalization in order to rank the factors collected in the questionnaire. Standard deviation shows data dispersion from mean value and the following formula is using to estimate it:

$$\sigma = \sqrt{\frac{\sum(x-\mu)2}{n-1}} \quad \ldots\ldots\ldots 1$$

Where:

(σ) is standard deviation, (x) is each score given by the respondents, (μ) is mean or average value and (n) is number of the respondents

$$X_{new} = \frac{(X_m - Min_d) * (Max_n - Min_n)}{Max_d - Min_d} + Min_n \ldots\ldots 2$$

Where:

(Xnew) is our new normalized value representing original data, (Xm) is the mean value of our data, (Maxd) is the maximum or highest value in our data (Mind) is the minimum or lowest value in our data, (Maxn) is the maximum or highest value in our new range which 1, (Minn) is the minimum or lowest value in our new range which 0.

1. Causes of Time delay and Cost overrun

The questionnaire contents have been divided in four phases stated before; the first phase is to find the main causes of overruns in Afghanistan Construction projects. The following table show ranking of factors causing overruns based on collected data from the respondents:

Table-2: 20 causes of schedule delay and cost overrun in Afghanistan infrastructure projects

No	Factors Affecting Schedule delay and Cost overrun	Means	Std.Deviation	Normalized Value	Rank
1	Security condition of the Construction areas	4.23	0.86	0.81	1
2	Administrative corruption and bureaucracy	4.15	0.74	0.79	2
3	Low cost bidding and tendering policy	4.12	1.09	0.78	3
4	Poor financial mechanism by contractor	4.05	0.85	0.86	4
5	Contractor's poor experience	4.00	1.04	0.75	5
6	Warlord influence	3.97	0.77	0.74	6
7	Poor site management	3.95	0.85	0.74	7
8	Poor contract management	3.95	0.78	0.74	7
9	Inappropriate project bidding process	3.88	0.88	0.72	8
10	Late delivery of Construction material	3.80	0.99	0.70	9
11	Unrealistic Time schedule	3.78	0.95	0.69	10
12	Shortage of technical staff	3.73	1.09	0.68	11
13	Inadequate Project Detailed Report (DPR)	3.73	1.01	0.68	11
14	Delay in Progress payment	3.63	0.84	0.65	12
15	Land acquisition/Construction permit	3.58	1.08	0.64	13
16	Mistakes and discrepancies in bidding documents	3.55	0.88	0.64	14
17	Delay in project design 18documents	3.53	1.11	0.63	15
18	Poor coordination among project stakeholders	3.53	1.11	0.63	15
19	The degree of project complexity	3.50	0.99	0.62	16
20	Late approval of Construction submittals	3.48	3.93	0.62	17

Table: 2 summarize 20 most significant causes of schedule delay and cost overrun in Afghanistan infrastructure projects. It has been requested from the respondents via questionnaire to rank the factors as per their understanding and field experience which causes schedule delay and cost overrun.

ISSN 2394 - 7780

2. Responsible Parties for overruns

The second part of this study is responsible parties including client, contractor, consultant and external factors. In other words, it has been requested from the respondents to rank the factors based on their best of knowledge and based on the severity of the factor causing overruns referred to any party. These factors have been categorized in four groups related to each of these parties which show how each party is responsible for their related factors causing schedule delay and cost overrun.

The following table shows four categories of factors related to each party and ranked by the respondents as per each party's responsibility and severity of the factors causing overruns:

Table-3: Responsible parties and most governing factors related to each parties causing overruns

No	Factors Affecting Schedule delay and Cost overrun	Means	Std.Deviation	Normalized Value	Rank
Contractor					
1	Poor financial management	4.03	0.89	0.76	1
2	Lack of interpersonal relation in the project	3.98	0.80	0.74	2
3	Poor material and site management	3.95	0.96	0.73	3
4	Frequent breakdown of plant equipment	3.93	0.76	0.73	3
5	Lack of timely decision	3.93	0.83	0.73	3
Consultant					
1	Mistakes in design documents	3.73	0.99	0.68	1
2	Poor supervision	3.65	0.95	0.66	2
3	Slowness in giving instructions	3.65	0.83	0.66	2
4	Unawareness of project requirements	3.65	1.10	0.66	2
5	Late provision of design documents	3.58	0.96	0.64	3
Client					
1	Low cost bidding policy	4.15	1.00	0.79	1
2	Delay in progress payment	4.03	0.97	0.76	2
3	Late approval of submittals	3.95	0.81	0.74	3
4	Slow decision making	3.75	0.84	0.69	4
5	Poor contract management	3.70	1.02	0.68	5
External Factors					
1	Security/political conditions	4.28	0.91	0.82	1
2	Administrative corruption	3.98	0.92	0.74	2
3	Government related authorities interference	3.85	0.86	0.71	3
4	Land acquisition/Permit	3.58	0.98	0.64	4
5	Unavailability of skilled staff	3.53	0.93	0.63	5

Table: 3 summarize four responsible parties for schedule delay and cost overrun and their top five related factors. A total of 46 factors have been collected in the questionnaire 18 for contractor, 10 for consultant, 10 for client and 8 factors as external factor responsible for overruns.

3. Impacts of overrun on Construction Projects in Afghanistan

As stated right from beginning that schedule delay and cost overrun are very critical issues negatively impacting overall Construction business in the country and one of the objectives of this study is to evaluate the impact of overruns on construction project through the industry. Thus, some factors as impacts of overruns were part of questionnaire sent to the respondents to seek their perceptions and to rank these factors as per their responses.

The following Table show the top five factors out of 15 factors as impacts of overruns on Construction business in the country:

Table-4: Impacts of schedule delay and Cost overrun on Construction projects

No	Impact of overruns on Construction projects	Means	Std.Deviation	Normalized Value	Rank
1	Negative effect on upcoming new projects by the same client and client's dissatisfaction	3.93	0.94	0.73	1
2	Reputation lost (Contractor)	3.90	0.84	0.72	2
3	Delay in progress payment and LDs	3.90	0.81	0.72	2
4	Loss of tangible and intangible benefits	3.75	0.77	0.71	3
5	Poor quality workmanship	3.68	0.92	0.67	4

ISSN 2394 - 7780

4. Resolution Measures for Schedule delay and Cost overrun

In order to minimize Cost overrun and schedule delay in Construction projects, the appropriate resolution methods have to be considered. For this purpose, this study includes some suggested resolution measures in the questionnaire to ask the respondents for ranking these methods as per their experiences in such projects starting from best method of resolution to overcome overruns in the Construction projects. The following table show top five resolution measures out of a total of 20 factors requested and rank by the respondents as best methods to minimize overruns:

Table-5: Resolution measures for schedule delay and cost overrun

No	Impact of overruns on Construction projects	Means	Std. Deviation	Normalized Value	Rank
1	Realistic Time schedule and Cost estimate	4.10	0.96	0.77	1
2	More focus on Iron triangular by project team	4.10	0.84	0.77	1
3	Effective Site management	4.00	0.88	0.75	2
4	Trainings provisions for skilled and semi Workers involved in the projects	3.93	0.97	0.73	3
5	Using of EVM on weekly and monthly bases	3.85	1.00	0.71	4

CONCLUSION AND RECOMMENDATION

It has been investigated by this study that the causes of schedule delay and cost overrun in Afghanistan infrastructure projects. Descriptive statistical method has been used for data analysis purpose and ranking the factors using mean, standard deviation and normalization. According to all participants of the survey, security situation of Construction sites, administrative corruption and low cost bidding/tendering policy are the top three factors causing schedule delay and cost overrun. Poor financial management, poor material and site management and frequent breakdown of the Construction plants and equipments are the responsible factors for overruns which are mostly related to the contractor. Further the study found that mistake in design documents and late provisions of design documents are responsible factors for overruns mostly related to the consultant party. Low cost bidding policy, delay in progress payment and late approval of documents and material mostly related to the client are responsible factors for schedule delay and cost overrun.

Security, corruption and interference of government related departments in Construction activities are the top three factors categorized as external party responsible for schedule delay and cost overrun in Construction projects.

The most important impacts/affects of both schedule delay and cost overrun on Construction projects are negative effect on overall Construction business, dissatisfaction of client and end users and bad reputation of the Construction firms are the most top three impacts ranked by the survey participants.

In order to eliminate or minimize delay and cost overrun in infrastructure projects, some resolution measures have been sent to the respondents along with other factors through questionnaire. The top three resolution measures for schedule delay and cost overrun issue ranked by the respondents are a realistic time schedule and cost estimation, effective site management and provision of trainings to the skilled and semi skilled workers.

As per researcher's progressively 6 years experiences in the Construction industry of the country and research findings, the following recommendation has been made:

1. Accurate cost estimation by an expert cost estimation engineer is required to avoid cost overrun.
2. It's required to revised and extend Construction schedule usually provided the client in the beginning of the project if it's a non-realistic schedule.
3. Focusing on highly experienced and technical staff especially for complicated Construction contracts need to be in high priorities.
4. An experienced Project manager or Construction manager who is responsible for overall project execution have to be one of project main requirements.
5. Among all parties stated, contractor is more responsible to keep the project on track and avoid schedule delay and cost overrun.

ISSN 2394 - 7780

REFERECES

1. ARSHI SHAKEEL FARIDI and SAMI MONIR EL-SAYEGH (2006), American university of Sharjah, department of engineering system and management. Significant factors causing delay in the UAE Construction industry. (Construction management and economics) ISSN: 1466-433X; 1167-1176
2. Anant Narayan Shete, Vaibhav Durwas Kothawade (2016), An Analysis of Cost Overruns and Time Overruns of Construction Projects in India. International Journal of Engineering Trends and Technology (IJETT) – Volume-41 Number-1, 33-36
3. Adnan Enshassi, Jomah Al-Najjar and Mohan Kumaraswamy (2009) Delays and cost overruns in the construction projects in the Gaza Strip. (Journal of Financial Management of Property and Construction Vol. 14 No. 2, 126-151
4. Ahmed Senoucia and Alaa Ismailb, Neil Eldina (2016). Time Delay and Cost Overrun in Qatari Public Construction Projects, Creative Construction Conference 2016, CCC 2016, , Procedia Engineering, 368 – 375
5. Abdullah Aljujani et.al (2017), Construction projects cost overrun, International Journal of Innovation, Management and Technology, Vol. 8, No. 2, 137-143
6. Ghulam Abbas Niazia & Noel Painting (2017), Significant Factors Causing Cost Overruns in the Construction Industry in Afghanistan, 7th International Conference on Engineering, Project, and Production Management, Procedia Engineering 182, 510 – 517.
7. Intan Rohani Endut, Akintola Akintoye and John Kelly (School of Build and Natural Environment, Glasgow Caledonian University, 70 Cowcaddens Road, Glasgow G4 0BA, 243-252
8. M.S.Ramabodu, JJP Verster (2010), Department of Quantity Surveying and Construction Management, Faculty of Natural and Agricultural Sciences, University of the Free State, Bloemfontein, Factors Contributing to Cost Overruns of Construction Projects, 132-143
9. Mr. Salim S. Mulla, Prof. Ashish P. Waghmare (2015), A Study of Factors Caused for Time & Cost Overruns in Construction Project & their Remedial Measures. (ISSN : 2248-9622, Vol. 5, Issue 1, (Part - 6) 48-53
10. Prof. Pankaj P. Bhangale (2016), Head of Civil Department, S.S.G.B. C.O.E.T. Bhusawal, Maharashtra, India, ANALYSIS OF TIME AND COST OVERRUN TO KEY SUCCESS OF HIGH-RISE COMMERCIAL BUILDING PROJECTS, International Journal of Civil Engineering and Technology (IJCIET) Volume 7, Issue 4, 400–405
11. Paul Terna Gbahabo and Oluseye Samuel Ajuwon (2017) , Development Finance, University of Stellenbosch Business School, Western Cape, South Africa, European Journal of Interdisciplinary Studies,- Vol.7,Nr.2, 46-58
12. Shabbab Al Hammadi, M. Sadique Nawab (2016), Study of Delay Factors in Construction Projects. ,International Advanced Research Journal in Science, Engineering and Technology Vol. 3, Issue 4, 87-93.
13. Salim S. Mulla , Ashish P. Waghmare (2015), Influencing Factors caused for Time & Cost Overruns in Construction Projects in Pune-India & their Remedies. (IJISET - International Journal of Innovative Science, Engineering & Technology, Vol. 2 Issue 10, 622-633.
14. Special Inspector General for Afghanistan Reconstruction (July-2017)
15. Wa'el Alaghbari, Mohd. Razali A. Kadir, Azizah Salim and Ernawati (2007), The significant factors causing delay of building construction projects in Malaysia, Engineering, Construction and Architectural Management Vol. 14 No. 2, 192-206.
16. Youcef J-T. Zidanea, Agnar Johansenb, Bjørn Andersena, Erfan Hoseinia (2015), Time-thieves and bottlenecks in the Norwegian construction Projects, 8th Nordic Conference on Construction Economics and Organization Procedia Economics and Finance 486 – 493.
17. KPMG- Project Management Institue-India, 2013. (Study on project Schedule and Cost overrun) Expedite infrastructure projects.
18. http://economictimes.indiatimes.com/news/economy/infrastructure/94-infrastructure-projects-facing-delay-cost-overrun-government/articleshow/57772669.cms
19. http://article.sapub.org/10.5923.j.ijcem.20150401.03.html

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

VIEWS OF DR. B. R. AMBEDKAR AND PERIYAR ON THE EMANCIPATION OF DEPRIVED PEOPLE

S. Kalaivanan[1] and P. Palanichamy[2]
Research Scholar[1] and Head[2], Department of Political Science, Presidency College, Chennai

ABSTRACT
Periyar and Ambedkar were highly critical of Brahminism and the Brahminical order of 'chaturvarna' (four castes). Surprisingly, their hatred was confined to the system and did not percolate to the individual level. This was evident when Ambedkar married a Brahmin woman and when Periyar maintained and respected his personal friendship with C Rajagopalachari though he fought against him tooth and nail politically and ideologically. On the caste system in India, Periyar dealt harshly with the practice of discrimination and its subordination of the different levels it created in society. But both leaders fought for every oppressed section of society including women from all castes. Similar to the scene in Tamil Nadu where for political parties Periyar has become indispensable, Ambedkar has become a part of national politics. In this paper, an attempt has been made to enlighten the approaches of Periyar and Dr.B.R.Ambedkar on the emancipation of Scheduled Castes and Scheduled Tribes.

INTRODUCTION
Dr.B.R.Ambedkar emphatically made it clear that it was not Buddha who as is often alleged, weakened Hindu society by his gospel of non-violence, but it was Brahmanic theory of Varna Vyavastha that has been responsible for not only for the defeat but for the decay of Hindu society because it was based on suppression, exploitation, and injustice. It was responsible for the enslavement of the motherland and the degradation of her progeny. Periyar was a Dravidian social reformer and politician from India, who founded the Self-Respect Movement and Dravidar Kazhagam (Thomas Pantham, Vrajendra Raj Mehta, 2006). On the caste system in India, Periyar dealt harshly with the practice of discrimination and its subordination of the different levels it created in society. He attacked those who used the system to take advantage of the masses through exploitation and subjugation and fought for the emancipation of Scheduled Castes and Scheduled Tribes through self-respect movement whereas Dr.B.R. Ambedkar considered Buddhism as an alternative for the emancipation of Scheduled Castes and Scheduled Tribes. In this paper, an attempt has been made to enlighten the approaches of Periyar and Dr.B.R.Ambedkar on the emancipation of Scheduled Castes and Scheduled Tribes under the headings Periyar's Views on Caste System, Dr.B.R. Ambedkar's Views on Caste System and Approaches of Periyar and Dr.B.R.Ambedkar on the Emancipation of Scheduled Castes and Scheduled Tribes.

PERIYAR'S VIEWS ON CASTE SYSTEM
Periyar felt that a small number of cunning people created caste distinctions in order to dominate over society. That was why he emphasized the view that we must first develop self-respect and learn to analyze propositions rationally. A self-respecting rationalist will readily realize that caste system has been stifling self-respect and therefore he will strive to get rid of this menace. One of Periyar's quotes on caste was, "a sizable population today remains as Untouchables, and another sizable population exists in the name of Sudras and as serfs, coolies, and menials. Who wants an independence that cannot help change these things? Who wants religion, scriptures, and gods, which cannot bring about a change in this sphere"? (Gopalakrishnan, 1991).

Periyar explained that the caste system in South India is, due to Indo-Aryan influence, linked with the arrival of Brahmins from the north. Ancient Tamil Nadu had a different stratification of society in four or five regions, determined by natural surroundings and adequate means of living (Diehl Anita, 1977). Periyar also mentions that birds, animals, and worms, which are considered to be devoid of rationalism do not create castes or differences of high and low in their own species. But man considered to be a rational being is suffering from these because of religion. He further explains that amongst dogs you do not have a Brahmin dog or a Pariah (untouchable) dog. Among donkeys and monkeys, we also do not find such things. But, amongst men, there is such discrimination (Veeramani, K. 2005). Periyar argued on how a person with an iota of sense or rationalism in could do such things such as giving special treatment only to Brahmins. Some examples practiced were for lower castes to fall at their feet and to even, sometimes, wash their feet and drink that water. Periyar explains that if this is Hindu doctrine and philosophy, such a religion must go. He gives examples of rituals such as christening, housewarming, marriage, and for puberty, that they are for the Brahmin's gain as the only ones to conduct these occasions. We do not respect our knowledge nor are we ashamed of our actions. Are we merely a mass of flesh and bones? Why should anybody get angry when I say all these to make you think over. Who is responsible for our degradation? Is it religion or government? (Veeramani, K. 2005). Gandhi advocated for the caste system in its preservation. On the question of Untouchables being prevented from drawing water from

ISSN 2394 - 7780

wells and entering temples, Gandhi suggested having separate wells and temples made for them instead (Veeramani, K. 2005). Periyar argued against this by demanding the Vedas of Indo-Aryans to be burnt and their deities to be destroyed since it was their creation of the castes and Untouchables. He also went on to state that "it was absurd to quote religion, god, or religious doctrines to render people as lowest castes" (Veeramani, K. 2005).

Periyar argued that the caste system has: "perverted people's ideas about human conduct. The principle of different codes of conduct for each caste based on birth and life, led in accordance with it for centuries, have spoiled the Hindu mentality almost beyond repair and destroyed the idea of uniformity in conduct. Graded inequality has got so much into the Hindu blood that general intelligence is warped and refused to mend even after English education and higher standards of living" (Veeramani, K. 2005). Therefore, the only alternative to fight against the caste system and untouchability is through self-respect movement.

Dr. B. R. AMBEDKAR'S VIEWS ON CASTE SYSTEM

In essence, Dr.Ambedkar's thesis is that in the Hindu society caste and Varna are one and the same thing, for the function of both of them is one and the same. Varna and caste are evil ideas and it is immaterial whether one believes in Varna or caste. Varna is infallible like Shastra which has always eulogized the Varna Dharma. It was, therefore, not possible to remove caste and untouchability without breaking the authority of Varna-dharma as enshrined in the Shastras. Not unless caste goes, as Ambedkar often insisted, will untouchability go, seeing in Gandhi's condonation of caste a plea for preserving the foundations of untouchability. Where is the excuse for untouchability once caste vanishes, he demanded. But Gandhi had a different view and firmly believed that if untouchability goes, caste goes, Gandhi's outlook was more orthodox than Ambedkar's whose mind was built in a modern mold. The Harijan leader, for instance, deprecated what seemed to him the mahatma's excessive insistence on temple entry for the Untouchables. He felt that better educational facilities and economic improvement were the real priorities. Gandhi, however, was working in his often quoted phrase for a change of heart among the caste Hindus. If by throwing their temples open to the Harijans, the caste Hindus acknowledged that untouchability was not sanctioned by the Hindu scriptures, it would he argued, be a big step forward. In Gandhi's thinking, once religious equality was achieved within Hinduism, the political, social and economic lot of the Untouchables would automatically improve (Moraes Frank, 1973). But how could Hinduism, create religious equality when the Shastras had already sown the seeds of religious contempt and hatred between one Varna and another or between one caste and another. To try to remove untouchability without striking at the root of Varna system was simple to treat the outward symptoms of a disease or to draw a line on the surface of the water and to seek the help of the Shastras for the removal of untouchability and caste was again simply to wash mud with mud. So Dr.Ambedkar maintained:

Not to question the authority of the Shastras, to permit the people to believe in their sanctity and their sanctions and to blame them and to criticise them for their acts as being irrational and inhuman is a most incongruous way of carrying on social reform. Reformers working for the removal of untouchability including Mr. Gandhi, do not seem to realise that the acts of the people are merely the results of their beliefs inculcated upon their minds by the Shastras and that people will not change their conduct until they cease to believe in the sanctity of the Shastras on which their conduct is founded.

Gandhiji, however, did not agree with Dr.Ambedkar, for there was a fundamental difference between the two. Like the revivalists, he was convinced that the Varna Dharma implying fourfold division was based on the socialistic principle of society. The Varna Dharma was a testimony to the communal and cooperative order of the Indian society and to the sense of duty (dharma) with which one affixed oneself to live. Gandhiji observed: It establishes certain spheres of action for certain people with certain tendencies. This avoided all unworthy competition, whilst recognizing limitations, the law of Varna admitted of no distinctions of high and low. My conviction is that an ideal social order will only be evolved when the implications of this law are fully understood and given effect to.

The ideal society that could be achieved by following Gandhi's teachings was described by him as Sarvodaya the welfare of all, which on the social side, required the eradication of all forms of social inequality, caste system, and untouchability. It also implied the revival of the ancient principle of the Varna Sharma Dharma. Gandhiji further maintained that Varnashrama Dharma defines man's mission on this earth, for the purpose of holding body and soul together (Young India, 1927).

The Varna Vyavastha, for Gandhiji, is not a human invention, but an immutable law of nature the statement of a tendency that is ever present and at work like Newton's law of gravitation. Just as the law of gravitation existed even before it was discovered so did the law of Varna. It was given to the Hindus to discover that law (Young

ISSN 2394 - 7780

India, 1927). It was, therefore, a fact of nature impossible to be contradicted by anyone. The Varna is the law of man's being and is essentially a part of Hinduism, for it has been its saving. In brief, Varna is the best form of insurance for happiness and for real religious pursuit.

Gandhiji's insistence on the Varna- dharma was unacceptable to Dr.Ambedkar who, by his experience, knew its inherent weaknesses. What could be the psychological effect of caste and untouchability be sided their physical ramifications, only an untouchable knows well. He has a direct empirical closeness to its existence. Despite Gandhiji's sympathy with the untouchables, we doubt whether he knew and experienced the reality of both caste and untouchability. He criticized these evils, like Swami Dayanand, Swami Vivekananda, and Dr. Bhagwan Das, in order to defend and save Varna-Dharma which, in Dr.Ambedkar's view, was the root of them. Gandhiji wanted the entire untouchable community to remain as the part and parcel of Hindu society, not as Hindu, but as Harijan mass, a new name given by him, which is now looked upon with hate and contempt. But Dr.Ambedkar very clearly said:

I feel I should not consent to live in a society which cherishes wrong ideas or a society which has the right ideals will not consent to bring its social life in conformity with those ideals. If I am disgusted with Hindus and Hinduism, it is because I am convinced that they cherish wrong ideals and live a wrong social life. My quarrel with Hindus and Hinduism is not over the imperfections of their social conduct. It is much more fundamental. It is over their ideals.

"The Mahatma to whom they appeal for guidance does not believe in thinking and can, therefore give no guidance which can be said to stand the test of experience. Like a conservative with his reverence for consecrated notions, he is afraid that if he once starts thinking many ideals and institutions to which he clings will be doomed.

It is now quite obvious why the conservative Hindus like Gandhiji and others became the critics of Dr.Ambedkar. To Ambedkar Varna-Dharma was the root of caste and untouchability; but for Gandhiji, it had nothing to do with them. It was the bone of contention. It had nothing to do with them. It was the bone of contention. It attracted people's intellectual attention. This basic contradiction in their approaches, however, made Ambedkar the condemned and Gandhiji the hailed one in the eyes of the conservative Hindus; but in the eyes of the erstwhile Untouchables and the progressive Hindus Ambedkar was acclaimed as the emancipator, whereas Gandhiji as the reactionary.

Broadly speaking the difference between Gandhi's and Ambedkar approach was the result of the one viewing the problem from above and the other from below. While Gandhi wanted the structure to remain the same with its four divisions, Ambedkar wanted the entire structure to change on the basis of equality. Thus, Gandhi devoted his energies to changing the heart of the Hindus and made it clear that there was no place in his programme for the educated politically conscious untouchable fighting for his civil rights.

But Dr.Ambedkar, unlike Gandhiji, fought against the very system which Gandhiji defended unto the last, and the fact is that there has been little change in the condition of the large, amorphous group of people who continue to be exploited by a system, unique only to India, which brands them inferior from birth.

The branding of a person, as an untouchable, the degraded and lowly, from the birth the Hindus society, irrespective of recognizing human potentiality what he could become in future, is really inconceivable to an intellectual's mind in human history. This is not only unfortunate but also disrespect to any civilized human society. How would this pernicious belief and practice be done away with only a charisma could foresee. Only an insane person can recognize the Varna system as the ideal form of society as Dr.Ambedkar said: "Individually it is a folly and a crime. One class and one class alone to be entitled to education and learning. One class and one class alone entitled to Arms. One class and one class alone to trade. One class and one class alone to serve, ninety percent of the Hindus Brahmins, Vaishyas and Shudras could not bear arms under the Hindu social system. How can a country are defended if its army cannot be increased in the hour of its peril.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

PROPERTIES OF S– CENTROHERMITIAN AND S – K CENTROHERMITIAN MATRICES

Dr. N. Elumalai[1], B. Arthi[2] and K. R. Rajasri[3]
Associate Professor[1], Assistant Professor[2] and Student[3], A.V.C. College (Autonomous), Mannampandal

ABSTRACT
The basic concepts and theorems of S- Centohermitian, S -k- Skew Centrohermitian matrices are introduced with examples.

Keywords: Hermitian matrix, Centrohermitian matrix, S- Centrohermitian matrix, and S - k centrohermitian matrix. AMS Subject Classification: 15A09, 15B05, 15B99.

I. INTRODUCTION

Centrosymmetric matrix have practical applications in information theory ,linear system theory,linear estimate theory and numerical analysis (see[1-3]).In this paper we will discuss about the basic properties and theorems on the s-centrohermitian and s-k centrohermitian matrices also we discussed some results on centrohermitian matrices.

Let C^{nxn} denote the set of all nxn complex matrix,A is centorhermitian matrix,A^* is called conjugate transpose of A .Let k be a fixed product of disjoint transposition in S_n and k be the permutation matrix associated with K, V is a permutation matrix with units in the secondary diagonal. Clearly K and V are satisfies the following properties. $K^2 = I$, $K^T = K$,$V^2 = I$, $V^T = V$

II. DEFINITIONS AND THEOREMS

Definition: 1

A Square matrix $A \in C^{nxn}$ is said to be hermitian if $A = A^*$ (ie) $a_{ij} = \overline{a_{ji}}$ $\forall i,j$

Definition: 2

A Square matrix $A \in C^{nxn}$ is said to be centrohermitian matrix if the elements of A satisfy the relation

$a_{ij} = \overline{a_{n-i+1,n-j+1}}$

Theorem: 1

Let $A \in C^{n \times n}$ is S-centrohermitian matrix then $A^S = V A^* V$, where V is a permutation matrix with units in the secondary diagonal.

Proof

$V A^* V = V A^S V$ where $A^* = A^S$

$= A^S V^2$

$= A^S$

Theorem: 2

Let $A \in C^{n \times n}$ is S-centrohermitian matrix then $A^* = V A^S V$

Proof

$V A^S V = V A^* V$

$= V^2 A^* = A^*$

Theorem: 3

If $A \in C^{n \times n}$ is S-centrohermitian matrix then $(AA^*)^S$ and $(A^*A)^S$ is also S- centrohermitian matrix

Proof

A matrix $A \in C^{n \times n}$ is S-centrohermitian matrix if $A^S = V A^* V$

Since A^* is also S-centrohermitian matrix then $A^* = V A^S V$

We will show that , $(AA^*)^S = V (AA^*)^* V$

Now $V (AA^*)^* V = V [V (AA^{*)S} V] V$

ISSN 2394 - 7780

$= V^2 (AA^*)^S V^2$

$= (AA^*)^S$

Similarly $V (A*A)^* V = (A^*A)^S$

Theorem: 4

If $A \in C^{n \times n}$ is S-centrohermitian matrix then $(A + A^*)^S$ is also S- centrohermitian.

Proof

A matrix $A \in C^{n \times n}$ is S-centrohermitian matrix if $A^S = V A^* V$

Since A^* is also S-centrohermitian matrix then $A^* = V A^S V$

We will show that , $(A+A^*)^S = V (A+A^*)^* V$

Now $V (A+A^*)^* V = V [V (A + A^*)^S V] V$

$= V^2 (A + A^*)^S V^2$

$= (A + A^*)^S$

Theorem: 5

If A and B are S-centrohermitian matrices then $A^S B^S$ is also S-centrohermitian matrix.

Proof

Let A and B be S-centrohermitian matrix if $A^S = V A^* V$; $B^S = V B^* V$

Since A^* and B^* is also is S-centrohermitian matrix then $A^* = V A^S V$; $B^* = V B^S V$

We will show that $A^S B^S = V (A^* B^*) V$

Now $V (A^* B^*) V = V(V A^S V \; V B^S V) V$

$= V^2 A^S V^2 B^S V^2$

$= A^S B^S$

Result

Let A_1 and A_2 are S - centrohermitian matrices for the following conditions are holds

[i] $A_1 + A_2$ is also S - centrohermitian matrix

[ii] $A_1 A_2 = A_2 A_1$

[iii] $(A_1 {}^* A_2 \; A_1)$ and $(A_2 {}^* A_1 \; A_2)$ are also S- centrohermitian matrices.

[iv] Adj A_1 also S-centrohermitian matrix.

[v] A_1(Adj A_1) is also S-centrohermitian matrix.

Example: 1

Let $A_1 = \begin{pmatrix} 2 & i \\ -i & 2 \end{pmatrix}$ and $A_2 = \begin{pmatrix} 1 & i \\ -i & 1 \end{pmatrix}$; $V = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$

(i) $V (A_1 A_2)^* V = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 2 & i \\ -i & 2 \end{pmatrix} \begin{pmatrix} 1 & i \\ -i & 1 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 3 & -3i \\ -3i & 3 \end{pmatrix} = (A_1 A_2)^S$.

(ii) $V (A_1^* A_2 \; A_1) \; V = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 2 & i \\ -i & 2 \end{pmatrix} \begin{pmatrix} 1 & i \\ -i & 1 \end{pmatrix} \begin{pmatrix} 2 & i \\ -i & 2 \end{pmatrix} \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} = \begin{pmatrix} 3 & -3i \\ -3i & 3 \end{pmatrix} = (A_1^T \; A_2 \; A_1)^S$

Definition: 3

A matrix $A \in C^{n \times n}$ is S-K centrohermitian matrix if

[i] $A = KV A^* VK$

[ii] $A^* = KVAVK$

[iii] $A^S = VK A^* KV$

[iv] $A^* = VK A^S KV$

Where V is a permutation matrix with units in the secondary diagonal and k is the permutation matrix.

ISSN 2394 - 7780

Theorem: 6

A matrix $A \in C^{n \times n}$ is said to be S-K centrohermitian matrix then

[i] $A^S = KV A^* VK$

[ii] $A^* = KV A^S VK$

[iii] $A^S = VK A^* KV$

[iv] $A^* = VK A^S KV$

Proof

[i] $KV A^* VK = K (V A^* V) K$

$= K (A^S) K$

$= K (A^*)^* K$

$= K A^* K.$

$= A^S$

[ii] $KV A^S VK = K (V A^S V) K$

$= K A^* K.$

$= K A K$

$= A^*$

iii] $VK A^* KV = V (K A^* K.) V$

$= V A V$

$= V A^* V$

$= A^S$

[iv] $VK A^S KV = V (K A^S K.) V$

$= V (K ((A^*)^* K) V$

$= V (K A^* K.) V$

$= V (K A K.) V$

$= V A^* V$

$= A^*$

Theorem: 7

If A_1 and A_2 are S – k - centrohermitian matrices then $A_1 + A_2$ is also S – k centrohermitian matrix.

Proof

Let A_1 and A_2 are S – k - centrohermitian matrices if $A_1 = KV A_1^* VK$; $A_2 = KV A_2^* VK$

We will show that , $A_1 + A_2 = KV (A_1 + A_2)^* VK.$

Now, $KV (A_1 + A_2)^* VK = K [V (A_1 + A_2)^* V] K.$

$= K (A_1 + A_2)^S K.$

$= K (A_1 + A_2)^* K$

$= A_1 + A_2$

Theorem: 8

If A_1 and A_2 are S – k - centrohermitian matrices then $A_1 A_2$ is also S – k centrohermitian matrix.

Proof

ISSN 2394 - 7780

Let A_1 and A_2 are S – k - centrohermitian matrices if $A_1 = KV A_1^* VK$; $A_2 = KV A_2^* VK$

We will show that , $A_1 A_2 = KV (A_1 A_2)^* VK$.

Now, $KV (A_1 A_2)^* VK = K [V (A_1 A_2)^* V] K.$

$= K (A_1 A_2)^S K.$

$= K (A_1 A_2)^* K$

$= A_1 A_2$

Theorem: 9

If $A \in C^{n x n}$ S – k - centrohermitian matrices then AA^* is also S – k centrohermitian matrix.

Proof

Let A be S – k - centrohermitian matrices if $A = KV A^* VK$.

Since A^* is also S-K centrohermitian matrix then $A^* = KV A V K$

We will show that , $AA^* = KV (AA^*)^* V K$

Now $KV (AA^*)^* VK = K [V (AA^*)^* V] K$

$= K (AA^*)^S K$

$= K AA^* K$

$= AA^*$

Theorem: 10

If $A \in C^{n x n}$ S – k - centrohermitian matrices then $A + A^*$ is also S – k centrohermitian matrix.

Proof

Let A is S – k - centrohermitian matrices if $A = KV A^* VK$.

Since A^* is also S-K centrohermitian matrix then $A^* = KV A V K$

We will show that , $A + A^* = KV (A + A^*)^* V K$

Now $KV (A + A^*)^* VK = K [V (A + A^*)^* V] K$

$= K (A + A^*)^S K$

$= K(A + A^*) K$

$= A + A^*$

Result

Let A_1 and A_2 are S – K centrohermitian matrices for the following conditions are holds

[i] $A_1 + A_2$ is also S - Kcentrohermitian matrix

[ii] $A_1 A_2 = A_2 A_1$

[iii] $(A_1^* A_2 A_1)$ and $(A_2^* A_1 A_2)$ are also S- K centrohermitian matrices.

[iv] Adj A_1 also S-K centrohermitian matrix.

[v] A_1(Adj A_1) is also S- K centrohermitian matrix.

REFERENCES

1. Ann Lec. Secondary symmetric and skew symmetric secondary orthogonal matrices; (i) Period, Math Hungary, 7, 63-70(1976).
2. A. Cantoni and P. Butler, Eigenvalues and eigenvectors of symmetric centrosymmetric matrices, Linear Algebra Appl. **13** (1976), 275–288.
3. James R. Weaver, Centrosymmetric (cross-symmetric) matrices, their basic properties, eigenvalues, and eigenvectors, Amer. Math. Monthly **92** (1985), 711–717.

ISSN 2394 - 7780

4. Gunasekaran.K, Mohana.N," k-symmetric Double stochastic , s-symmetric Double stochastic , s-k-symmetric Double stochastic Matrices" International Journal of Engineering Science Invention, Vol 3,Issue 8,(2014) .
5. Hazewinkel, Michiel, ed. (2001), "Symmetric matrix", Encyclopedia of Mathematics, Springer, ISBN 978-1-55608-010-4 .
6. Krishnamoorthy.S, Gunasekaran.K, Mohana.N, " Characterization and Theorems on doubly stochastic matrices" Antartica Journal of Mathematics, 11(5)(2014).
7. Elumalai .N,Rajesh kannan .K " k - Symmetric Circulant, s - Symmetric Circulant and s – k Symmetric Circulant Matrices " Journal of ultra scientist of physical sciences, Vol.28 (6), 322-327 (2016).
8. Hazewainkel, Michiel ed(2001) Hermitian Matrix, Encyclopedia.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

EMPLOYEE ATTACHMENT TO ORGANIZATIONS- MEDIATING ROLE OF WORK PLACE

Dr. Sarita R. Karangutkar
Assistant Professor, VMV Commerce, JMT Arts and JJP Science College, Nagpur

Organizational behaviour (OB) has rapidly become one of the most extensively studied topics in applied psychology and organizational behavior. For many decades, social psychology, especially the social psychology of organizations, has not been interested in the notion of place, focusing preferably on that of identity. Although many social psychology researches on social categories made more or less direct reference to spatial dimensions (community, ethnic group, nation), or recorded their thoughts on the identity of users or residents of specific areas (house, workspace, laboratory), the study of the dynamics that can be established between a person and space has been largely ignored. It was not until the 80s that a connection between social psychology and environmental psychology has occurred, and the concept of place has gradually taken its place in the psycho-social literature.

This paper provides a critical review of four constructs-organizational identification, organizational commitment, occupational identification, and occupational commitment-to advance our understanding about how public sector employees from different occupations may become psychologically attached to their organizations.

Employee involvement in the missions and visions of an organization, and the types of employee commitments towards an organization remain at the center of designing any management strategy. Business leaders have led through the centuries by understanding employee psychology, employee emotions, and employee expectations, and by catering to employee needs in a manner that resulted in a win-win situation for both employer and employee. This situation guaranteed organizational commitment of the employee and in turn helped the organization realize its goals.

The term organizational commitment has become so much a part of management jargon today, that many of us use it every day without clearly visualizing the norms and parameters associated with it. Failure to understand the nature of organizational commitment leads to a lack of understanding of employee attachment to the organization and in turn leads to deficient management strategies that fail to reach their goals. In this article, we will briefly describe the three types of organizational commitment observed and accepted by research.

In simple words, it is the strength of the attachment an employee feels towards an organization. It may be measured by the degree to which an individual is ready to adopt organizational values and goals. It may be measured by the degree to which an employee fulfills his/her job responsibilities. And it may also be measured by behavior observed in the workplace.

In the 90s, Allen and Meyer proposed an analytic view of organizational commitment, splitting it into three definable components – affective, continuance, and normative commitment. Affective commitment is the emotional attachment of an employee to organizational values – how much an employee likes the organization. Continuance commitment is a measure of the willingness of an employee to continue working for the same organization. Normative commitment deals with the feelings of obligation, or sense of responsibility an employee feels towards the organization. Though each component of organizational commitment may affect other components, for the purpose of designing management strategies, it is easier to segment and visualize the three types of organizational commitments in order to bolster them according to need.

AFFECTIVE COMMITMENT TOWARDS AN ORGANIZATION

Affective commitment, or how much an employee actually likes or feels part of an organization has a tremendous effect on employee and organizational performance. High levels of affective commitment in employees will not only affect continuance commitment, but also encourages the employee to try to bring others into the talent pool of the organization. An employee with high levels of affective commitment acts as a brand ambassador of the organization. On the other hand, an employee with high continuance commitment (due to lack of alternatives), but poor affective commitment may harm the organization by criticizing it in his/her social circles.

Affective commitment of an employee is directly proportional to positive work experience. So, management policies and strategies that make proper strength and weakness assessments of employees and create situations and workflows where the maximum number of employees individually experience positive work experiences, help to build a successful organization.

ISSN 2394 - 7780

The great emphasis placed by recruiting managers upon person-organization-fit is also to ensure a high level of affective commitment in employees. Affective commitment is higher when the gap between individual values and organizational values is minimal. However, the congruence between individual values and organizational values in employees can also be built and enhanced by strategies and programs to enhance employee understanding and recognition of organizational values.

CONTINUANCE COMMITMENT

When continuance commitment is not completely driven by affective commitment, it usually boils down to the costs that an employee associates with leaving the organization. Continuance commitment is also driven to a great extent by organizational culture, and when an employee finds an organization to be positive and supportive, he/she will have a higher degree of continuance commitment. Important organizational factors like employee loyalty and employee retention are components of continuance commitment.

NORMATIVE COMMITMENT

Normative commitment builds upon duties and values, and the degree to which an employee stays in an organization out of a sense of obligation. There are times in small companies, when payments are delayed, and the employees have to suffer pay cuts or deferred pay, but they stay on, because they do not want to leave an employer during bad times. Normative commitment comes from a sense of moral duty and the value system of an individual. It can be a result of affective commitment, or an outcome of socialization within the workplace and commitment to co-workers. Normative commitment is higher in organizations that value loyalty and systematically communicate the fact to employees with rewards, incentives and other strategies. Normative commitment in employees is also high where employees regularly see visible examples of the employer being committed to employee well-being.

An employee with greater organizational commitment has a greater chance of contributing to organizational success and will also experience higher levels of job satisfaction. High levels of job satisfaction, in turn, reduces employee turnover and increases the organization’s ability to recruit and retain talent.

CONCLUSION

The relationships found in this study existed regardless of the employee’s age, gender, part-time or full-time status, education, ethnicity, years worked at the company, location, or number of required work ties. Additionally, the emotions employees often experienced did not affect the findings in the study, and neither did whether or not a leadership position was held.

To maintain employee satisfaction, the study suggests that companies should encourage positive employee relationships and lessen negative ones. Doing so can ensure that employees will stick around, as satisfaction leads to higher job satisfaction and feelings of commitment.

To aid employee satisfaction, it suggests managers should:

1. Support informal get-togethers among co-workers.
2. Proactively resolve employee differences early on to decrease the occurrence of negative exchanges in workgroups.
3. Form a climate of open communication to promote trust and relationship building.
4. Adjust the workflow and communication arrangements in workgroups so that workers with negative relationships do not work together.

It also proposes ways for employees to increase their own satisfaction levels:

1. Work on fostering positive connections as opposed to socially withdrawing when negative relationships exist.
2. Stop negative relationships when they begin to form, and before they affect promotion and other growth-related opportunities.
3. Use negative relationships as feedback to bring about personal change.

REFERENCES

- Frederick J. Slack, John N. Orife, and Fred P. Anderson, "Effects of Commitment to Corporate Vision on Employee Satisfaction with Their Organization: An Empirical Study in the United States," International Journal of Management 27, no. 3 (2010)

ISSN 2394 - 7780

- https://www.employmentcrossing.com/employers/article/900006766/The-Three-Types-of-Organizational-Commitment-of-Employees/
- https://www.tandfonline.com/doi/abs/10.1080/095851997341577?journalCode=rijh20
- https://www.cairn.info/revue-internationale-de-psychologie-sociale-2012-3-page-211.htm

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

GREEN MARKETING: AN OVERVIEW

Dr. M. J. Kolhatkar
Assistant Professor, VMV Commerce, JMT Arts & JJP Science College, Nagpur

ABSTRACT
Green marketing incorporates a broad range of activities, one that can be applied to consumer goods, industrial goods and even services. The number of companies developing green products has been rapidly growing and consumers have shown an increasing interest for these products. Governmental regulations relating to environmental marketing are designed to protect consumers in several ways. Green marketing has continued to gain adherents, particularly in light of growing global concern about climate change. This concern has led more companies to advertise their commitment to reduce their climate impacts, and the effect this is having on their products and services.

Keywords: Green Marketing, Business

INTRODUCTION
Green marketing products that are presumed to be environmentally safe. It incorporates a broad range of activities, including product modification, changes to the production process, sustainable packaging, as well as modifying advertising. Yet defining green marketing is not a simple task where several meanings intersect and contradict each other; an example of this will be the existence of varying social, environmental and retail definitions attached to this term. Other similar terms used are environmental marketing and ecological marketing.

Since all product production involves the consumption of energy and the production of some amount of waste, any company could potentially participate in green improvements and marketing. In practice, however, different companies participate in green marketing based on their estimation of its dollar and non-dollar value, with some businesses devoting their mission statements to green practices.

Over the past decades, environmental sustainability has raised at the top of the international political agenda and has been recognized as a key driver of innovation. As a result, the number of companies developing green products has been rapidly growing and consumers have shown an increasing interest for these products. Thus, understanding the main characteristics of green products, identifying factors affecting their price and consumers' willingness to pay more for them, sales channels and promotional tools (the 4Ps of Green Marketing) would be very useful for companies aiming at designing, developing and marketing green products. For this reason, deeply understanding Green Marketing would foster, on the one hand, cleaner production through the development of green products and, on the other hand, sustainable consumption through the successful marketing of them.

Green marketing requires a holistic approach. A company cannot succeed simply by highlighting a green aspect of a particular product, but must demonstrate a commitment on multiple levels, such as in production processes or environmental engagement. Customers are particularly skeptical of many green claims; they know that businesses seek profit and aren't above "green washing" their everyday business to make it appear environmentally friendly when it's of no real concern.

OBJECTIVES OF THE STUDY
- To study the meaning of Green Marketing
- To study the Government regulations of Green Marketing
- To study the Green Marketing and Business

MEANING OF GREEN MARKETING
Green marketing incorporates a broad range of activities, including product modification, changes to the production process, packaging changes, as well as modifying advertising. Yet defining green marketing is not a simple task. Indeed the terminology used in this area has varied, it includes: Green Marketing, Environmental Marketing and Ecological Marketing. While green marketing came into prominence in the late 1980s and early 1990s, a majority of people believe that green marketing refers solely to the promotion or advertising of products with environmental characteristics. Terms like Phosphate Free, Recyclable, Refillable, Ozone Friendly, and Environmentally Friendly are some of the things consumers most often associate with green marketing. While these terms are green marketing claims, in general green marketing is a much broader concept, one that can be applied to consumer goods, industrial goods and even services.

ISSN 2394 - 7780

GOVERNMENT REGULATIONS

As with all marketing related activities, governments want to "protect" consumers and society; this protection has significant green marketing implications. Governmental regulations relating to environmental marketing are designed to protect consumers in several ways,

1. Reduce production of harmful goods or byproducts;
2. Modify consumer and industry's use and/or consumption of harmful goods; or
3. Ensure that all types of consumers have the ability to evaluate the environmental composition of goods.

Governments establish regulations designed to control the amount of hazardous wastes produced by firms. Many by-products of production are controlled through the issuing of various environmental licenses, thus modifying organizational behavior. In some cases governments try to "induce" final consumers to become more responsible. For example, some governments have introduced voluntary curb-side recycling programs, making it easier for consumers to act responsibly. In other cases governments tax individuals who act in an irresponsible fashion. For example in Australia there is a higher gas tax associated with leaded petrol.

GREEN MARKETING AND BUSINESS

The main reasons for the importance businesses' attached to environmental activities are as follow (Ay and Ecevit, 2005)

- They believe that green marketing will enhance opportunities to reach their goals,
- They can use environmental activities to pressure other competitive companies,
- They can cooperate to reduce wastes,
- They realize the cost-friendly benefits such as effective use of resources and recycling activities,
- Participation in environmental activities lifts employees' spirits by demonstrating a sensitivity to environmental issues,
- Participation fulfills the business' obligation to conform to the rules of various institutions, and central and local authorities that are related to the environment,
- And, they participate instate run promotions and comply with state sanctions.

GREEN OPPORTUNITIES

- Use recycled materials in product production
- Use green energy such as wind and geothermal
- Reduce production waste in energy as well as materials
- Use eco-friendly methods, including sustainable and organic agriculture
- Reduce product packaging
- Make products reusable and recyclable

Businesses claiming to be interested in green marketing should conduct the following activities (Kotler et al, 1999)

- Perform a broad assessment of current business performance (and practices?),
- Guarantee the observation, investigation, reporting and measuring of performance improvement,
- Develop feasible environmental policies with clear target and practicing program,
- Follow developments in the overall green agenda,
- Invest in environmental science, technology and education,
- Organize training programs that increase the environmental responsibility of consumers by providing support and assistance, product recall and information supply,
- Organize training programs for suppliers,
- Build bridges with authorities,

ISSN 2394 - 7780

- And contribute to environmental programs that express a commitment to marketing values such as selling benefit instead of product, or protecting not only products but also company values.

Popular Green certifications

- Green Seal
- Ecologo
- SMART certification by MTS
- Energy Star – energy efficiency
- Green-e – renewable energy

CONCLUSION

Consumers and businesses began to make efforts to use resources more effectively that also are in line with their needs. green marketing has continued to gain adherents, particularly in light of growing global concern about climate change. This concern has led more companies to advertise their commitment to reduce their climate impacts, and the effect this is having on their products and services.

Currently, natural resources are not an individual problem but an issue concerning the whole society. Although consumers' environmental concerns increase day by day, it is seen that they are not careful to buy and use environment-friendly products and to dispose of wastes. Businesses should pay more attention to consumers in this manner and help them to meet their needs in a more appropriate way.

REFERENCES

- Ay C, Ecevit Z (2005). Çevre Bilinçli Tüketiciler. Akdeniz İİBF Dergisi.10: 238–263.
- Kotler P, Armstrong G, Saunders J, Wong V (1999). Principles of Marketing. European Edition. 2nd edt, Prentice Hall
- http://jitbm.com/JITBM%2019th%20Volume/2%20Marketing.pdf
- http://www.greenprof.org/wp-content/uploads/2010/06/An-Introduction-to-Green-Marketing.pdf
- http://www.marketing-schools.org/types-of-marketing/green-marketing.html

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

ARE ADOLESCENTS' VOCATIONAL ASPIRATIONS GENDERED?

Shilpa Kapadia
Assistant Professor, Center for Life Long Learning, The Maharaja Sayajirao University of Baroda, Vadodara

ABSTRACT
The study investigated the gender differentials in vocational aspirations of adolescent boys and girls in an urban Indian context. The sample comprised 600 adolescents, 300 boys and 300 girls, 15 to18 years, from the high, middle and low socioeconomic strata studying in English medium schools in Baroda city in Gujarat. Standardized tools were used to assess the study variables. Statistical analyses including t-tests, analysis of variance, and chi-squares were computed. Results revealed significant gender differences in adolescents' vocational aspirations. Implications for adolescent counselling and parental guidance towards enabling adolescents to choose gender-neutral vocational aspirations are outlined.

Keywords: Adolescents, Vocational aspirations, Gender, Sex-role orientation

I. INTRODUCTION
Adolescence is a critical period of development involving myriad developmental changes in an individual. It is generally understood as a period of transition between childhood and adulthood. This transition is greatly influenced by the culture and context in which the adolescent is growing up. The present globalizing context is posing multiple challenges to this transition, in turn affecting the adolescent's development. In the urban Indian context, one of the key developmental tasks of adolescents, especially in middle class families, is to get a good education that will enable entry into a suitable vocation (Kapadia, 2017). The adolescent years of 15 to 18 are crucial as the formative years of life for selection of a vocation for the future. The task of selecting a vocation is rendered more challenging today as adolescents are faced with innumerable options, which in turn influence their aspirations. Adolescence is a developmental stage in which an individual is curious and open to change, and hence adolescents tend to get more influenced by newer elements and options (Arnett, 2002).

'Vocational aspiration' usually means what the individual considers to be the ideal vocation for oneself. Vocational or career aspirations are an individual's point-in-time expressions of educational and occupational goals (Rojewskij, 2005). It refers to the level at which an individual wishes to work. The aspirations can be either ideal or realistic (Rojewskij, 2005). The ideal aspirations reflect career goals given ideal conditions, while realistic aspirations reflect the perceived likelihood for entering a particular education or occupation. During adolescence, the idealistic aspirations are regulated in relation to more realistic and actually achievable expectations (Lee & Rojewskij, 2012).

Aspirations can have lifelong consequences as they are associated with significant later outcomes, such as where one works and lives, and the standard of living one attains (Das, 2016). Several factors affect the career aspirations of an individual: gender, socio-economic status, sex roles and family. One of the most striking characteristics of the vocational world is intense gender segregation. Gender influences behaviours and preferences across a variety of contexts. Men tend to work in some occupations, women in others, and from very early years, boys and girls tend to aspire and prefer different vocations. Gender is considered to be a significant factor in the career choice of individual. The society sets different roles for both genders. Gender denotes the social cultural norms and expectations that govern the lives of both men and women in society. Frome very early years, children are socialized for gender based expectations and roles. Family and other social agencies such as school reinforce gender typed behaviours which in turn influence one's gender identity. During the process of their development from childhood to adolescence, individuals are exposed to various types of sex-differentiated activities through which they learn gender socialization. Such gender socialization during very early years of the girls' lives, compels them to prefer those careers that conform to the cultural stereotypes of female occupations (Phukan & Saikia, 2017).

Girls consistently have higher aspirations than boys (Schoon, Martin, & Ross, 2007) and concern has been noted recently about the low aspirations of males from working-class backgrounds. The value of education is increasing across social classes, although it is greater in middle class families as they perceive educational achievement as a route to upward mobility (Kapadia, 2017). Recent trends indicate that parents tend to have higher aspirations for their daughters than their sons, although this is a reversal of the situation in previous generations. Traditional families who want their daughters to marry at younger ages are likely to hinder educational and occupational aspirations (Gutman & Akerman, 2008).

ISSN 2394 - 7780

The career choice process occurs throughout the life cycle as individuals make a series of decisions that have occupational consequences. However, as noted above, gender differences in the selection of activities that constrain occupational choices often occur earlier in the life cycle. This is especially evident in the case of professions like engineering, where a college degree in the field is necessary to pursue a career. Since gender differences in the selection of activities relevant to careers in these fields emerge as early as high school, it is important to examine decisions made at this stage in the life cycle (Correl, 2001).

The study addressed the psychosocial variables gender and sex roles to determine their role in adolescent students' vocational aspirations.

OBJECTIVES

1. To find out the gender differences in the vocational aspirations of adolescent boys and girls.
2. To find out the effect of sex roles on the vocational aspirations of adolescent boys and girls.

HYPOTHESES

Based on the trends indicated in the review of literature the following hypotheses were generated:

1. There will be significant differences between the vocational aspirations of adolescent boys and girls.
2. There will be significant differences between the vocational aspirations of adolescent boys and girls belonging to different sex role categories.

II. METHOD

Sample

In the present study the focus was on adolescents from higher secondary standards, as the last three years of school are very important for the selection of a vocation and happen to be terminal points in the Indian education system.

A stratified random sample was drawn. It comprised of 600 adolescents, equally distributed by gender social class, and subject stream (see Figure 1 below). All the subjects were residents of Baroda city and came from the higher secondary sections (i.e., 10th, 11th, and 12th standards) of English medium schools. Five English medium schools were selected on the basis of the following criteria:

1. The medium of instruction was English.
2. All the schools were co-educational. All the schools either had science or arts/commerce stream, or both the streams. The schools were selected from various areas of the city so that students from all the three social classes, namely, high, middle and low would be available.

The sampling design is presented in Figure 1.

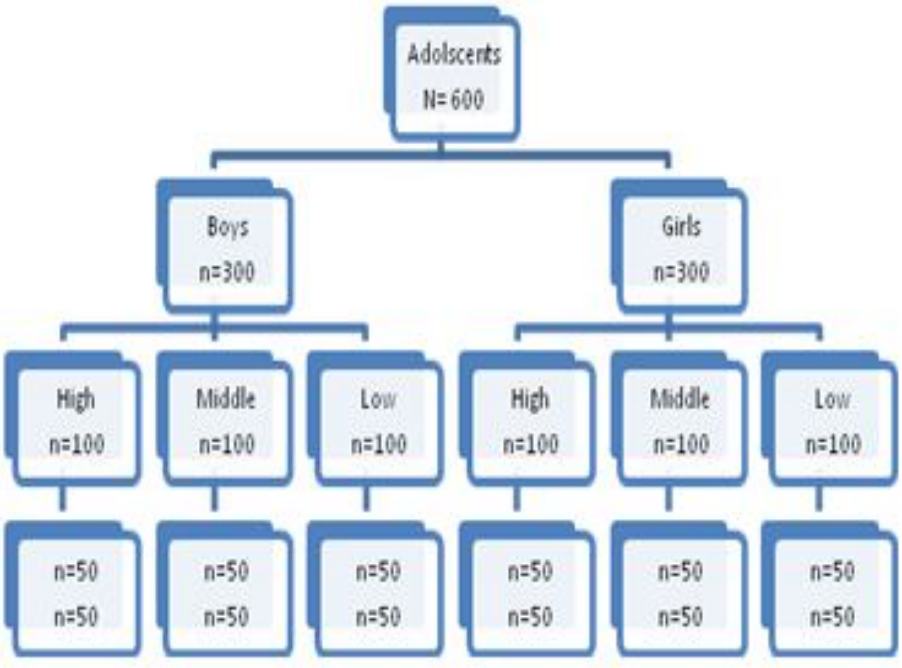


Figure-1: Sampling design

ISSN 2394 - 7780

Study Variables

Independent variables

The two independent variables of the study are described below:

1. *Gender*: It encompasses the social-cultural differences between the two sexes, which affects the development of specific psychological dispositions and attitudes.
2. *Sex/Gender roles*: refers to behaviours viewed as acceptable for each sex according to societal norms. The terms sex roles and gender roles are often used interchangeably to denote a repertoire of emotions, attitudes, behaviours, and perceptions that are commonly associated more with one sex than with the other (Levesque, 2011). Essentially the concept denotes the gender stereotypical traits and behaviours that persons use to describe themselves and which influence their dispositions.

Dependent variable

Vocational aspirations: Vocational aspirations are the thoughts, feelings, fantasies and goals that people have about their work, that affect their motivation and decision making with respect to their occupational choice and subsequent participation in their occupation. Rojewski (2005) defined occupational aspirations as "an individual's expressed career related goals or choices".

Assessment Measures

The following assessment measures were used

1. *Gender role/Sex role inventory.* The gender role/sex role inventory is a Likert type scale (Patel & Gon, 1989). It contains 32 personality characteristics. Of these, 16 are stereotypically masculine (e.g., adventurous, independent) and 16 are stereotypically feminine (e.g., adaptable, sensitive to others' needs). Based on the responses, the individuals are categorized into one of the following four sex roles based on the median split of the masculinity and femininity scores: (1) androgynous, (2) masculine, (3) feminine, and (4) undifferentiated.
2. *Occupational aspiration scale.* A scale including a range of currently prevalent occupations in India was developed based on the structure of Haller and Miller's (1968) scale for measuring the Level of Occupational Aspiration.

Procedure of Data Collection

The present study was conducted in the following two phases:

Phase I: Principals of different schools were contacted personally and the time and place for administering the tools was scheduled according to the convenience of the classroom teachers.

Phase II: For the purpose of the data collection, the investigator met the students in small groups in their classrooms. The booklet containing the measures (sex role inventory and the occupational aspiration scale) was distributed among the participants after the initial rapport was established. On completion the booklets, were closely scrutinised. Incomplete, wrongly filled or copied answers were eliminated from the data set.

Plan of Analysis

The statistical techniques used to analyze the data are stated below:

- t - tests were computed to find out any significant differences in vocational aspirations according to gender
- One way Analyses of Variance (ANOVA) was computed to find out the differences in vocational aspirations according to sex roles.
- Chi - square and contingency coefficients were computed to find out the relationship between study stream (i.e., arts/commerce and science) and sex roles (i.e., androgynous, masculine, feminine and undifferentiated).

III. RESULTS AND DISCUSSION

The t - test revealed a significant gender difference in vocational aspirations ($t = 3.55$, $df = 598$, $p < .05$) with aspirations of girls being lower than those of boys (girls $\bar{X} = 47.39$, 10.527; boys $\bar{X}=50.45$, 10.614). Although Indian parents today are encouraging of girls' education leading to an occupation, the cultural-gender goals of marriage and child bearing tend to supersede these aspects. Girls and women are expected to give priority to their family related roles and goals. This intervenes in their vocational aspirations.

Tables 1 and 2 below present the oneway ANOVA results, and the means and standard deviations for occupational aspirations and sex roles.

ISSN 2394 - 7780

Table-1: One-Way ANOVA of Occupational Aspirations and Sex Roles

Source	DF	Sum of Squares	Mean Squares	F Ratio
Between Groups	3	676.8057	225.6019	1.9901
Within Groups	595	67449.0307	113.3597	-
Total	598	68125.8364	-	-

* $p < .05$

Table-2: Means and Standard Deviations of Occupational Aspirations and Sex Roles

Sex Roles	Count	Mean	SD
Undifferentiated	178	48.8820	10.3984
Feminine	117	46.9829	10.4848
Masculine	120	50.1750	11.2180
Androgynous	184	49.4348	10.6055
Total	599	48.9399	10.6735

The result in Table 1 indicates a non-significant F ratio for occupational aspirations of adolescents with different sex role orientations. However, the mean trends in Table 2 show that adolescents with a masculine and androgynous orientation have higher aspirations ($\bar{X}$s = 50.17 and 49.43, respectively). Adolescents with a feminine sex role orientation have the lowest mean score ($\bar{X}$ = 46.98), and those with a masculine sex role orientation have the highest mean score ($\bar{X}$ = 50.17). The non-significant differences are indicative of changing social perceptions and expectations regarding gender roles. Another probable reason for this finding could be the possibility of a discrepancy between one's wishes and actually choosing a vocation. In the globalizing context, adolescents are exposed to a wide variety of occupational choices, which in turn gives rise to aspirations for particular vocations. In due course however, they may realize that it is unrealistic to aspire for certain vocations and hence are likely to adjust their aspirations to align with the realities of their contexts, which urge them to opt for gender-typed occupations. The primacy of family in the Indian context also plays a significant role and it is common for adolescents to adjust their aspirations in tune with the view of their family.

Table 3 below depicts the proportions of choices of study stream by sex-role orientation.

Table-3: Proportions of Study Stream by Sex Roles

Stream	Undifferentiated	Feminine	Masculine	Androgynous	Total %
Arts/Commerce	.522	.521	.333	.571	.499%
Science	.478	.479	.667	.429	.501%

x^2 (599) = 17.58, df = 3, $p < .001$

Adolescents from the science stream show a masculine sex role orientation (66.7%), whereas, adolescents from the arts/commerce stream showed an androgynous orientation. The contingency coefficient C was significant (C = .169, $p < .01$), thereby revealing a close association between educational stream and sex roles.

The present globalizing context offers a rich array of choices in educational vocation. Yet, the traditional prestige attached to STEM fields persists. Notwithstanding one's own interest and aptitude, boys are inclined to and are encouraged by family members to opt for science, engineering or medicine. Success in these fields involves a single-minded career focus and a certain kind of competence, which fits well with the masculine sex-role orientation. Hence, adolescent girls as well as boys having masculine traits lean toward science. Adolescents with an androgynous orientation have opted for arts/commerce fields, which also indicate the flexibility in vocational aspirations.

IV. CONCLUSION AND IMPLICATIONS

Gender and sex roles are pervasive variables that influence much of one's life goals. Although the Indian society is advancing toward more progressive attitudes and views, the traditional gender-typed orientations continue. On the one hand parents want to pursue modernity and hence they encourage their girls to study well and also take up an occupation. However, the career trajectory cannot be pursued at the cost of fulfilling their traditional gender roles of marriage and childbearing. These aspects need to be given priority and the vocational aspirations then need to be adjusted around these core gender goals. Boys too are constrained by gender stereotypes. Many parent-adolescent conflicts arise from disagreements in this domain (Kapadia, 2017).

One of the major implications of the present study would be to inform adolescent girls and boys of the range and nature of vocations available to them, including the pros and cons of different types of vocations. Both, girls and boys can be encouraged to aspire for vocations that are stereotypically dominated by the other gender, if it fits with their interest and aptitude. For instance, if a boy has the aptitude for becoming a classical dancer,

ISSN 2394 - 7780

he may be encouraged to pursue this vocation. Parents too need to be counselled regarding giving their adolescents the freedom to choose a vocation that is of interest to the adolescent. Given our social structure, not only the family but also other relatives, neighbours and friends intervene with advice on what is the "right" career for a boy or a girl. Although the advice is well-meaning, it often puts pressure on the adolescent who then makes a choice with which he or she may not be comfortable. In future then one is faced with failure and perhaps even dire consequences such as suicide for not being able to honour the parents' and family's expectations. Parents need to understand their adolescents better and engage in active conversation to understand the adolescent's perspective and offer the necessary support.

The vision of the National Youth Policy 2014 is to "empower youth to achieve their full potential, and through them enable India to find its rightful place in the community of nations" (National Youth Policy, 2014). One priority is to create a productive workforce through education, entrepreneurship, and employment and skill development. If India is to achieve this objective, we need to create support and space for adolescents to share their aspirations and counsel them to opt for vocations that meet with their interest and aptitude, irrespective of gender stereotypes. In the long term, this will enable our youth to lead more fulfilling lives and contribute to a more gender equitable society.

REFERENCES

- Arnett, J. J. (2002). The Psychology of Globalization. *American Psychologist*, *57*(10), 774-83. http://doi.org/10.1037//0003-066X.57.10.774
- Correl, S.J. (2001). Gender and The Career Choice Process: The Role of Biased Self Assessments. *American Journal of Sociology*, 106 (6): 1691-1730
- Das, A., & Bhagabati, N. (2016). A Study on Occupational Aspiration of Higher Secondary Girls Students in Nagaon District. *International Journal of Advanced Research in Education and Technology*, 3(2): 56-58.
- Gutman, L. M., & Akerman R. (2008). Determinants of Aspirations. London: Centre for Research on the Wider Benefits of Learning. Institute of Education
- Haller, A. O., & Miller, I.W. (1968). The Occupational Aspiration Scale: Theory, Structure and Correlates. East Lansing: Michigan Agricultural Experiment Station Bulletin 288.
- Kapadia, S. (2017). Adolescence in Urban India: Cultural Construction in a Society in Transition. New Delhi: Springer.
- Lee, I. H., & Rojewskij, J.W. (2012). Development of Occupational Aspirations on Early Korean Adolescents: A Multiple-Group Latent Curve Model Analysis. *International Journal for Educational and Vocational Guidance 12:* 189-210.
- National Youth Policy (2014). Ministry of Youth Affairs and Sports, Government of India, New Delhi.
- Patel, R., & Gon, M. (1989). Sex Role Inventory. Unpublished doctoral dissertation, The Maharaja Sayajirao University of Baroda, Baroda.
- Phukan, D., & Saikia, J. (2017). Parental Influences, Gender Socialization and Career Aspirations of Girl Students: A Study in the Girls' College of Upper Assam. *International Journal of Research in Humanities and Social Studie*s, 4(2): 31-37.
- Rojewski, J. W. (2005). Occupational Aspirations: Constructs, Meanings, And Application. In S. D. Brown & R.W. Lent (Eds.), *Career development and counseling: Putting theory and research to work*, 131-154. Hoboken, New Jersey: John Wiley.
- Schoon, I., Martin, P. and Ross, A. (2007) Career Transitions in Times of Social Change: His and Her Story. *Journal of Vocational Behavior*, 70: 78-96.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

THE GARLAND KEEPERS: A PEEP INTO 'A STATE OF EMERGENCY'

Dr. Shashi Goyal
Associate Professor, Department of English, Vaish Mahila Mahavidyalya, Rohtak

ABSTRACT
India witnessed the rule of Emergency, notorious for its excesses. The topicality of Indian National Emergency of those dark years is used as the background by Manohar Malgonkar in The Garland Keepers. It shows how a state apparatus armed with emergency powers becomes perverted and terrorises the very people it is meant to serve.

Keywords: Emergency, Politics, Communal, Constitutional, Privileged

Manohar Malgonkar has set his narrative in the recent political and historical milieu weaving significant political happenings therein. He recreats the historic sepoy mutiny of 1857 (The Devil's Wind), the Jallianwala Bagh massacre on ' a hot April day in the year 1919' (A Bend in The Ganges p. 94), the quit India movement , the national movement for freedom, the politics within the princely states with all its complex nuances, the Second World War in its fiery phase, the communal riots in the wake of partition climaxed by the creation of two states. Even in the post independence period the chronicling is invested with pertinent political nuances. The Garland Keepers (1986) is the sensitive artist's response to the iron fisted rule of abhorrent Emergency. It shows how a state apparatus armed with emergency powers becomes perverted and terrorises the very people it is meant to serve.

India witnessed the rule of Emergency, notorious for its excesses through the press censorship, MISA, extra-constitutional authority of a caucus of sycophants etc. The topicality of Indian National Emergency of those dark years is used as the background by Malgonkar in The Garland Keepers. Malgonkar understandably endeavors to distance the novel from this historical background when he asserts in the "Author's note", "the Emergency which forms the background for this story is not the 1975-77 Emergency, but a fictional one, supposedly imposed some year later."1 The novel depicts how during this Emergency, the entire power set -up can be used to serve the political ends of the top leaders. Anybody can be arrested, terminated or promoted depending on his compliance. "Seniority means nothing- not even for the highest judges in the land" (p.44). "An Under Secretary in the Health Ministry who had pointed out in his noting on the file that the land had been earmarked for another purpose was summarily dismissed and was later sent to prison on a charge of being anti – government" (p.57). While compliant officers are awarded with promotions, the duty bound officers are transferred and arrested on false charge under MISA. It is against this background that the honest officials put their careers and lives on the line in a deadly duel of wits and bullets with a clique of official assassins in a desperate attempt to combat the madness gripping the nation.

Malgonkar projects the moral degeneration of people during this period through the antagonists like Swami Rajguru, the 'head priest', his chief disciple Ekanti Ma, the Great Leader, who is left to be invisible, his son Kalas Kak, the most dreaded men, Kaul and Pashupal, known as the Owl and Pussycat, rhyming with their names, who enjoy a unique status and run the affairs of the country by transmitting all the orders of the Great Leader to others on phone without keeping anything on record. The title of the novel is taken from the epigraph to the novel.

The principle deity in the temple may be garlanded only by the head priest or his deputy, a monarch only by those in the first circle of nobility. When garlands are removed, they are passed on to the most favoured among the courtiers, whose privilege it is to keep them. the etiquette of flowers (n.pag).

The title ironically makes the antagonist, the priest, one whose sole prerogative is to offer worship to the deity.

The antagonist is Swami Rajguru, an octogenarian yoga teacher who rose to be the spiritual guide of the Great Leader and the closest friend of his son Kalas Kak- the dynastic heir, who takes active interest in the administration of the country. Swami Rajguru's name has become a household word in the capital, a living legend. Rajguru, in fact, is a notorious criminal, a Kashmiri Dogra who joins Pakistan army soon after partition. This charming young Naik Fida Ali escapes from the humiliation of homosexuality by killing his tormentors. He learns Yoga, learns English and lands in the capital and becomes an important member of the caucus. He impresses upon the Great Leader that he is over eighty but looks young due to the rigours of yoga and spiritual energy.

ISSN 2394 - 7780

Rajguru's highly inaccessible and guarded ashram, built in "a six-acre wooded plot containing half a dozen snow-white bungalows of different sizes, designed by the German architect, Rainer Storch" (p.56) becomes a type of operational headquarter to the drop-out Brigade of young men, ever ready for mobilization to support any pet project of Kalas Kak. Rajguru preached salvation through the full enjoyment of sensual pleasures as he has immense faith in the metaphysics of coitus.

"…. Salvation can be achieved through the fullest enjoyment of the senses,"... "For mankind, it is the natural path, the ordained path. Kama, carnal lust, must be recognized as a divine force ,the light all the sciences, the essence of all religion, a force to be brought to perfection through Yoga"(p.152).

Swami Rajguru is a highly privileged person and favour done to him by officials would not go unrewarded and that anyone found unco-operative be shown no mercy. He could make paupers into princes and aristocrats into abdominal beggers, working these miracles through political maneuvering. He has perfected the art of raising enormous funds:

Vast sums were collected from traders, steel merchants and sugar merchants, from oil, cloth, grain, cement and fertilizer merchants, by the simple expedient of putting restrictions on sales and then removing the restrictions when the ransom was paid (p.102).

The bigger industrialists readily give whatever is asked for in the name of party fund but demand special favours in return. A few industrialists who do not go along with the trend are singled out for chastisement or worse. Crores of rupees have been collected as donations to Mukti Bahini and sent to Mauritius and then converted into foreign currency. "The money was laundered through financiers in Mauritius by paying them handsome discounts; then brought back to India in the form of donations, or gifts" (p.142). The inconvenient witnesses in this nefarious game were eliminated through arranged accidents.

Rajguru uses official channels for personal gains. Connived by the Great Leader, he could order the magistrates to issue signed, blank arrest warrants for use against his opponents. Swami Rajguru had a microfilm library of the secret dossiers of the men and women prominent in the nation's life to make Machiavellian use of others' weaknesses by him.

It was a brain child of Shamkant Sen known as Uncle Sham, a Junior Minister, who had channelized the resources of his ministry by giving his star agents a new task; to collect all the scandals they could about the political enemies as "power does not come out of the barrel of a gun," "…in democracies it flows from your knowledge of your rivals' secrets" (p.95). Udamrao Maney, who was one of the henchmen of Swami Rajguru, held temporary charge of Uncle Sham's portfolio and got the secret files microfilmed and took the spools personally to Rajguru in two large Samsonite suitcases.

Other convenient tools in the 'no holds barred' game for power were B.G. Kaul and R.A. Pashupat, the uncle and nephew team that had rocketed into prominence since the Emergency had been declared. They were accepted as the 'surrogate voice of a supreme authority" (p.23) unchallengeable because no one could reach beyond them to find out what the Great Leader at the top of the pyramid really wanted done. They administered the country by transmitting orders of the Great Leader orally, leaving no trace of any recorded evidence in its report about the modus operandi:

It was they who summoned Cabinet ministers and kept them cooling their heels, they who chastised the senior most civil servants as though they were erring schoolboys, made transfers, ordered dismissals, arrests, held back or cancelled trains or air services(p.23).

Swami Rajguru, aware of all-pervasive powers enjoyed by them utilizes them to his advantage, as he points out:

I know that nobody, but nobody, can afford to say no to that pair. I have seen ministers quaking, and a Lieutenant Governor standing on his head to do their bidding. Surely, even the toughest general will come running with his tail between his legs when he is told that his promotion would be withheld or that his son would never pass his university examination (p.155).

Malgonkar's antagonists thus stand for values which are the very anti-thesis of those his protagonists espouse. The degenerate beings in the dictatorial Emergency regime are characterized by unscrupulousness, corruption, lack of commitment to any ideal other than self-interest, sycophancy and the like. Malgonkar's fond belief that all is not lost, despite the evil machinations of sick minds like those of the Great Leader and of the caucus, comes out through the activities of honest officials like Om Parkash Agarwal, Visram Lal, A.B.Chopra, torture and humiliation notwithstanding. These serve as the protagonists espousing the novelist's code-values.

ISSN 2394 - 7780

1. Manohar Malgonkar, The Garland Keepers, 'Author's Note' (New Delhi: Vision Books, 1986). All subsequent references to this novel are from this edition of the novel and the page numbers are given in brackets.
2. See M.K. Bhatnager, Political Consciousness in the Indian English Writing, (New Delhi: Bahri Publications, 1991).
3. G.S. Amar, Manohar Malgonkar. (New Delhi: Arnold Heinmann; 1973).

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

A COMPARATIVE ANALYSIS OF SOLUTION METHODS OF TSP AND CASE OF MAXIMIZATION IN ASSIGNMENT PROBLEM

Dr. P. K. Dwivedi[1] and Dr. Hamanshu Pandey[2]
Professor[1], Ambalika Institute of Management & Technology, Lucknow
Professor[2], Department of Mathematics & Statistics, DDU Gorakhpur University, Gorakhpur

ABSTRACT
In this paper our aim is to find the solution method of TSP and maximization case of AP by matrix one's division method & further taken numerical examples to show proposed method is either providing same solution as previous methods or better optimum solution.

Keywords: Assignment Problem, Linear Programming, Matrix one's division.

1. INTRODUCTION

Assuming a salesman has to visit n cities. He wishes to start from a particular city, visit each city once, and then return to his starting point. His objective is to select the sequence in which the cities are visited in such a way that his total traveling time is minimized. To visit two cities, there is no choice, to visit 3 cities, we have 2! possible roots. In general to visit n cities, there are n-1! possible routes. [1] [2] [3] [4] [14] [15]

Mathematical formulation of TSP is given by if C_{ij} be the distance or time or cost of going from city I to city j, the decision variable X_{ij} if the salesman travels from city i to city j, otherwise zero. Our objective is to minimize the travelling time & subject to addition that X_{ij} is so chosen that no city is visited twice before all the cities are visited. In particular going from i to i is not permitted. It means that $C_{ij} = \infty$, When i=j

$$\text{i.e.} \qquad Z = \sum_{i=1}^{n} \sum_{j=1}^{n}$$

S. T.

$$\sum_{j=1}^{n} x_{ij} = 1, \; i = 2 \ldots\ldots n$$

$$\sum_{i=1}^{n} x_{ij} = 1, \; j = 2 \ldots\ldots n$$

In TSP we can not choose the element along diagonal and it can be avoided by filling the diagonal with infinity large elements. It is very similar to assignment problem except that in the former case. There is an additional restriction that X_{ij} is so chosen that, no city is visited twice before the tour of all the cities are completed. [14]

2. MAXIMIZATION IN ASSIGNMENT PROBLEM

In this case our objective is to maximize the profit. To solve this problem first we convert the profit matrix into loss matrix by subtracting all the elements of cost matrix by highest element of matrix & then apply the matrix division method to find out, the solution. [1] [2] [6] [14]

3. MATRIX ONE'S DIVISION METHOD

This section present a new method to solve Assignment Problem, which is different from usual Hungarian Method named Matrix one's Division method. It is based on creating some ones in the Assignment matrix and then try to find complete assignment in terms of ones [11] [12] [13] [14] [15]. Consider the Assignment matrix. When C_{ij} is the cost of effectiveness of assigning i^{th} job to j^{th} Matrix.

$$\begin{array}{c} \\ 1 \\ 2 \\ 3 \\ \\ n \end{array} \begin{array}{c} \begin{array}{cccc} 1 & 2 & 3 \ldots\ldots\ldots\ldots & n \end{array} \\ \begin{bmatrix} C_{11} & C_{12} & C_{13} \ldots\ldots. & C_{1n} \\ C_{21} & C_{22} & C_{23} \ldots\ldots\ldots & C_{2n} \\ \ldots\ldots & \ldots\ldots & \ldots\ldots & \ldots\ldots \\ C_{n1} & C_{n2} & C_{n3} \ldots\ldots. & C_{nn} \end{bmatrix} \end{array}$$

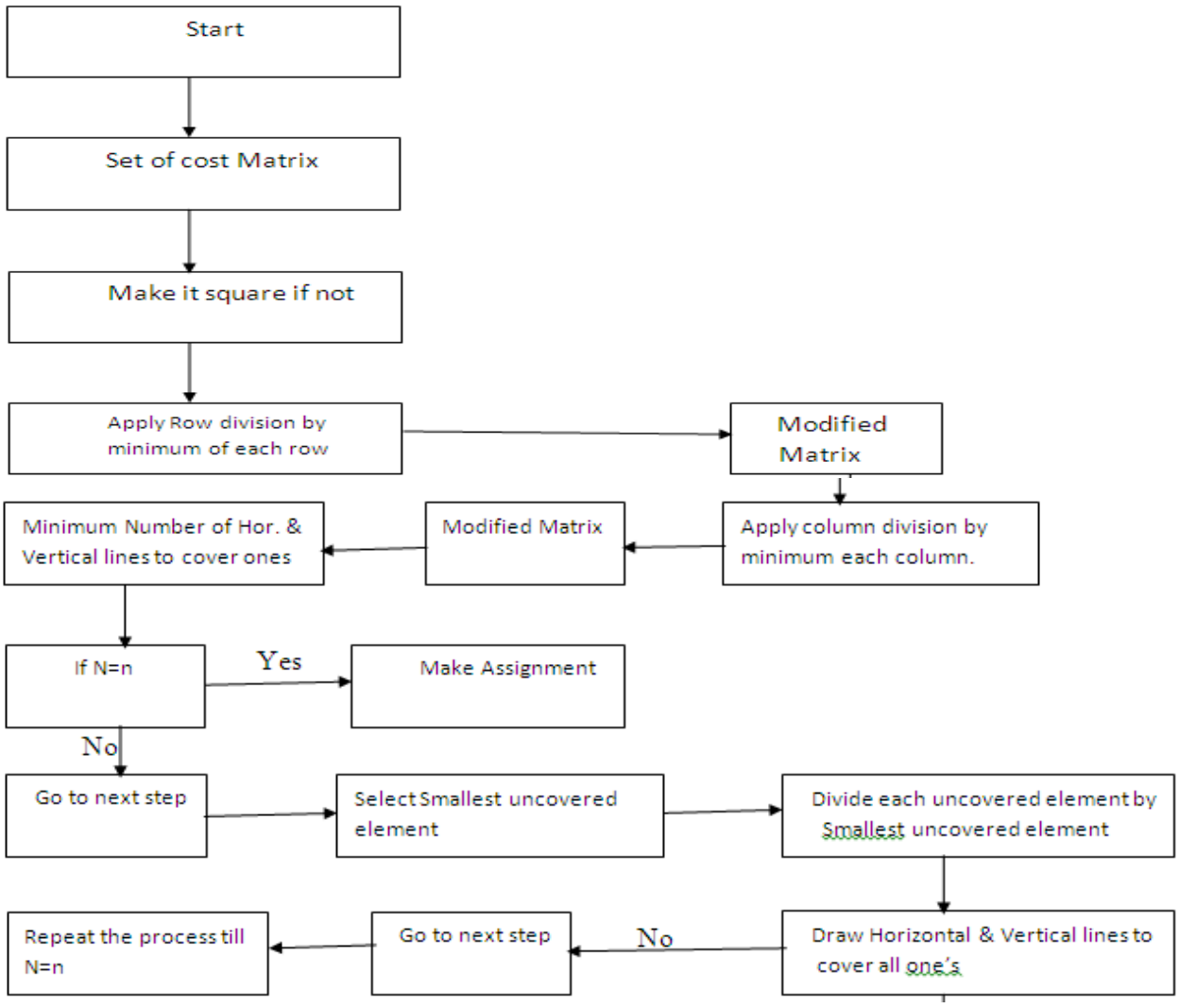
The new algorithm is given below

1. Prepare a cost matrix. If cost matrix is not square then make it square by adding dummy row or dummy column with zero cost.
2. Find the minimum element of each row in the assignment matrix and write it on the right hand side of matrix. Then divide each element of ith row by minimum element and get at least one ones in each row also find modified matrix.

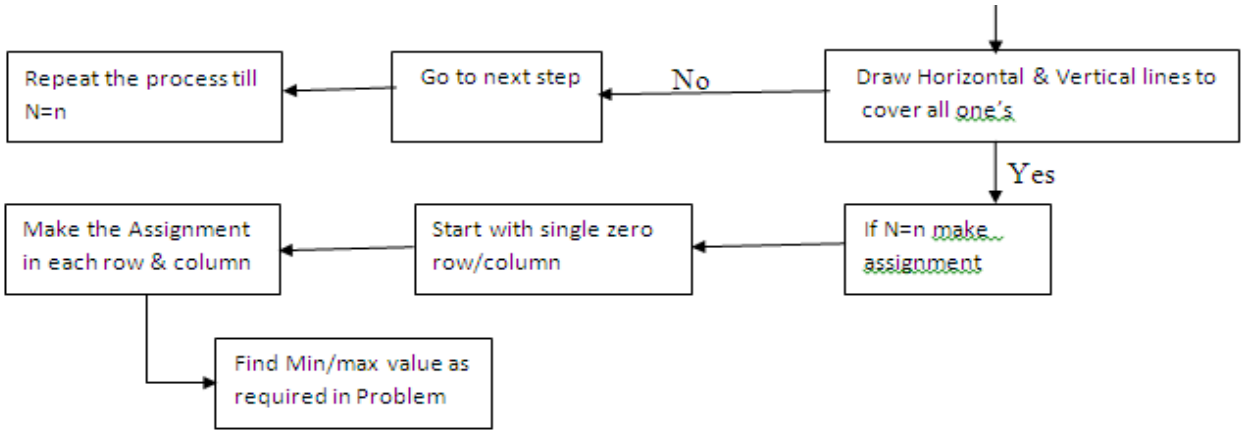
ISSN 2394 - 7780

3. Find the minimum element of each column in modified matrix and write it below the j^{th} column. Then divide each element of j^{th} column by minimum element and get at least one ones in each column. Make assignment in terms of ones. If no feasible assignment can be achieved in step 1 & 2, then we go to next step.
4. Draw the minimum number of horizontal & vertical lines to cover all the ones of the matrix. If the number of lines less than n (order of matrix) then complete assignment is not possible. Further go to next step.
5. Select the smallest uncovered element in resulting matrix and divide all the uncovered element by smallest element and get new ones.
6. Draw number of horizontal & vertical lines to cover all the ones. If number of drawn lines are equal to n (order of matrix), then find the complete Assignment otherwise go to step 3 & 4 and repeat the process to get the minimum number of drawn lines & order of matrix are equal.
7. To make the assignments examine the rows with single one. If row wise single one is found then circle it and cross all one's in corresponding column. Continue the process until all the one's examined. We can repeat the same process for column also.
8. Repeat the above steps successively until one of the following situation arises.
   (i) If no unmarked one is left, then the process ends.
   (ii) If these lies more than one unmarked one's in any column or row, then circle one of the unmarked one's arbitrarily and mark a cross on remaining one's of corresponding column. Repeat the process until no unmarked one is left.
9. Exactly one marked circle 'one' in each row & each column of the matrix is obtained. The optimum assignment can be made.

Flow chart for Matrix one's Division Method-



ISSN 2394 - 7780



NUMERICAL EXAMPLE'S BY MATRIX ONE'S DIVISION METHOD

4. Example- Consider the following Travelling Salesman Problem

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} \infty & 4 & 10 & 14 & 2 \\ 12 & \infty & 6 & 10 & 4 \\ 16 & 14 & \infty & 8 & 14 \\ 24 & 8 & 12 & \infty & 10 \\ 2 & 6 & 4 & 16 & \infty \end{bmatrix} \end{array}$$

1. Find minimum element of each row in assignment matrix and divide each element of each row by minimum element and find the revised matrix.

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} \infty & 2 & 5 & 7 & 1 \\ 3 & \infty & \frac{3}{2} & \frac{5}{2} & 1 \\ 2 & \frac{14}{8} & \infty & 1 & \frac{14}{8} \\ 3 & 1 & \frac{3}{2} & \infty & \frac{5}{4} \\ 1 & 3 & 2 & 8 & \infty \end{bmatrix} \end{array}$$

2. Find minimum element of each column in above matrix and divide all elements of each column by minimum element of each column and find the next resulting matrix.

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} \infty & 2 & \frac{10}{3} & 7 & 1 \\ 3 & \infty & 1 & \frac{5}{2} & 1 \\ 2 & \frac{14}{8} & \infty & 1 & \frac{14}{8} \\ 3 & 1 & 1 & \infty & \frac{5}{4} \\ 1 & 3 & \frac{4}{3} & 8 & \infty \end{bmatrix} \end{array}$$

3. Draw minimum number of horizontal & vertical lines to cover all the ones we have

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} \infty & 2 & \frac{10}{3} & 7 & 1 \\ 3 & \infty & 1 & \frac{5}{2} & 1 \\ 2 & \frac{14}{8} & \infty & 1 & \frac{14}{8} \\ 3 & 1 & 1 & \infty & \frac{5}{4} \\ 1 & 3 & \frac{4}{3} & 8 & \infty \end{bmatrix} \end{array}$$

Here N=n=5, we can make the Assignment

A→E, B→C, C→D, D→B, E→A.

ISSN 2394 - 7780

As the salesman should go from A to E & then come back to A. without going BCD, which contradicting the fact that no city is visited twice before all the cities are visited. Hence we can obtain the next solution by bringing the next minimum element & continue the process in next step, we have

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ F \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} \infty & 2 & \frac{10}{3} & 7 & 1 \\ 3 & \infty & 1 & \frac{5}{2} & 1 \\ 2 & \frac{14}{8} & \infty & 1 & \frac{14}{8} \\ 3 & 1 & 1 & \infty & \frac{5}{4} \\ 1 & 3 & \frac{4}{3} & 8 & \infty \end{bmatrix} \end{array}$$

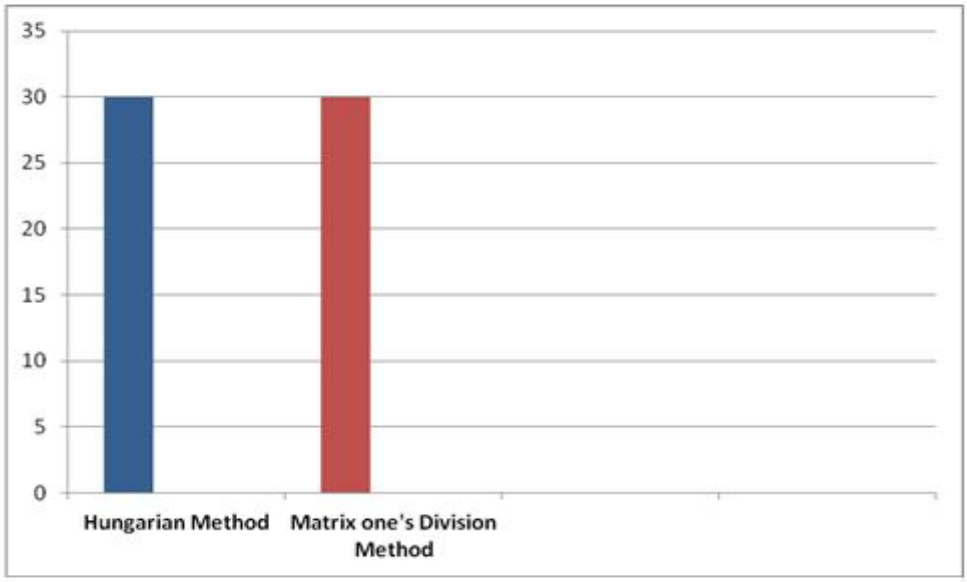
Now the required path is

A-B-C-D-E-A

& Hence cost is given by

4+6+8+10+2 = 30 days.

COMPARISON OF VALUE OBTAINED BY BOTH METHODS



CONCLUSION 1

Here we see that the result obtained by Hungarian method & proposed Matrix one's division method are same. [1] [14]

5. Example- Consider the following maximization case in Assignment problem

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} 32 & 38 & 40 & 28 & 40 \\ 40 & 24 & 28 & 21 & 36 \\ 41 & 27 & 33 & 30 & 37 \\ 22 & 38 & 41 & 36 & 36 \\ 29 & 33 & 40 & 35 & 39 \end{bmatrix} \end{array}$$

Given cost matrix is a profit matrix. To maximize the profit. First we convert it into loss matrix by subtracting all elements from highest element. We have the modified matrix.

$$\begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array}\begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} 9 & 3 & 1 & 13 & 1 \\ 1 & 17 & 13 & 20 & 5 \\ 0 & 14 & 8 & 11 & 4 \\ 19 & 3 & 0 & 5 & 5 \\ 12 & 8 & 1 & 6 & 2 \end{bmatrix} \end{array}$$

Now solve the above matrix by proposed matrix division method

ISSN 2394 - 7780

(i) Find minimum element of each row and divide each element of row by the respective minimum element also get the modified matrix, we have

	A	B	C	D	E
A	9	3	1	13	1
B	1	17	13	20	5
C	0	14	8	11	4
D	19	3	0	5	5
E	12	8	1	6	2

(ii) Find minimum element of each column & divide each element of column by the same element also get the next modified matrix. Draw minimum no. of horizontal and vertical lines to cover all the ones. Finally we get

	A	B	C	D	E
A	~~9~~	~~1~~	~~1~~	$\frac{13}{5}$	~~1~~
B	1	$\frac{17}{3}$	13	4	5
C	0	$\frac{14}{3}$	8	$\frac{11}{5}$	4
D	~~19~~	~~1~~	~~0~~	~~1~~	~~5~~
E	~~12~~	$\frac{8}{3}$	~~1~~	$\frac{6}{5}$	~~2~~

Here n=5, N=4, we can not make the minimum assignment. Select minimum uncovered element & divide all uncovered element by same element. We have

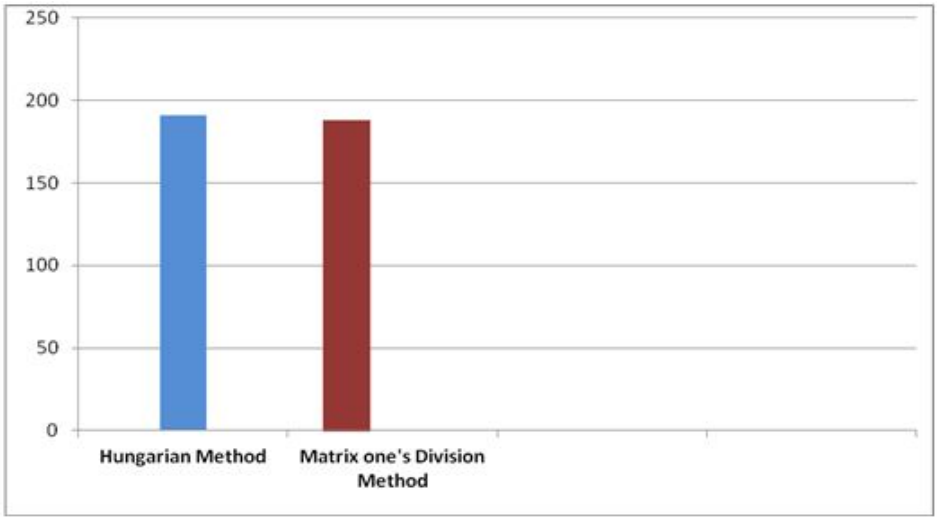
	A	B	C	D	E
A	~~9~~	$\frac{85}{33}$	$\frac{5}{11}$	$\frac{13}{5}$	~~1~~
B	1	$\frac{70}{33}$	$\frac{40}{11}$	$\frac{20}{11}$	$\frac{25}{17}$
C	0	$\frac{14}{8}$	~~∞~~	~~1~~	$\frac{20}{11}$
D	~~19~~	~~1~~	~~0~~	~~1~~	~~5~~
E	~~12~~	$\frac{8}{3}$	~~1~~	$\frac{6}{5}$	~~2~~

Now n=5=N

Since n=5=N, we can make the optimum assignment.

		Cost
1 – E	-	40
2 – A	-	40
3 – D	-	30
4 – B	-	38
5 – C	-	40
		188

Comparison of values obtained by both Methods-



ISSN 2394 - 7780

CONCLUSION 2

If we go to comparative study of Hungarian method and proposed matrix division method, we see that cost of Assignment is Rs. 188 by proposed method but cost of Assignment by Hungarian method is Rs. 191. [14] Hence we conclude that proposed method is more over superior than Hungarian method.

REFERENCES

1. H.W.Kuhn, "The Hungarian Method for the Assignment Problem", Naval Research Logistic Quarterly, 2 (1995, pp. 83-97).
2. A. kumar "A Modified Method for solving the Unbalanced Assignment Problems", Applied Mathematics and computation, 176,2006, pp.76-82.
3. Anupong Iampang, Veera Boonjing and Pisit Chanvarasuth, "A cost and space efficient method for unbalanced assignment problems",978-1-4244-8503-1/10 2010 IEEE.
4. A.Ahmed and Afaq Ahmad "A new method for finding an optimal solution of assignment problem",IJMMS,2014,12(1):10-15 ISSN:2166-286X.
5. Hadi Basirzadeh "Ones Assignment Method for solving Assignment problems",AMS, vol. 6, 2012, no. 47,2345-2355.
6. Anju Khandelwal "A Modified Approach For Assignment Method",IJLRST,vol:3, Issue 2: Page No.136-138, March-April, 2014,ISSN:2278-5299.
7. A. Schrijver, combinatorial optimization: polyhedra and efficiency, vol. A. Paths, Flows, Matchings, Springer, Berlin, 2003.
8. Hadi Basirzadeh, Vahid Morovati, Abbas Sayadi "A quick method to calculate the super-efficient point in multi-objective assignment problems" ,Journal of mathematics and computer science", p157-162,.2014.
9. Dr.A.Ramesh Kumar and S. Deepa "Restrictions of interval Assignment problem using Hungarian method" vol.2 Issue-12 (December 2014), ISSN:2321-1776.
10. Jatinder Pal Singh, Neha Ishesh Thakur " A Novel Method To Solve Assignment Problem in Fuzzy Environment", IISTE, ISSN :2224-6096, vol. no.2, 2015.
11. Taejoon Kim,Member, IEEE, and Miaomiao Dong "An Iterative Method to joint Relay Selection and Resource Allocation for D2D Communications", IEEE,Vol.3No.6,December 2014.
12. Jameer. G. Kotwal, Tanuja S. Dhope Computer Department Gyanchand Hirachand Raisoni College of Engineering, Pune, Maharashtra, India International Journal of Advanced Research in Computer Science and Software Engineering.
13. Volume 5, Issue 7, July 2015 ISSN: 2277 128X.
14. Manohar Mahajan, Operation Research Dhanpat Rai & Co. Private Ltd. Delhi Reprint 2016.
15. P.K. Dwivedi, Suresh Maithani & Ajay Kumar Mishra "Comparative Analysis of solutions methods of Assignment Problem", GJESR Vol-5, issue 8 Aug. 2018.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

ASSOCIATION BETWEEN WRITING ERRORS OF ELEMENTARY SCHOOL CHILDREN AND THEIR FRIENDS CIRCLE AND AMUSEMENTS

Dr. Chhaya D. Bhise
Assistant Professor, Smt. Ratnaprabhadevi Mohite Patil College of Home Science for Women, Akluj (MS)

ABSTRACT
A stratified random sample of ninety children out of 314 , IVth class children , whose mother tongue was Marathi were selected from 4 different schools of Parbhani town from Maharashtra state. Based on the magnitude of writing errors, 90 children were categorized in 2 groups i.e. children with more writing errors (Group 1) and children with less writing errors (Group 2). Results revealed that, statistically there was significant difference between group 1 and group 2 children's images on their on their friends and also in various amusements such as drawing, coloring and painting, listening music and singing, T.V. viewing, reading story books and chitchatting.

Keywords : writing errors, amusements, elementary school children, friends

INTRODUCTION

Children's formal academic learning starts with their entry into elementary schools. At this stage children are expected to achieve certain fundamental academic skills such as reading, writing and arithmetic. Amongst all, writing is one of the most basic skills for academic achievement. Writing skills helps children to be effective communicator and also acts as a main tool to develop formal operational ability to solve their academic problems and carry out day to day transactions.

Our educational setup is more 'writing oriented'. Children's academic success is mostly measured by their write-ups in examinations. If children fail in writing or writing up to the mark, in spite of knowing appropriate information they may fail or get boundary marks which later may turn into school dropouts or retained in the same class.

There are many causes responsible for children to commit errors in writing. Many times along with the poor potentials, moods, interests and habits of committing silly mistakes, environment in which they live is also equally responsible for their writing performance. After home, all children spend their significant proportion of time along with their friends and amusing themselves. Friends and amusements have lot of influence on shaping their personalities. They start making their congenial group who generally match their attitudes and their achievement level. Here, in this study environment of the child includes his friends and his amusements.

In light of the above the study is conducted to find out the association between children's writing errors with their friends images and amusements with the following objectives

1. To find out the association between children's writing errors and their friends circle details .
2. To study the association between children's writing errors and their various amusements.

METHODOLOGY

To study the association between writing errors of elementary school children and their friends circle details and amusements, a stratified random sample of 314 female and male children from IVth standard whose mother tongue was Marathi were identified from 4 Marathi medium elementary schools of Parbhani town in Maharashtra. Out of 314 sample 90 male and female students were picked up for studying them in detail. The data pertaining to the study was collected by personally interviewing the children, their parents and their teachers based on the prepared survey schedule. The collected data was pooled, statistically analyzed, tabulated and discussed.

Results and Discussion: Results of the study are as follows

Table-1: Details on friend's circle of the elementary school children

Details on friends circle	Percentage of children		t values
	Group 1(40)	Group 2(50)	
Number of friends			
1-3	27.50	32.00	0.55NS
4-6	50.00	52.00	0.20NS
Above 6	22.50	16.00	0.75NS
Images on friends			

ISSN 2394 - 7780

Very bright	55.00	8.00	5.87**
Bright	32.50	4.00	4.00**
Average	7.50	34.00	3.85*
Dull	5.00	54.00	7.00**

** PÃ0.01level *PÃ0.05 level NS – Non-significant

Table 1 illustrates details on friend's circle of the elementary school children. About number of friends ., it is obvious from the table that above fifty per cent of children (50-52%) from both the groups were found to have had 4-6 number close friends of their own classmates from and playmates from neighborhoods followed by having 1-3 friends (27-32%) and or above 6 friends (22-16%). About the image on out of all friends, group 1 children, a higher proportion (55%) of them were very proud of themselves in having very bright (55%) and bright (55%) and bright (32%) friends, while the rest of them informed that they did not mind having average (7%) and dull (5%) friends as these friends were good on nature and also good in extracurricular activities. In group 2 many of children perceived their friends dull(54%) was followed by images on friends were average (34%), bright(4%) and very bright (8%) friends. From this it is very clear that generally speaking all elementary school children like to make friendship with children having similar interest and IQ. This sort of peer social circle might be the probable cause for children's either superior or inferior academic performance. Similar results were observed in research studies carried out by French (1990), Nabuzoka and Smith (1993) on the same line.

Statistically there was significant difference between group 1 and group 2 children's images on their friends and non-significant for having number of friends.

Table-2: Amusements of elementary school children

Amusements	**Percentage of children**		**t values**
	Group 1	**Group 2**	
Drawing, coloring and painting	70.00	42.00	2.80**
Listening music and singing	57.50	74.00	2.20*
Viewing T.V.	52.50	50.00	1.72*
Dancing	25.00	18.00	0.81NS
Acting	5.00	2.00	--
Reading story books	47.50	20.00	2.81**
Chit-chatting	50.00	18.00	3.36**
Games and sports	87.50	96.00	1.52NS
Collection	40.00	34.00	0.58NS
Writing down information	12.00	--	--

** PÃ0.01level *PÃ0.05 level NS – Non-significant

Table 2 exhibits amusements of the elementary school children. From this table it is very clear that, amongst all the sample children were found to have one or other hobby to amuse themselves. Irrespective of the groups, a major proportion of children were very much interested in playing games with their friends. Relatively higher proportion of Group 1 children than group 2 children were found to have shown special interest in drawing, coloring and painting(70-42%); listening to music and singing (57-50%); collecting cartoon books(40-34%); reading story books and comics(57-20%); chitchatting with their friends about pictures friends, family members and T.V. programs(50-18%). Very few of them from both the groups were very much fond of acting and dancing. Viewing of T.V. was a favorites amusement for most of group 2 children (74%) than group 1 children (52%). None of the group 2 and a small per cent of group 1 children had shown the hobby of writing down information anything interesting to them which might have made these children to show less error in writing. Slightly higher percentage of group 1 children than group 2 children were found to have amused themselves by involving in all activities enlisted in table except T.V. watching and games and sports might have helped them to show better academic performance and less writing errors. Research of Smith and Kuhaneck (2008) are supporting these results.

Highly significantly many number of group 1 children as compared to group2 children were found to have shown interest was more in drawing, coloring, painting, reading story books , chit-chatting, while many group 2 children's favorite T.V. viewing was significant.

ISSN 2394 - 7780

CONCLUSION

Statistically there was significant difference between group 1 and group 2 children's images on their friends. Highly significantly many number of group 1 children as compared to group2 children were found to have shown in drawing, coloring, painting, reading story books , chit-chatting, while many group 2 children's favorite T.V. viewing was significant.

REFERENCES

- French, D. C. (1990). Heterogenity of Peer rejected girls. Journal of Child Development 61:2028-2031.
- Nabuzoka, D. and Smith, P. K. (1993). Sociometric status and social behavior of children with and without learning difficulties. Child Psychology and Psychiatry 34(8):1435-1778.
- Smith, J. C.; Kuhaneck, H. M. (2008). Play Preferences of Typically Developing Children with Developmental Delays Between Ages 3 and 7 years. OTJR: Occupation, Participation and Health 28(1) : 19-29
- Online – Journals.sagep.com
- http://www.inclusion.com/friendspreface.pgf
- http://www.mass.gov/eohns/docs/dmr/ge-reports/ga-gina-friendship.pdf

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

FINANCIAL POSITION OF TSRTC A STUDY WITH REFERENCE TO HYDERABAD REGION DURING THE YEAR 2107-18 AND FIRST QUARTER OF 2018-19

Dr. MD Taherullah[1] and Prof. Badiuddin Ahmed[2]
Associate Professor[1], Anwer Ul Uloom College of Business Management, Hyderabad
Dean[2], School of Commerce & Business Management, MANUU, Hyderabad

ABSTRACT
In current days TSRTC is in headlines due to the strike notice issued by the Unions of the corporation demanding the Pay Hike of the Employees. In response to this the Telangana Government version was, as the corporation is in huge losses no Pay Hike can be made at present. The following paper depicts on the current Financial Position of TSRTC up to the month ending June 2018 from April 2017. The study basically focuses on the financial performance of Hyderabad Region in particular and TSRTC as whole. The current paper analysis the various aspects of revenue and cost centres due to which the corporation is in losses. It tries to compare the performance of Hyderabad region from April 2107 to June 2018. TSRTC is divided into three Zones i.e. Greater Hyderabad zone, Hyderabad zone and Karimnagar zone. The Greater Hyderabad zone is divided into two Regions i.e. Hyderabad region and Secunderabad Region. The Hyderabad Region comprises of sixteen Units.

Keywords: Financial Performance of TSRTC, Various Revenue and Cost centres, comparison from April'17 to June'18 figures.

INTRODUCTION

Road Transport system is the most popular medium of transport in India. In fact, travelling in various parts of India is very easy through state Road Transport Corporations including undertakings or institutions authorized by the Ministry of Transportation, Government of India or by the State Government authorities. All the Government authorized transport organizations have their own operational style and they try their best to provide has free services to public. Almost all the Indian states have their own State Road Transport Corporation, providing transport facility within the state and the neighbouring states. Apart from the public transport corporations, private operators also play a major role in fulfilling the needs of the public.

Public Transport is an important part of the nation's economy. Since the economic liberalization of the 1990's, development of infrastructure within the country has progressed at a rapid pace, and today there is a wide variety of modes of transport by land, water and air. However, the relatively low GDP of India has meant that access to these modes of transport has not been uniform. In the interim however, public transport still remains the primary mode of transport for most of the population, and Indian public transport systems are among the most heavily utilized in the world. India's rail network is the longest and fourth most heavily used system in the world transporting over 6 billion passengers and over 350 million tons of freight annually.

Nizam Guaranteed State Railways (NGSR): The NGSR was also under the British company during 1930 i.e. three years before the expiry of the company's contract Sir Akbar Haidari the then Finance Minister of Nizam Government suggested to take over the Railways from the clutches of the company and provide better transport facility to the passengers. The Nizam Government considered the suggestion and consequently Nizam State Railways came into existence.

The Nizam Government imported 27 Albion petrol buses from England. The capacity of each bus was 25 seats. Out of 27 buses were allotted to Hyderabad, 10 to Narkedpally and reaming 7 to Kazipet. The Nizam Government issued a press notification in times of India inviting applications from the eligible candidates for the posts of drivers, conductors and mechanics. After the office of the Railway audit, candidates were given appointments. Punctuality and promptness were the major attributes of the bus crew in those days that people used to correct their watches by seeing the plying of the buses. The capital investment for these buses was 3.93 Lakhs. The total number of employees was 166. The first bus was piled on the route from Kachiguda to Gulzar House and the first Depot established was Kachiguda.

Buses are an important means of Public Transport in India. Particularly in the countryside and remote areas where the rail network cannot be accessed and airline operations are few or non-existent. Due to this social significance, public bus transport is predominantly owned and operated by public agencies, and most state governments operate bus services through a State Road Transport Corporation. These Corporations, introduced in the 1960s and 1970s, have proven extremely useful in connecting villages and towns across the country.

ISSN 2394 - 7780

TELANGANA STATE ROAD TRANSPORT CORPORATION: AT A GLANCE

Vision of TSRTC

TSRTC is committed to provide consistently high quality of services and to continuously, improve the services through a process of teamwork for the utmost satisfaction of the passengers and to attain a position of pre-eminence in the Bus Transport sector.

Corporate Philosophy

- To provide safe, clean, comfortable, punctual and courteous commuter service at an economic fare.
- To provide employee satisfaction in financial and humanistic terms.
- To strive towards financial self-reliance in regard to performance and growth.
- To attain a position of reputation and respect in the society.

Guiding Principles of TSRTC

- To provide efficient, effective, ethical management of the business.
- To assist the State administration in attaining good governance.
- To treat the customer, i.e. passenger, as a central concern of the Corporation's business and provide the best possible service.
- To explore and exploit technological, financial and managerial opportunities and developments and render the business cost effective at all times.
- To regularly and constantly the state prove the capabilities of employees for higher Productivity.
- To focus on service conditions and welfare of the employees and their families consistent with their worth to the Corporation.
- To fulfill its obligation to the State and Central governments by optimizing return on investment.
- To emphasize environmental and community concerns in the form of reducing air and noise pollution.
- To consciously confirm to the policy guidelines of the State in its business operations.
- To reach a position of pre-eminence in bus transport business.

LITERATURE REVIEW

The Hindustan Motors Ltd., conducted a study pertaining to the various problems confronted by the automobile industry in India.

Halder D. K extensively evaluated the traffic problems in Calcutta with a focus on Calcutta State Transport Corporation (CSTC). For the lower productivity of the CSTC during the period of 1964 – 65 to 1972 – 73, the following factors were responsible viz., (i) low fleet utilization (as a result of lack of proper preventive maintenance); (ii) higher absenteeism and (iii) evasion of fare. However, Linear Programming (LP) Model was applied to the problem of efficient allocation of buses on different routes.

Sharma.K.K. extensively studied the state of affairs, problems and prospects of Motor Transport in Rajasthan.

Patankar studied the Road Passenger Transport in different dimensions since 1950s and analyzed the urban transportation in detail with emphasis on operational productivity and efficiency of STUs for the period 1973-74 to 1979-80. He opined that the future of road transport sector in India would brighten only with productivity-oriented planning and offers comprehensive solutions to urban mobility problems in the cities of developing countries.

Khan.R.R. presented a kaleidoscope of transport network and transport management system in India. Besides, continuing with systems approach, a model was framed for a comprehensive transport system and transport planning. He provides an analytical study of several vital areas along with the benchmark data for transport management.

Ali A. El-Mezawie studied the problems and prospects of 32 State Transport Undertakings in India and observed that the performance of company form of organization is better on almost all important counts. He recommended the exchequer an immediate relief of at least 60% in tax, and provision for regular revision of fare at an interval of two years, failing which provision for subsidy.

Srivastava.S.K. portrays the historical development of various modes of transport in India keeping in view the means to coordinate the development of transport system. He examined the effect of efficient, cheap and well coordinated transport system to the development of the economy.

ISSN 2394 - 7780

The study made by **Subrahmanyam.P.** On the organization structures of various Road Transport Corporations reveals there is a dire need of restructuring of organizational structures of Road Transport Corporations to achieve self-sufficiency.

Arora S.K. made a comparative study on the performance of Punjab Road Ways with Andhra Pradesh, Gujarat, Rajasthan and Kerala Road Transport Corporations in general and the public and private sector road transport undertakings of Punjab in specific.

Ratna Kumar Singh made a study with reference to Bihar State Road Transport Corporation and examined the physical and financial performance of Bihar State Road Transport Corporation. The study advocated the nationalization of more number of bus routes in Bihar State to reach maximum number of public.

Kulshreshta.D.K. evaluated the managerial problems of road transport undertakings in the country and suggested various measures to control the cost of bus operation while improving their revenue.

Rama Mohan Rao.P.S. Investigated on various strategies adopted by Andhra Pradesh State Road Transport Corporation for improving its performance. The focus of the study is on various operational and administrative areas of the Corporation during his tenure with the Corporation as Vice Chairman and Managing Director.

Sudarshanam Padam elaborated in detail the history of bus transport in India, various forms of organizational structures of State Transport Undertakings, the management and performance during 1970-80. For the sake of the study the cross-sectional analysis of road transport corporations of Andhra Pradesh, Maharashtra, Gujarat and Karnataka are considered and found the operative as well as financial problems in functioning. The study suggested number of operative measures to resolve these problems.

Akbar Ali Khan.M.D., Explicitly analyzed the management of finances and the problems of finance encountered by different State Road Transport Corporations in India.

Baig Nafees and Dr.Iqbal.B.A., Emphasized the need of transportation in India in general and Uttar Pradesh in particular. Transportation provides both backward and forward linkages to the economy of a region or a state or a country. The dependence of Indian economy and more so of Uttar Pradesh on agriculture provides large scale opportunities for developing agro-based industries and the same requires adequate availability of transport infrastructure. He found that transportation as a constraint for Agro-Industrial Development in Uttar Pradesh.

An attempt made by **Mahajan** to study the planning policy and development of Transport in India reveals that there is a need of policy regulation to regulate the transporters in India.

Kulshrestha critically evaluated the functioning of State Road Transport Undertakings, specifically public sector transport organizations. The observations *interlaid* include the public sector transport has been facing competition with other means of transport exclusively from the private operators, management of bus stations, fleet utilization etc., The study throws light on the bus station management and offers some practical ways and means to improve the conditions with special reference to Uttar Pradesh State Road Transport Corporation.

Rajeswari. G. empirically examined the performance of Public Sector Units with a special reference to APSRTC. This study focuses on the history, evolution and performance of APSRTC at Corporation level and Regional levels. The organizational set up of the Corporation along with various parameters viz., capital investment, staffing, the pricing policies of transport undertakings in general and the APSRTC in particular are addressed.

An extensive study by Jagadish **Gandhi.P.,** on the structure, growth and performance of State Transport Undertakings with special reference to Thiruvalluvar Transport Corporation of Tamilnadu evinced the state road transport undertakings cater the needs of the Indian mass keeping in view the lifeline of the economy. Moreover, majority of State Transport Undertakings are facing severe financial crunch.

Ramdas.R. analyzed the drivers of cost of State Owned Road Passenger Services in India keeping in view the size and organization of the transport unit.

Jaishankar. K. made an economic analysis on APSRTC with a view to know the efficiency of the Corporation while **Narasimhulu.M.,** empirically examined the taxation and depreciation policy areas of APSRTC.

Viswanadham.V., made an exploratory study on the financial aspects of the APSRTC and evaluated the financial performance of the Corporation during the period 1965-66 to 1976-77

ISSN 2394 - 7780

NEED FOR THE STUDY

- Financial crises in the operations of day to day services.
- Understanding the current financial position of TSRTC with reference to Hyderabad Region.
- Analyse the factors of Revenue and cost with their importance in overall functioning of TSRTC.

OBJECTIVE OF THE STUDY

- To Study the current financial performance of TSRTC during the financial year 2017-18
- To analyze the importance and impact of expenditure and revenue factors on total financial performance of TSRTC.
- To point out the major causes behind the crucial financial crises being faced by the Corporation.

SCOPE OF THE STUDY

The scope of study is restricted up to the jurisdiction of Hyderabad Region. The Hyderabad Region being the biggest region in the corporation and impacts on the overall functioning of the corporation. The various Revenue and Cost centres are compared and analysed with the corresponding month of previous year to know the move of the corporation.

LIMITATIONS OF THE STUDY

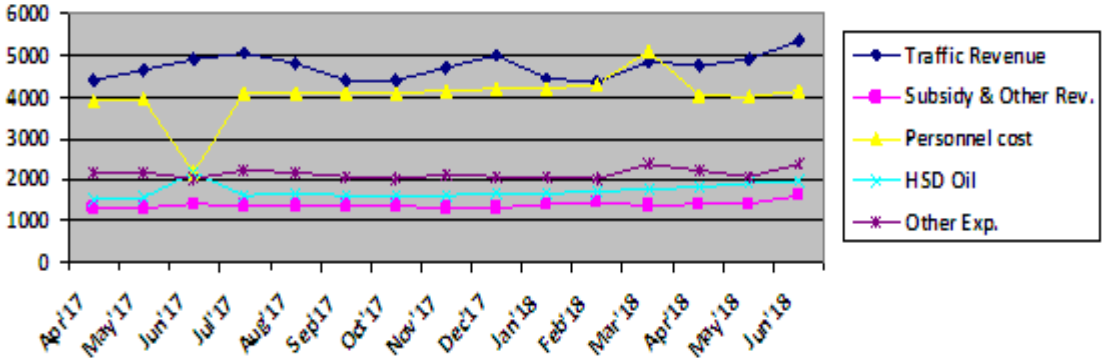
- The study is restricted to the financial matters of the corporation and omits the human Resource and Marketing aspect.
- The study is based on the past records provided by the corporation.
- The study is restricted up to the jurisdiction of Hyderabad Region only.

Table showing the Financial Position of HYDERABAD REGION during the year 2017 & 2018 along with major Revenue and Expenditure centres

Particulars/ Month & Year	KM's Operated	Traffic Revenue	Subsidy & Other Revenue	Personnel Cost	HSD oil	Other Expenses
April 2017	145.79	4398.10	1313.87	3905.70	1533.41	2164.75
May 2017	146.33	4623.89	1327.95	3946.28	1538.21	2166.93
June 2017	147.62	4897.70	1387.96	2164.75	2166.93	2027.83
July 2017	154.41	5043.42	1340.44	4084.87	1610.05	2213.31
August 2017	155.81	4805.37	1346.41	4100.54	1674.23	2157.74
September 2017	147.33	4389.60	1339.70	4095.86	1595.81	2079.70
October 2017	146.38	4365.29	1368.92	4098.38	1598.64	2018.65
November 2017	144.98	4685.24	1325.61	4125.38	1621.85	2135.21
December 2017	149.68	4982.27	1334.82	4198.95	1654.52	2087.57
January 2018	146.28	4421.82	1398.57	4207.82	1687.67	2064.82
February 2018	145.45	4329.67	1457.16	4297.59	1704.56	2013.41
March 2018	157.62	4840.60	1338.62	5109.61	1774.58	2370.02
April 2018	152.11	4756.04	1392.9	4008.51	1794.75	2230.15
May2018	156.54	4908.48	1396.07	3992.58	1923.57	2080.05
June2018	152.00	5344.23	1612.68	4113.68	1951.49	2383.34

(source: Official TSRTC Wide Area Network)

TREND ANALYSIS



ISSN 2394 - 7780

FINDINGS

1. The traffic Revenue being top of all during the period of study with slight fluctuations in between. Overall the Traffic Revenue of the corporation has increased a bit.
2. Subsidy and Other Revenue factor is least among all throughout the period of study, with almost maintaining the constant figures.
3. In the Expenditure scenario the Personnel cost is above all. It was sturdily maintain same figures except for the month of Jun'17 and Mar'18 where it went abnormally low and high respectively.
4. HSD Oil being the next top expenditure centre keeps on fluctuating due changes in the market price of Diesel.
5. Coming to the other expenses part it includes Workshop, Tyres and tubes, Stores and Lubricants, M. V. Taxes, Depreciation, Misc. Expenses, Expenses on Hired Vehicles and Overheads
6. The Impact on NET Profit/Loss of the corporation with the fluctuations in the expenditure and revenues centres is positive, as the losses of the corporation have reduced during the period of study.

CONCLUSIONS

1. It is to conclude that the traffic revenue of the corporation is good and able to fulfil many expenses of the corporation.
2. Subsidy and Other Revenues are very less throughout the study period and could not able to meet the requirement of the corporation.
3. Personnel cost being the top most expenditure of the corporation and keeps on swallowing the maximum portion of the revenues and it is inevitable.
4. The life of the corporation is the Power HSD Oil which is the second topmost expensive cost centre for the corporation and needs to be controlled.
5. Other expenses include many factors which is manageable with some good managerial policies by the corporation.
6. The overall impact on the profit/loss is also positive even though there is increase in some of the cost centres, which is a positive indicator for Future of the Corporation.

SUGGESSIONS

Corporation now should concentrate on increase in the Other Revenue, where there is more scope available for generating revenues such as Rents, Hire special services, Luggage transport, Advertisement etc. Government should cooperate to the corporation in implementing the taxes on its revenue, providing special subsidy on HSD Oil, reduction of direct and indirect taxes.

Management should focus on optimum utilization of its resources as there are lot of resources left over which are not utilised from long period of time.

REFERANCES

1. Argenti John., Corporate Collapse: The Causes and Symptoms, McGraw Hill, UK, 1976.
2. Bibeault. Donald.B., Corporate Turnaround, McGrawHill, New York, 1981.
3. Bibeault. Donald.B., Corporate Turnaround: How Managers Turn Losers Into Winners, McGrawHill, New York, 1982.
4. Grinyer, P. H, Mayes D. G. and McKiernan P., Sharpbenders: The Secrets of Unleashing Corporate Potential**,** Basil Blackwell: Oxford, UK, 1988.
5. Bo Arpi and Per Wejke., International Turnaround Management , Palgrave Macmillan, London, 1999.
6. Kewal K. Nohria., Painless Transformation: A Case Study of Crompton Greaves , Macmillan India, New Delhi, 1999.
7. www.tsrtc.org
8. www.apsrtconline.in
9. Rtcwan provided for internal members for data sharing.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

PERFORMANCE ABILITY, GENERAL EMOTIONAL STATUS AND PRACTICES OF SELECTED INSTITUTIONALIZED ELDERLY

Dr. Bharati Bhosale[1] and Dr. Rohini Devi[2]
Assistant Professor[1], SRMP College of Home Science for Women Akluj Tal- Malshiras, Solapur
Professor[2], Department of Foods & Nutrition, College of Community Science, VNMKV Parbhani

ABSTRACT
Aging can be defined as "Regression of physiological function accompanied by advancement of age." The present study was carried out to assess performance ability, general emotional status and practices of selected institutionalized elderly belonging to different districts of Marathwada region of Maharashtra state. General information of selected institutionalized elderly showed that majority of elderly (58.6%) was performing exercise. The per cent of elderly able to do their daily personal activity was 98.6. Majority of elderly (96.4%) were happy about their stay in the institute. Majority of elderly (65.75%) found to have hobby singing religious songs about 28.6 per cent of elderly did not visit to their relative while majority of elderly (69.2%) were reported to be visited by their relatives.

Keywords: Performance ability, emotional status, practices, institutionalized, elderly

INTRODUCTION
Aging can be defined as "Regression of physiological function accompanied by advancement of age."(Vimala,1999). Strength of elderly decrease due to advancement in age and declined physiological properties of muscle. Mobility and the ability to perform daily living activities decrease in elderly as muscle mass decline and poor overall functioning. **(**Franke et al, 2006). Den Draak (2010) observed mobility problems in 78 % of the older adults living in residential homes and the main cause of disability in them. Disability and diminished health in older persons living in residential homes is due to multiple chronic conditions (Schram et al, 2008). According to Stewart (2003) loss of muscle mass, strength, balance, and mobility problems are aspects of disability in older persons. One of the factors for achieving successful aging is maintaining high physical function. So the present study was conducted to assess performance ability, general emotional status and practices of selected institutionalized elderly.

METHODOLOGY
The present study was carried out to assess performance ability, general emotional status and practices of selected institutionalized elderly belonging to different districts of Marathwada region of Maharashtra state. The samples of elderly for study were selected from different regions of Marathwada. Investigation comprised of 500 institutionalized elderly. Data pertaining to general background of selected elderly was obtained by personally interviewing them. Information on hobbies of elderly, type of exercise, emotional feelings, visit of relative etc. was collected. Statistical analysis of collected data was carried out after consolidation and computation to interpret the results and conclusions from the present study.

RESULT AND DISCUSSION
Distribution of elderly according to ability of performance of their personal activity (Fig. 1) indicated that majority of elderly (98.6%) were able to perform their daily personal activity while only 1.4 per cent of elderly were not performing their daily personal activity. The reasons expressed by elderly for inability to perform personal activities were prevalence of paralysis, old age, weakness, stiffness and fracture of leg and blindness.

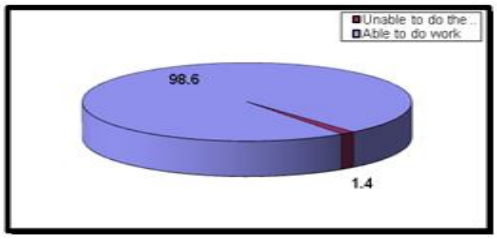


Fig-1: Distribution of elderly according to ability of performance of their

Emotional feelings of selected elderly towards the stay in institute are presented in Fig. 2. It was observed that majority of elderly (96.4%) were happy about their stay in the institute while 3.6 per cent of elderly were unhappy regarding their stay in the institute. The per cent of elderly male and female expressed happiness towards their stay in institute were 46.68 and 53.31 respectively while about 66.66 per cent female and 33.33 per cent males were unhappy towards their stay in institute.

ISSN 2394 - 7780

Fig-2: Emotional feelings of selected elderly towards the stay in institute

Exercise practices prevailed among the selected elderly is summarized in Table 1. It was inferred from table that majority of elderly (58.6%) were performing exercise while 41.4 per cent of elderly did not follow the practice of exercise. Walking (96.24%) and yoga (3.75%) were the types of exercise performed by selected elderly. Data on frequency of exercise revealed that majority of elderly (63.48%) were performing exercise daily followed by occasionally (32.76%) and weekly (3.75%). Daily walking and performing yoga were observed in 63.82 and 54.54 percent of elderly respectively. There were 32.62 and 36.36 per cent of elderly who were occasionally following the practice of walking and yoga respectively. The percentages of elderly following weekly practice of walking and yoga were 3.54 and 9.09 respectively.

Table-1: Exercise practices prevailed among the selected elderly

Parameters	Per cent of elderly performing different exercise		
	Walking	Yoga	Total
Exercise practice			
Perform exercise	96.24 (282)	3.75 (11)	58.6 (293)
Do not perform exercise	-	-	41.4 (207)
Frequency of exercise			
Daily	63.82 (180)	54.54 (6)	63.48 (186)
Weekly	3.54 (10)	9.09 (1)	3.75 (11)
Occasionally	32.62 (92)	36.36 (4)	32.76 (96)

Figures in parenthesis indicate number of elderly

Percent prevalence of hobbies among the selected elderly is listed in Table 2. Multiple responses in hobbies were observed in 400 selected elderly subjects. Majority of elderly (65.75%) found to have hobby of singing religious songs followed by reading religious books (48.0%) and watching T.V. (24.75%). Remaining hobbies prevalent among elderly were writing (1.75%), listening music and songs (1.0%), listening religious songs (2.0%), listening radio (1.25%), listening religious speech (2.75%), playing harmonium (0.25%) and travelling (0.25%).

Table-2: Per cent prevalence of hobbies among the selected elderly (n=400)

Hobbies	Number of elderly	Percentage
Reading religious books	192	48.0
Singing religious songs	263	65.75
Writting	07	1.75
Watching T.V.	99	24.75
Listening music and songs	4	1.0
Listening religious songs	8	2.0
Listening radio	5	1.25
Playing harmonium	1	0.25
Travelling	1	0.25
Listening religious speech	11	2.75

ISSN 2394 - 7780

Table 3 shows per cent of the selected elderly visiting to their relatives. Results indicated that majority of elderly (71.4%) were visiting to their relatives. About 28.6 per cent of elderly did not give visit to their relatives. There were 73.10 per cent of elderly visiting occasionally to their relatives. About 28.6 per cent of elderly were giving monthly visit to their relatives. A visit once and twice in year were seen in 8.12 and 6.16 per cent of elderly respectively.

Table-3: Percent of the selected elderly visiting to their relatives

Parameters	Number of elderly	Percentage
Visit of elderly		
Give visit	**357**	**71.4**
Do not give visit	**143**	**28.6**
Frequency of visit		
Monthly	**45**	**12.60**
Yearly	**29**	**8.12**
Twice a year	**22**	**6.16**
Occasionally	**261**	**73.10**

Table 4 explains the per cent of the selected elderly visited by their relatives. Majority of elderly (69.2%) were reported to be visited by their relatives. There were 30.8 per cent of elderly to whom their relatives did not give visit. Majority of elderly (69.36%) reported that they were visited occasionally by their relatives. Monthly, yearly and twice a year visit of relatives were noticed in 17.91, 6.35 and 6.35 per cent of elderly respectively.

Table-4: Percent of the selected elderly visited by their relatives

Parameters	Number of elderly	Percentage
Relative Visit		
Give visit	**346**	**69.2**
Do not give visit	**154**	**30.8**
Frequency of visit		
Monthly	**62**	**17.91**
Yearly	**22**	**6.35**
Twice a year	**22**	**6.35**
Occasionally	**240**	**69.36**

Study was conducted by Lin P-S and et al to determine association between Physical Fitness and Successful Aging in Taiwanese Older Adults. Results of study suggested that physical fitness tests are significant associated factors for Successful Aging along with known factors of age, education level, and regular exercise.

Study on Exercise: Effects on Physical Functional Performance in Independent Older Adults by Cress et al (1999) Concluded that Independent older adults gain meaningful functional benefits from several months of exercise training. Physical activity play important role in enhancing physical function.

CONCLUSION

General information of selected institutionalized elderly showed that majority of elderly (58.6%) was performing exercise. The per cent of elderly able to do their daily personal activity was 98.6. Majority of elderly (96.4%) were happy about their stay in the institute. Majority of elderly (65.75%) found to have hobby singing religious songs about 28.6 per cent of elderly did not visit to their relative while majority of elderly (69.2%) were reported to be visited by their relatives.

REFERENCES

- Cress M. E, Buchner D. M., Questad K.A., Esselman P. C., Del.ateur, B.J. and Schwartz R. S. (1999). Exercise: Effects on Physical Functional Performance in Independent Older Adults. Journal of Gerontology: MEDICAL SCIENCES.Vol. S4A, No.5, M242-M248
- Draak den M. (2010) SCP. Oudere tehuisbewoners. Den Haag
- Jason E. Franke, Jonathan F. Bean, Walter R. Frontera. (2006). Exercise in the Elderly: Research and Clinical Practice. Clin Geriatr Med 22. 239 – 256
- Lin P-S, Hsieh C-C, Cheng H-S, Tseng T-J, Su S-C (2016) Association between Physical Fitness and Successful Aging in Taiwanese Older Adults. PLoS ONE 11(3): e0150389. https://doi.org/10.1371/journal.pone.0150389

ISSN 2394 - 7780

- Schram MT, Frijters D, van de Lisdonk EH, Ploemacher J, de Craen AJ, de Waal MW, van Rooij FJ, Heeringa J, Hofman A, Deeg D, Schellevis FG (2008) Setting and registry characteristics affect the prevalence and nature of multimorbidity in the elderly. Journal of Clinical Epidemiology, 61: 1104-1112.
- Stewart AL (2003). Conceptual challenges in linking physical activity and disability research. American Journal of Preventive Medicine, 25 (3Sii): 137-140.
- Vimala, V. (1999). Changes in body composition and physiological functions during aging. Recent advances in nutrition for vulnerable groups. Ed.CAS, Dept. of FN, ANGRAU., Rajendra Nagar, Hydrabad. 357.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

RULES AND REGULATIONS PERTAINING TO E-WASTE MANAGEMENT IN INDIA- A CRITICAL REVIEW

Shelley Pandit[1] and Dr. Dipankar Dey[2]
Assistant Professor[1], Bijoy Krishna Girls' College, Howrah
Former Dean[2], ICFAI Business School, Kolkata

ABSTRACT
The changing lifestyles of people, urbanization and globalization of economy have lead to increasing rates of consumption of electronic products. On the other hand, the throw away culture among the users of electronic goods leads to a hi-tech environmental hazards- the e-waste. E-wastes are toxic in nature and therefore harmful for human health. It is the role of the Government to frame and implement proper Rules and Regulations to stop the import/export of e-wastes and to manage e-waste by a sound environmental way. Like other countries India has also framed and implemented a number of rules and regulations for a proper management of e-wastes. Several loopholes can be traced under the rules and regulations pertaining to e-waste in India that are to be checked and corrected for an effective management of e-wastes. The aim of the paper is to identify and describe briefly such rules and regulations and to make a critical review of that.

Keywords: E-waste, Rules and Regulations, India, E-waste management, EPR

INTRODUCTION
While global market for electrical and electronic products continues to expand and accelerate, the life span of the product is becoming limited. This results in corresponding increase in electronic scrap or electronic waste or simply e-waste. UNEP report 2005 revealed that –"every year 20-50 million tones of electrical and electronic scrap generated worldwide" which could bring serious risk to human health and the environment if not handled properly. The e-wastes, typically coming from hardware comprises of aluminium, cadmium, mercury, brominated flame-retardants, complex plastic blends and lead- which are toxic in nature. As per Basel Action Network, 1992- "E-waste encompasses a broad and growing range of electronic devices ranging from large household devices such as refrigerators, air conditioners, cell phones, personal stereos, and consumer electronics to computers which have been discarded by their users." E-waste or electronic waste, therefore, broadly described as ―discarded, surplus, obsolete, broken, electrical or electronic devices (Rajya Sabha, 2011).

The ASSOCHAM-Frost & Sullivan study (2016) said that India's electronic waste is likely to reach 30 lakh metric tonnes (MT) per year by 2018 from the present level of 18.5 lakh metric tonnes (MT) with a CAGR of 27.34%. Due to the lack of governmental legislations on e-waste, standards for disposal and proper mechanism for handling these toxic hi-tech products, mostly end up in recycling yards in developing countries like India and China (UNEP report-2010) , where poorly-protected workers dismantle them, often by hand, in appalling conditions. Governments of a number of countries have come out with their own definitions, interpretation and management of the term "E-waste/WEEE" by implementing rules and legislations. The responsibilities of government to control e-waste are-

- To frame, implement, regulate E-waste policy and legislation and to monitor the same.
- To encourage organised system recycling and to make a link between formal and informal management of e-wastes
- To prohibit the import/export of e-wastes
- To collect fee from manufacturers/consumers for the disposal of toxic materials
- To conduct awareness programme on e-waste.

REVIEW OF LITERATURE
Some of the major works done in this area are noted below

- Bhaskar & Mohana (2017) found that though the EPR norms of 2011 rules made a compulsion for the producers to take some steps for the management of e-wastes, the collection and recycling system of such were not convenient to the end users to indispose the discarded e-goods in formal collection and recycling centers. They also found that, Indian EPR regulation should implement deposit-refund system.

ISSN 2394 - 7780

- Ganguly (2016) argued that the draft E-Waste (Management and Handling) Rules must include the methods the formalization of the informal sector by organising, registering and monitoring their activities instead of closing their units. Again he said that the business plan of collecting e-waste by the producers from their customers.
- Kumar & Shing (2013) disclosed that because of the insufficient laws, e-wastes are illegally transferred and piled up form developed to developing countries. The implementation of e-waste regulations may be delayed by economic impetus and want of sufficient financial support for the organized sector.
- Borthakur & Singh (2012) said that the policy level initiatives in India related to e-waste management are not at all imposed in proper way and need some urgent reconciliation. The study also revealed that without any detail description, e-waste was included in that rule.
- Olowu (2012) observed that though the US is a signatory to the Basel Convention on the Control of Transboundary Movement of hazardous Wastes and their disposal ('the Basel Convention'), 1989, it has not implemented the agreement till date.

OBJECTIVES

The objectives of this paper are classified under the following sub-headings

- To identify and describe in brief about various Rules and Legislation of E-waste management in India, and
- To make a critical review of those Rules and Regulations.

METHODOLOGY

The present study is descriptive in nature and is based on secondary data collected from various sources i.e. books, journals, reports, as well as relevant websites.

ANALYSIS AND FINDINGS

E-Waste Legislation in India

Up to 2003 there were no specific Environmental Laws or Guidelines for e-waste even from the Indian Central Pollution Control Board (CPCB). However from the existing laws of CBCP, the e-waste fall under the category of 'Hazardous' waste and covered under the purview of the 'National Hazardous Waste Management Rules 2003' (revised rule-2008) and the 'Municipal solid Wastes Management and Handling Rules 2000'. The first ever comprehensive guideline of E-waste Management Rules was introduced in India by the Government of India in the Ministry of Environment, Forest and Climate Change in 2011 and was known as 'E-Waste Management and Handling Rules-2011'. The 2011 Rules were subsequently revised in the year 2016 and came into force as 'E-waste (Management) Rules, 2016. Again, the 2016 rules were amended in 2017 and 2018 and hence known as 'E- Waste (Management) Amendment Rules, 2017' and 'E- Waste (Management) Amendment Rules, 2018' respectively.

Following legislations cover different aspects of e-waste in our country

1. The Hazardous Waste (Management and Handling) Rules, 1989 as amended in 2008 for toxic content
2. Municipal Solid Waste (Management and Handling) Rules 2000, for non-toxic content
3. DGFT EXIM policy-2002-2007, which restricted import of second-hand computers
4. Foreign Trade Policy-2009-2014
5. Guidelines by Central Pollution Control Board, 2008
6. E-Waste Management and Handling Rules-2011
7. E-waste (Management) Rules, 2016
8. E- Waste (Management) Amendment Rules, 2017, 2018

CRITICAL REVIEW OF RULES AND LEGISLATIONS

1. The Hazardous Waste (Management and Handling) Rules, 1989 as amended in 2008

Hazardous Waste (Management & Handling) Rules 1989 were subsequently amended in 2000 and 2003 and replaced on 24 September 2008 by Hazardous Waste (Management, Handling and Transboundary Movement) rules 2008. The objectives of the rules were 'to put an effective mechanism to regulate the generation, collection, storage, transport, treatment and disposal of hazardous wastes both indigenously generated and imported'. Under this rule**,** Hazardous Waste means 'any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause

ISSN 2394 - 7780

danger to health or environment, whether alone or when in contact with other wastes or substances, and shall include-

a. wastes listed in column (3) of Schedule-1,

b. wastes having constituents listed in Schedule-2 if their concentration is equal to or more than the limit indicated in the said Schedule, and

c. wastes listed in (Part-A) and Part-B of Schedule-3 applicable only in case(s) of import or export of hazardous wastes in accordance with rules 12, 13 and 14 if they possess any of the hazardous characteristics listed in Part C of that schedule'.

As per Schedule 1 of the Rules, waste generated from electronic industry is considered as hazardous waste. A List of 'Hazardous Wastes Requiring Registration of Recycling/ Reprocessing' (20 Items) is given under Schedule IV and components of E wastes came under these items (Sl. No. 18). Chapter II of the act said that the occupier shall be responsible for safe and environmentally sound handling of hazardous wastes generated in his establishment. Chapter IV of the Rules disclosed the laws about Import & Export (Transboundary Movement) of Hazardous Wastes. It said that 'no import of the hazardous wastes from any country to India for disposal shall be permitted'.

Though the same rule (13.2) said that the import of Hazardous Waste from any country to India shall be permitted only for the recycling or recovery or reuse. Unfortunately these are the methods/ways by which e-waste get entered in the country and all the three facts, viz. recycling/recovery and reuse are the indispensable parts of e-waste management. It is not clear in the rules that who is responsible to pay the cost of collection, storage, transport, treatment and disposal of hazardous wastes. Part A of Schedule III revealed a list of hazardous wastes that are applicable for import with prior Informed Consent and it included 'waste electrical and electronic assembles or scrap containing activated glass cullets from CRT (Basel no. 1180 and 2010). Part B of the same Schedule was about a number of hazardous wastes that are applicable for import without prior Informed Consent and it included electrical or electronic assemblies (including printed circuit boards, electronic components and wires) destined for direct reuse and not for recycling or final disposal (Basel no. B1110). Thus it is clear that in the name of reuse, e-wastes were imported in our country.

2. Municipal Solid Waste (Management and Handling) Rules 2000

MSW rules are applicable to every municipal authority responsible for collection, segregation, storage, transportation, processing and disposal of municipal solids. The Rules contains four Schedules namely;

- Schedule-I: Relates to implementation Schedule
- Schedule-II: Specifications relating to collection, segregation, storage, transportation, processing and disposal of municipal solid waste (MSW).
- Schedule-III: Specifications for landfilling indicating; site selection, facilities at the site, specifications for landfilling, Pollution prevention, water quality monitoring, ambient air quality monitoring, Plantation at landfill site, closure of landfill site and post care.
- Schedule-IV: Indicate waste processing options including; standards for composting, treated leachates and incinerations.

Authorities and responsibilities are given to the -1) Municipal Authorities to ensure that municipal so1id wastes to be handled as per rules. 2) State Government to enforce the provisions of the rules in the metropolitan cities. 3) Central Pollution Control Board (CPCB) to co-ordinate with State Boards and Committees , to prepare consolidated annual review report and to laying down standards on waste processing/ disposal technologies including approval of technology. 4) State Pollution Control Board (SPCB) to monitor the compliance of the standards and to Prepare and submit to the CPCB an annual report with regard to the implementation of the rules.

The rule said that characterisation of waste is necessary to know changing trends in composition of waste. But what should be the characters to identify the composition are not specified. It also pointed out that, on the basis of composition/ characterization of waste, appropriate selection of waste processing technologies could be selected. Emphasis has also been given to implement various activities of solid waste system through private sector participation. Although the success rate of this participation is itself a question.

ISSN 2394 - 7780

3. DGFT EXIM Policy-2002-2007

As per The Directorate General of Foreign Trade (DGFT) EXIM policy 2002-07, second hand personal computers/ laptops were not permitted for import under Export Promotion Capital Goods (EPCG) scheme under the provisions of the EXIM policy. Second hand photocopiers machines and air conditioners, etc. also cannot be imported even if these are less than ten years old. As per the Notification No. 30/2004-cus dated 28.01.2004, in exercise of the powers conferred by sub-section (1) of section 25 of the Customs Act, 1962 (52 of 1962), donation of second hand computers and computer peripherals including printer, plotter, scanner, monitor, keyboard and storage unit are exempted from levied any custom duty if such donation is made for-

(i) a School run by the Central Government or, Government of a State or, a Union territory or, a local body;

(ii) an Educational Institution run on non-commercial basis by any organization;

(iii) a Registered Charitable Hospital;

(iv) a Public Library;

(v) a Public Funded Research and Development Establishment;

(vi) a Community Information Centre run by, the Central Government or, Government of a State or, a Union territory or, local body;

(vii) an Adult Education Centre run by the Central Government or, Government of a State or, a Union territory or, a local body, or

(viii) an organisation of the Central Government or, a Government of a State or, a Union territory,

This means second hand computers and its peripherals were imported before this notification for commercial as well as for non-commercial uses. Duties and additional duties were charged for both the applications. Critical review revealed that after this notification, second hand computers were still imported in India in the name of donations or charitable purposes/ non commercial purposes and enjoyed the exemption of duty charges**.**

4. Foreign Trade Policy-2009-2014

As per Foreign Trade Policy 27th August 2009 - 31st March 2014, EPCG Scheme at zero duty has been introduced for certain engineering products and electronic products. However, second hand personal computers/ laptops, photocopier machines, air conditioners, diesel generating sets were only be allowed against a license. Import of re-manufactured goods shall be allowed only against a license. For Electronics and IT Hardware Manufacturing Industries,

a. Export of electronic goods to be incentivized under Focus Product Scheme.

b. Expeditious clearance of approvals required from DGFT, shall be ensured.

c. Exporters /Associations would be entitled to utilize MAI & MDA Schemes for promoting Electronics and IT Hardware Manufacturing industries exports.

d. Electronics Sector included for benefits under SHIS scheme.

The above policy clearly indicates that if the importer could collect a license, then he or she can easily imports second hand e-goods. These will not only increase the quantum of e-waste in our country but also accelerate the rate of degradation of environment.

5. Guidelines by Central Pollution Control Board, 2008

The Guidelines for environmentally sound management for e-waste, April 2008 were issue by CPCB for the State Pollution Control Boards as well as industries. These guidelines provided guidance for identification of various sources of waste electrical and electronic equipment and prescribed procedures for handling e-waste in an environmentally sound manner by e-waste generators, collectors, transporters, dismantlers and recyclers and stakeholders of e-wastes irrespective of their scale of operation.

But the Policy has not addressed all issues ranging from production and trade to final disposal, including technology transfers for the recycling of electronic waste. It was not indicated that which products could be re-cycled and which could not..

6. E-Waste Management and Handling Rules-2011

These rules were published by Govt of India, Ministry of forest and Environment Dept, dated 14th May 2010 and came into effect from 1stMay, 2012. These rules shall apply to every producer(s), dealer(s), collection

ISSN 2394 - 7780

centre(s), refurbisher(s), dismantler(s), recycler(s), auctioneer(s) consumer(s) or bulk consumer(s) involved in the manufacture, sale, purchase and processing of electrical and electronic equipment or components as specified in schedule-I including collection centre, dismantler and recyclers of e-waste but shall not apply to batteries as covered under Batteries (Management & Handling)Rules,2001. The rule disclosed the 'extended producer responsibility'(EPR) which means responsibility of any producer of electrical or electronic equipment, for their products beyond manufacturing until environmentally sound management of their end-of-life products.

Chapter II of the act describes the Responsibilities of the producer, in terms of collection of any e-waste generated during the manufacture of electrical and electronic equipment and channelizing the same for recycling or disposal.

Chapter III discloses the method for seeking authorization and registration for handling e-waste with central and state pollution control board.

Chapter IV describes the procedures of storing of e-waste which should not stored for more than 180 days

Chapter V instructs the manufacturers to not to use hazardous substances in manufacturing e-goods.

This rule is a comprehensive rule for the management of e-waste in India. But certain loopholes can be seen. While describing the responsibilities of consumers or bulk consumers it has been stated that the consumers should return the goods to the pick-up or take back services provided by the producers but at whose cost is not mentioned. The rule stressed upon the EPR but nothing has been said about individual producers' responsibilities (IPR). The rules are silent about the informal economy where a mammoth volume of the country's e-wastes 95% (source- ASSOCHAM study, 2016) are handled and managed.

7. E-waste (Management) Rules, 2016

The newly framed E-waste (Management) Rules, 2016'are based on Extended Producer Responsibility (EPR). The EPR in this rule is a target based approach where producers are responsible to collect 30 per cent to 70 per cent (over seven years) of the e-waste generation as indicated in the Extended Producer Responsibility Plan. The producers have to submit an EPR Plan to take EPR Authorisation from Central Pollution Control Board, India for managing EPR with implementation plans and targets outlined in such authorisation including detail of Producer Responsibility Organisation (PRO) and e-waste exchange. A 'Deposit Refund scheme' is introduced which is means a scheme whereby the producer charges an additional amount as a deposit at the time of sale of the electrical and electronic equipment and returns it to the consumer along with interest when the end- of- life electrical and electronic equipment is returned.

The concept of Producer Responsibility Organisation and Deposit Refund scheme will be effective only when the main stakeholders of e-goods i.e. marginal consumers become aware of the harmful effect of e-wastes and willing to shift from informal recycling to formal recycling. Thus it is the need of time to start awareness program about e-wastes and its management.

8. E- Waste (Management) Amendment Rules, 2017 and 2018

On 30th October, 2017, Government amended Schedule III of the E-Waste (Management) Rules, 2016 as under-

Year	E-Waste Collection Target as Indicated in EPR Plan (Number/Weight)	Year	E-Waste Collection Target as Indicated in EPR Plan (Number/Weight)
2017-2018	10%	2021-2022	50%
2018-2019	20%	2022-2023	60%
2019-2020	30%	2023 onwards	70%
2020-2021	40%		

The subsequent amendment in 2018 introduced the responsibilities of new sellers who have started their operations very recently. Their e-waste collection target will be 5% to 20% sales figure of the year preceding to the previous year.

The 2017 amendment is itself a question as responsibilities of the producers are decreased. Previously the target of collection of the producers of e-waste in the 1st year was 30%. In this amendment it was decreased to 10% only.

CONCLUSIONS

E-waste is hazardous in nature. This has made electronic waste management an issue of environment and health concern. Though there are several rules and legislations in India to tackle e-waste effectively, there exist some

ISSN 2394 - 7780

loopholes. The trade policy framed by DGFT needs to be revised so as to stop the import of obsolete technology. Policies and regulations that cover Design for Environment and better management of restricted substances must be implemented for a better e-waste management. On the other hand increased public awareness is the need of the hour. Along with EPR, individual producer's responsibility (IPR) should be implemented. Laws should be made to make a bridge between informal and formal sector for a sound environmental e-waste management in India.

REFERENCES

1. Bhaskar K & Monana R, 'India's E-Waste Rules and Their Impact on E-Waste Management Practices: A Case Stud' Journal of Industrial ecology, Volume22, Issue 4, Pg 930-942, 2017, https://doi.org/10.1111/jiec.12619
2. Dejo Olowu, 'Menace of E-Wastes in Developing Countries: An Agenda for Legal and Policy Responses', 8/1 Law, Environment and Development Journal (2012), p. 59, available at http://www.lead-journal.org/content/12059.pdf
3. DGFT EXIM policy-2002-2007
4. E-Waste Management and Handling Rules-2011
5. E-waste (Management) Rules, 2016
6. E- Waste (Management) Amendment Rules, 2017, 2018
7. Foreign Trade Policy-2009-2014
8. Ganguly R, E-Waste Management in India – An Overview. Available from: https://www.researchgate.net/publication/305268040_E-Waste_Management_in_India_-_An_Overview
9. Guidelines for environmentally Sound Management of e-waste, published by Ministry of Environment & Forests and Central Pollution Control Board, March 2008
10. Kumar U & Singh D,' E – Waste Management through Regulations', International Journal of Engineering Inventions e-ISSN: 2278-7461, p-ISSN: 2319-6491 Volume 3, Issue 2 (September 2013) PP: 06-14
11. Municipal Solid Waste (Management and Handling) Rules 2000
12. rajyasabha.nic.in/rsnew/publication_electronic/E-Waste_in_india.pdf,(2011) (last accessed on 5.09.2018)
13. The Hazardous Wastes (Management and Handling) Rules, 1989 as amended in 2008
14. Singh P & Borthakur, 'Electronic waste in India: Problems and policies' International Journal of Environmental Sciences Volume 3, No 1, 2012
15. UNEP report 2005 and 2010
16. www.assocham.org/newsdetail.php?id=5642 (last accessed on 7.09.2018)
17. www.basel.int (last accessed on 08.9.2018)

ACKNOWLEDGMENT

This paper is a part of PhD work of Shelley Pandit under the supervision of Dr. Dipankar Dey, Dept. of Management, University of Calcutta.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

OPTIMISED INTEGRAL TAKE AWAY PROPORTIONAL DERIVATIVE CONTROLLERS FOR AGC LOOP IN A MULTI-AREA CCGT-THERMAL DEREGULATED POWER SYSTEM

S. Ezhil[1], B. Paramasivam[2] and I. A. Chidambaram[3]
Lecturer[1], Department of EEE, Government Polytechnic College, Udhagamandalam
Assistant Professor[2], Department of EEE, Government College of Engineering, Bodinayakkanur
Professors[3], Department of Electrical Engineering, Annamalai University, Annamalainagar

ABSTRACT
In this paper, the application of Integral take away Proportional Derivative with derivative Filter (I-PDF) is used for mitigating the various for Automatic Generation Control (AGC) issues of an interconnected Combined Cycle Gas Turbine (CCGT) incorporated two-area thermal power system under deregulated environment. The control strategy of CCGT plant includes temperature and air flow controllers that are designed on the basis of minimization of Area Control Error (ACE). The proposed I-PDF controller is used as secondary controller whose promising performance is compared with Proportional-Integral (PI), Pseudo-Derivative Feedback with Feed-forward controller (PDFF) controllers. A new metaheuristic algorithm known as Lightning Search Algorithm (LSA) is employed for optimization of the controller parameters. Integral Square Error (ISE) criteria have been used as performance index to design the optimal controller. The simulation results reveal that the superiority of proposed I-PDF controller, the dynamic performance of AGC loop have improved in terms of less peak deviation and settling time of area frequencies and tie-line power in different transactions of deregulated power system. Moreover the Power System Restoration Indices (PSRI) is computed based on system dynamic performances of two-area CCGT-thermal interconnected power system and the remedial measures to be taken can be adjudged.

Keywords: Automatic Generation Control, Combined Cycle Gas Turbine, I-PDF controller, Lightning Search Algorithm, Power System Restoration Indices.

1. INTRODUCTION
The main objectives of the AGC is to maintain system frequency as well as tie-line power deviations within permissible limit by regulating the output power of each generator at prescribed levels in response to continuously-changing load demand [1]. The AGC action is directed by the Area Control Error (ACE) which is a function of system frequency and tie line flows. As the ACE is focused to zero by the AGC both frequency and tie-line power errors will be put on to zero [2]. The increase in exchange of power through tie-lines, economic and ecological impact has created an utmost interest among the researchers after deregulation [3]. At the present time the conventional power system has been changed to deregulated environment. A deregulated power system comprises of generation companies (Gencos), distribution companies (Discos), transmission companies (Transcos) and Independent Contract Administrator (ICA). In such a new scenario, Discos can autonomously make agreement with Gencos for delivery power to meet the demand of the consumer. An ICA is a self-governing agent that manages all the transactions alleged between Discos and Gencos. A Disco Participation Matrix (DPM) is used for hallucination of bonds between Gencos and Discos [4-7].

AGC systems with number of sources such as hydro, thermal, and diesel plants are studied [4]. Among the conventional units, combined cycle gas turbine (CCGT) is unique in nature. The unique modeling system of CCGT includes temperature and air flow controller along with secondary controller; to control the frequency is one of its kinds in conventional system. Fuel flow and air flow controllers are controlled according to predetermined exhaust gas temperature values that are defined as a function of the gas turbine power outputs. The effect of temperature control in its output control response when it operates near its rated capacity. Frequency control becomes even challenging when the number and proportion of base loaded CCGTs increases. It possesses some advantages over thermal generations such as higher efficiency and lower emissions combined with progressively shorter installation times and reduced installation. CCGT plants have always played an effective role in meeting the growing power demand worldwide [8, 9].

Many literatures on AGC have used classical controllers such as I, PI, PID and integral double derivative as supplementary controller and their performance are compared in solving AGC problem [9, 10]. In conventional systems, I, PI and PID are being successfully used due to its simplicity, reliable nature and cheap cost. However, a step change in the reference input to a parallel PID controller results into sudden spike in the controller output via the proportional term known as proportional kick, whereas differentiation of the same results into an impulse like spike change in the control signal known as derivative kick. Higher amount of kick may cause a serious problem in any electronic circuitry [11]. For reducing the effects, one of the modified

ISSN 2394 - 7780

versions of the PID controller called the integral minus proportional derivative with filter (I-PDF) controller was proposed [12]. So far, I-PD or I-PD with first-order filter effect has not been used as secondary controller in AGC. This calls for an investigation to find out its performance over the dynamics of the system.

Several optimization techniques plays an important role to find the optimal controller parameters such as Particle Swarm Optimization (PSO), Genetic Algorithm (GA), Biogeography-Based Optimization (BBO), Krill Herd Algorithm (KHA), Teaching Learning Based Optimization (TLBO) and Bacterial Foraging Optimization (BFO) algorithm have been planned to resolve the control parameters of a several standard controllers to solve the AGC problem [13-18]. A more recent powerful meta-heuristic algorithm called Lightning Search Algorithm (LSA) is a powerful and flexible optimization technique that was inspired by the natural phenomenon of lightning [19]. The advantages of this algorithm are to be utilized for optimization of PI, PDFF and I-PDF controller gains of AGC loop for two-area CCGT-Thermal interconnected deregulated power system for different transactions. The purpose of this paper is to provide a conceptually computational methodology for ensuring the system restoration strategies in a faster manner. To achieve a faster restoration process, new black start generators can be installed allowing network reconfigurations and the load recovery can also be adopted in accelerating the system restoration. In this study to evaluate Power System Restoration Indices (PSRI) based on the Automatic Generation Control (AGC) assessment of two-area CCGT-Thermal interconnected power system in a restructured environment.

2. MODELING OF TWO-AREA CCGT-THERMAL POWER SYSTEM IN DEREGULATED ENVIRONMENT

Investigations are carried out on a two unequal area CCGT-thermal system under deregulated environment. Area 1 has two conventional reheat thermal Gencos, area 2 has two Gencos one is conventional reheat thermal and other is CCGT and two numbers of Discos have been considered in each control area. Both CCGT and thermal plants are made to operate at base-loaded capacity continuously for attaining maximum efficiency and lower per unit fuel costs [8]. Due to relatively constant power usage, the load factor is high in both cases. The schematic diagram and transfer function model of the CCGT-Thermal deregulated power system is shown in Fig 1. In view of these, the controlling action in CCGT plant operation is done by (i) secondary controller controls the frequency deviation (ΔF) from nominal value, (ii) temperature controller controls fuel flow in CCGT plant. Its objective is to keep the exhaust temperature (Te) constant, and hence the temperature deviation between calculated and rated one is to be minimised to zero [8]. (iii) Air flow controller controls air flow in compressor with the help of IGVs at the entrance of compressor. Although temperature and air-flow controller does not serve the purpose of secondary control but temperature and air-flow control during base and partial load affect ΔF as the air flow (Wa) into the combustor depends on shaft speed (ω) [8]. Proper balance of Te is the measure of desired efficiency and ΔF which is maintained by the aforesaid controllers [8]. The detailed transfer function model of CCGT power is shown in Fig 2 [9].

ISSN 2394 - 7780

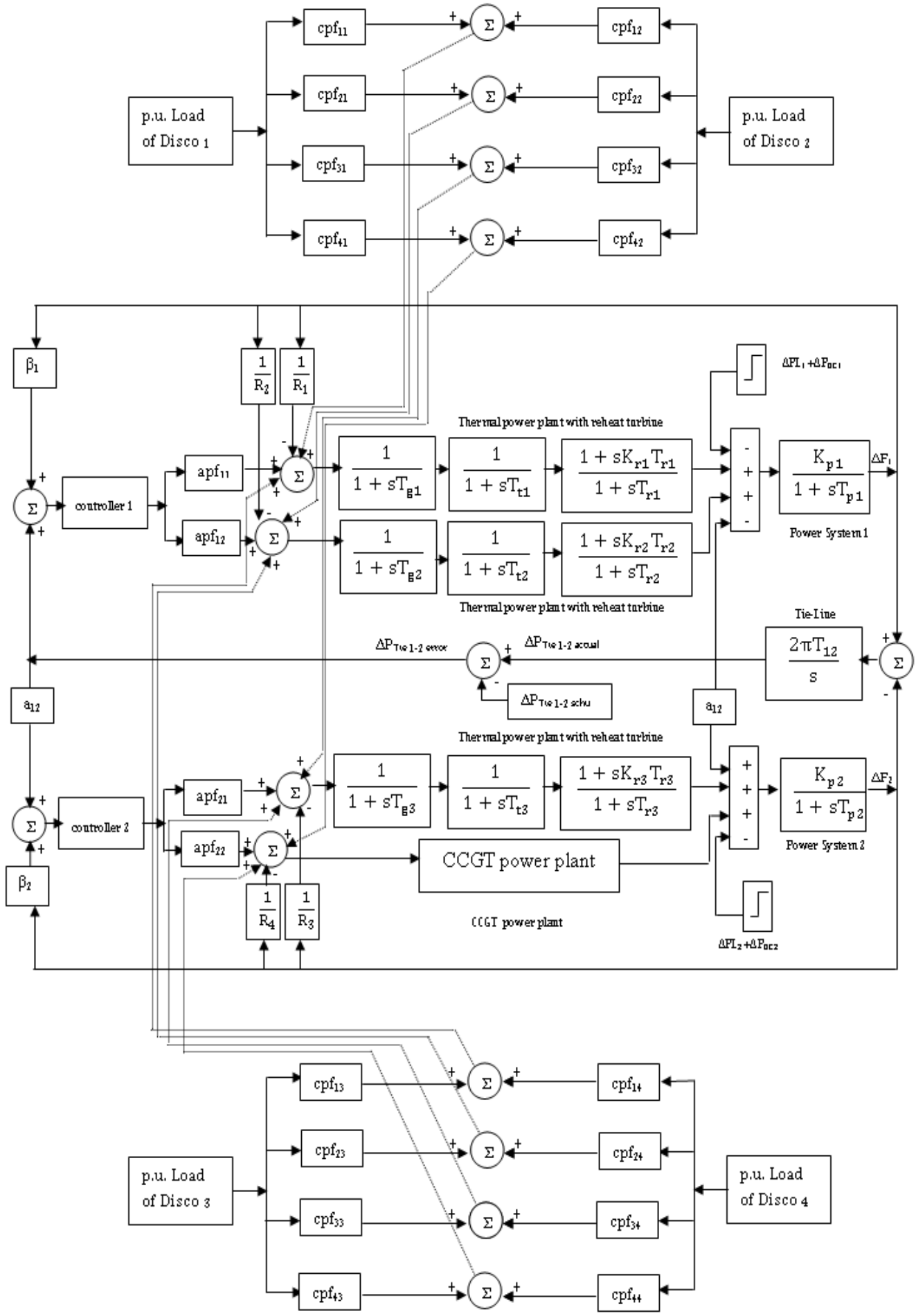


Fig-1: Transfer function model of two area CCGT-Thermal power system in deregulated environment

ISSN 2394 - 7780

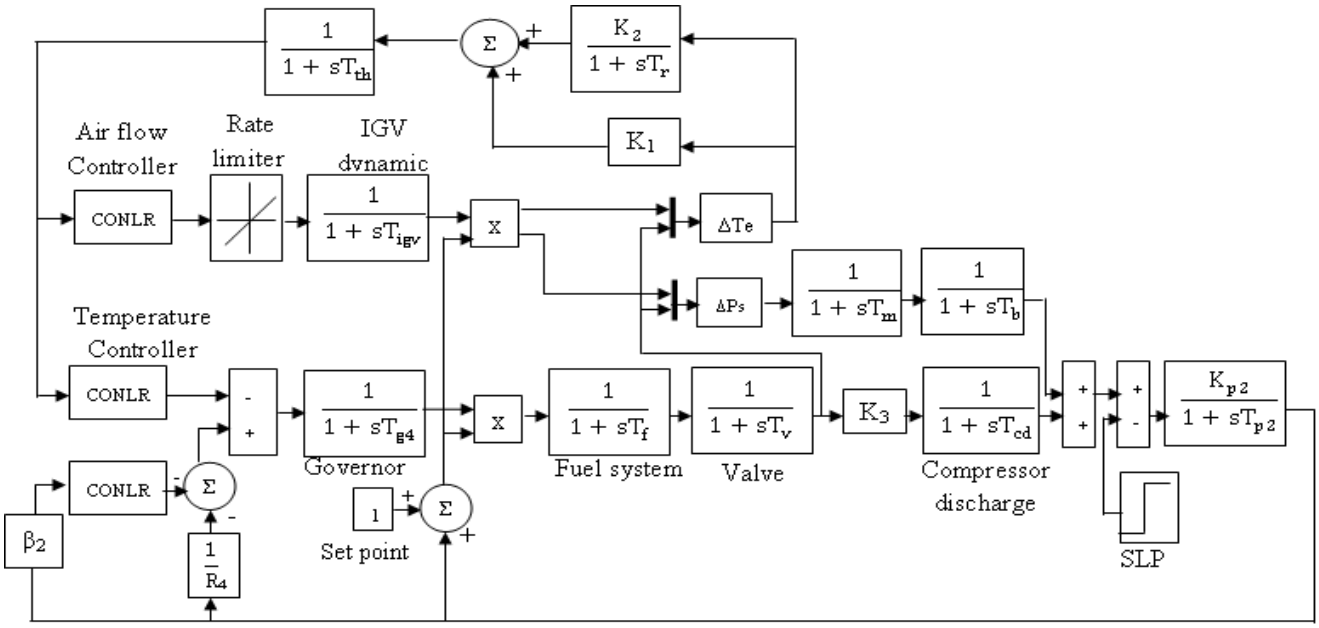


Fig-2: Transfer function model of a CCGT plant

In the new environment, Discos may contract power from any Gencos and ISO has to supervise these contracts. DPM is a matrix in which the number of rows is equal to the number of Gencos and the number of columns is equal to the number of Discos in the system. Each entry in this matrix can be thought of as fraction of a total load contracted by a Disco towards a Genco. The sum of all the entries in a column DPM is unity. From the Fig 1, Let $Genco_1$, $Genco_2$, $Disco_1$, $Disco_2$ be in area 1 and $Genco_3$, $Genco_4$, $Disco_3$, $Disco_4$ be in area 2. The corresponding DPM is given as follows

$$DPM = \begin{bmatrix} cpf_{11} & cpf_{12} & cpf_{13} & cpf_{14} \\ cpf_{21} & cpf_{22} & cpf_{23} & cpf_{24} \\ cpf_{31} & cpf_{32} & cpf_{33} & cpf_{34} \\ cpf_{41} & cpf_{42} & cpf_{43} & cpf_{44} \end{bmatrix} \quad (1)$$

where *cpf* represents "contract participation factor" i.e. p.u. MW load of a corresponding Disco. The scheduled steady state power flow on the tie-line is given as [4]

$$\Delta P_{Tie\,12}^{scheduled} = \sum_{i=1}^{2}\sum_{j=3}^{4} cpf_{ij}\,\Delta P_{Lj} - \sum_{i=3}^{4}\sum_{j=1}^{2} cpf_{ij}\,\Delta P_{Lj} \quad (2)$$

The actual tie-line power is given as

$$\Delta P_{Tie\,12}^{actual} = \frac{2\pi T_{12}}{s}(\Delta F_1 - \Delta F_2) \quad (3)$$

At any given time, the tie-line power error is given by [4]

$$\Delta P_{Tie\,12}^{Error} = \Delta P_{Tie\,12}^{actual} - \Delta P_{Tie\,12}^{scheduled} \quad (4)$$

$\Delta P_{Tie\,12}^{Error}$ vanishes in the steady as the actual tie-line power flow reaches the scheduled power flow. This error signal is used to generate the respective Area Control Error (ACE) signals as in the traditional scenario [4].

$$ACE_1 = \beta_1 \Delta F_1 + \Delta P_{Tie12}^{Error} \quad (5)$$

$$ACE_2 = \beta_2 \Delta F_2 + \alpha_{12} \Delta P_{Tie12}^{Error} \quad (6)$$

The generation of each Genco must track the contracted demands of Discos in steady state. The desire total power generation of i^{th} Genco in terms of DPM entries can be calculated as

$$\Delta P_{mi} = \sum_{j=1}^{4} cpf_{ij}\,\Delta P_{Lj} \quad (7)$$

As there are two Gencos in each area, ACE signal has to be distributed among them in proportion to their participation in the AGC. Coefficients that distribute ACE to Gencos are termed as "area participation factors

ISSN 2394 - 7780

(apfs)". In a given control area, the sum of participation factors is equal to 1. Hence, apf_{11}, apf_{12} are considered as ACE participation factor in area 1 and apf_{21}, apf_{22} are in area 2.

3. DESIGN OF I-PDF CONTROLLER USING LIGHTNING SEARCH ALGORITHM

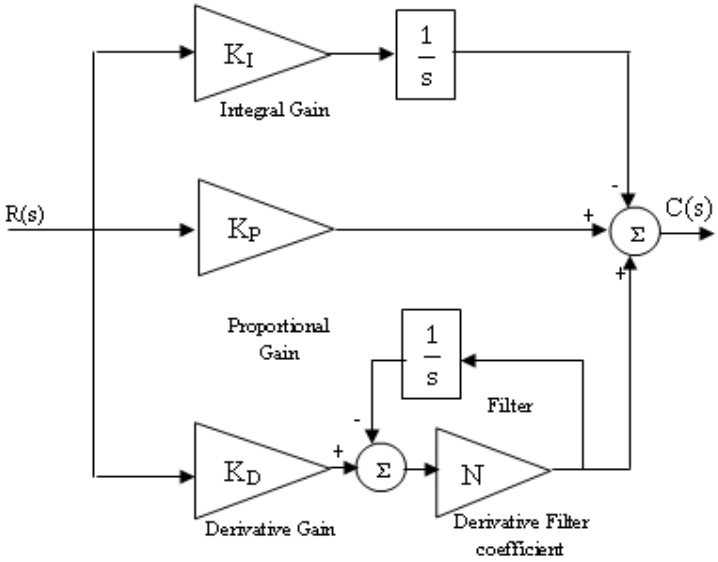


Fig-3: Block diagram for I-PDF controller

In PID controller, proportional, integral and derivative terms are in parallel. Hence, the transfer function, $T(s)$ of PID controller is given by (8). The output PID controller signal is multiplication of $T(s)$ and input signal $R(s)$ given by (9).

$$T(s) = K_p(s) + \frac{K_I(s)}{s} + sK_D(s) \tag{8}$$

$$C(s) = R(s)\left(K_p(s) + \frac{K_I(s)}{s} + sK_D(s)\right) \tag{9}$$

Due to proportional and derivative term in the forward path, PID offers proportional and derivative kick (impulse signal) in the controller output which is undesirable in electronic circuitry [11]. To solve this problem, industrial engineers redesigned the PID controller structure as I-PD controller by setting the integral term on forward path and the proportional and derivative term on feedback path [11]. The transfer function of I-PD controller and the output controller signal $T(s)$ is given by

$$T(s) = \frac{K_I(s)}{s} - (K_p(s) + sK_D(s)) \tag{10}$$

$$C(s) = R(s)\left(\frac{K_I(s)}{s} - (K_p(s) + sK_D(s))\right) \tag{11}$$

Here, a first-order filter is included in the derivative path of I-PD controller to wipe out the noises in the system and the transfer function is given by

$$C(s) = R(s)\left(\frac{K_I(s)}{s} - \left(K_p(s) + \left(\frac{Ns}{s+N}\right)K_D(s)\right)\right) \tag{12}$$

Comparing (8) and (10), it is clearly seen that an abrupt change in the reference input $R(s)$ does not affect the proportional K_P and derivative K_D terms. This explains the superiority of the I-PD controller. Generally, industries use PID controller. However, when required, the structure of the PID controller may be changed [11]. Due to wide availability, simple structure and less cost of I-PDF controller, just like PID controller, it is successfully applicable in non-linear systems for higher order controllability [11, 12]. In this study, LSA is used to tune the I-PDF controller for a two area CCGT-thermal interconnected power system. The performance of these responses is measured using performance functions such as Integral of Squared Error (ISE) given by Eqn (13).

$$J = \int_0^{t_{sim}} (\beta \Delta F_1^2 + \beta \Delta F_2^2 + \Delta P_{tie}^2)\, dt \tag{13}$$

ISSN 2394 - 7780

The relative simplicity of this controller is a successful approach towards the zero steady state error in the frequency of the system. With these optimized gain values the performance of the system is analyzed and various PSRI are computed.

3.1 Lightning Search Algorithm

LSA is a natural phenomenon based on a novel meta-heuristic algorithm. It is based on the lightning mechanism which involves the propagation of step leader [19]. Some of the molecules of water condensed from a thundercloud split in random directions, known as projectiles. It is considered that the fast particles called projectiles form the binary tree structure of the step leader. The initial population size of the algorithm is represented by these projectiles. The velocity of the projectile is shown in (14)

$$v_p = \left[1 - \left(\frac{1}{\sqrt{1-\left(\frac{v_0}{c}\right)^2 - \left(\frac{sF_i}{mc^2}\right)}}\right)^{-2}\right]^{-1/2} \tag{14}$$

where v_0 is the initial velocity of the projectile, m is the mass of the projectile, F_i is the constant ionisation rate, c is the speed of light and s is the length of the path travelled. Thus, the projectile has less potential to ionise or explore a large space if the mass is less and travelled path is long. Hence, the relative energy of the step leader controls the exploration and exploitation of the algorithm. An important property of projectile is forking, which improves the bad solution of the population and if it is not so one of the channels at the forking point is lighted up to keep the population size. In this algorithm, three types of projectiles are introduced to represent the whole step leader movement. These are transition projectiles which construct the population of first step leader, space projectile which try to attain the best position and lead projectile which represents the best position among all population. Since the transition projectiles are ejected in random direction, it can be represented by a random number from uniform probability distribution function, which is given by (15)

$$f(x^T) = \begin{cases} \frac{1}{b-a}; & a \leq x^T \leq b \\ 0 \quad ; & x < a, x^T > b \end{cases} \tag{15}$$

where x^T is the random number that gives the solution or the initial tip energy of step leader i, a and b are the lower and upper boundaries of the solution space. After evolving the N step leader tips, it will move by ionising the surrounding area of the old leader using energetic projectiles in the next step. The position of the space projectile can be obtained from probability density function of exponential distribution as shown in (16)

$$f(x^s) = \begin{cases} \frac{1}{\mu} e^{-x^{s}/\mu}; & a < x^T < b \\ 0 \quad ; & x^{s} \leq 0 \end{cases} \tag{16}$$

where μ is the shaping parameter which determines the space projectile position or direction in the next step. For a particular space projectile, μ_i is considered as the distance between lead

projectile and space projectile in the algorithm. The position of a particular space projectile is given by (17)

$$P^s_{i-new} = P^s_i \mp \exp rand_i(\mu_i) \tag{17}$$

If the projectile energy is not greater than the step leader, the new position of the space projectile does not ensure propagation of stepped leader to expand the channel. If it is not so, it will become lead projectile. The normal probability distribution function of lead projectile with scale parameter σ is given by (18)

$$f(x^L) = \frac{1}{\sigma\sqrt{2\pi}} e^{-(x^L-\mu)^2/2\sigma^2} \tag{18}$$

In LSA, the best solution can be obtained as shape parameter for space projectile and scale parameter decreases exponentially. The position of lead projectile is expressed in (19).

$$P^L_{new} = P^L + norm\, rand_i(\mu_L, \sigma_L) \tag{19}$$

If the new position of the lead projectile gives a good solution, then the step leader is extended and the lead projectile position is updated. Thus, the exploitation and exploration are performed by space and lead projectiles to find the optimum solution. The exploration is represented by exponential random behaviour of the space projectile and exploitation process is controlled by lead projectile with random search. The control

ISSN 2394 - 7780

parameters of LSA are population size, maximum iteration and channel time. In this paper, population size, maximum iteration and channel time are considered as 100, 100 and 20, respectively.

4. EVALUATION OF POWER SYSTEM RESTORATION INDICES

Power system restoration is well recognized as an important task to reduce the duration of a disturbance that occurs in power systems. The high level strategy of the System Restoration Plan is to restore the integrity of the interconnection as quickly as possible. The system restoration strategies are found closely related to the systems' characteristics. After analyzing the system conditions and characteristics of outages, system restoration planners or dispatchers will select the Power System Restoration Indices (PSRI) which were obtained based on system dynamic performances and the remedial measures to be taken can be adjudged. In this study two-area CCGT-thermal interconnected power system in a restructured environment are considered when the system is operating in a normal condition with Gencos units in operation and is one or more Gencos unit outage in any area. From these Restoration Indices the restorative measures like the magnitude of control input, rate of change of control input required can be adjudged. The various power system restoration indices $(PSRI_1, PSRI_2, PSRI_3 \text{ and } PSRI_4)$ are calculated as follows

Step 1: The Power System Restoration Index 1 $(PSRI_1)$ is obtained from the ratio between the settling time of the control input deviation $\Delta P_{c1}(\tau_{s1})$ response of area 1 and power system time constant (T_{p1}) of area 1

$$PSRI_1 = \frac{\Delta P_{c1}(\tau_{s1})}{T_{p1}} \tag{20}$$

Step 2: The Power System Restoration Index 2 $(PSRI_2)$ is obtained from the ratio between the settling time of the control input deviation $\Delta P_{c2}(\tau_{s2})$ response of area 2 and power system time constant (T_{p2}) of area 2

$$PSRI_2 = \frac{\Delta P_{c2}(\tau_{s2})}{T_{p2}} \tag{21}$$

Step 3: The Power System Restoration Index 3 $(PSRI_3)$ is obtained from the peak value of the control input deviation $\Delta P_{c1}(\tau_p)$ response of area 1 with respect to the final value $\Delta P_{c1}(\tau_s)$

$$PSRI_3 = \Delta P_{c1}(\tau_p) - \Delta P_{c1}(\tau_s) \tag{22}$$

Step 4: The Power System Restoration Index 4 $(PSRI_4)$ is obtained from the peak value of the control input deviation $\Delta P_{c2}(\tau_p)$ response of area 1 with respect to the final value $\Delta P_{c1}(\tau_s)$

$$PSRI_4 = \Delta P_{c2}(\tau_p) - \Delta P_{c2}(\tau_s) \tag{23}$$

5. SIMULATION RESULTS AND OBSERVATIONS

In this study the proposed I-PDF controller are designed and implemented for AGC loop of a two-area CCGT-thermal deregulated power system under different type of possible transactions. A new metaheuristic Lightning Search Algorithm is used for optimal tuning I-PDF controller and their performances are compared with PI and PDFF controllers. The model of the system under study has been developed in MATLAB/SIMULINK environment. The nominal parameters are given in Appendix.

Scenario 1: Poolco based transaction

In this scenario, Gencos participate only in the load following control of their areas. It is assumed that a large step load 0.2 p.u.MW, is demanded by each Disco in area 1. Assume that a case of Poolco based contracts between Dicos and available Gencos is simulated based on the following Disco Participation Matrix (DPM) referring to Eq (1) is considered as

$$DPM = \begin{bmatrix} 0.5 & 0.5 & 0.0 & 0.0 \\ 0.5 & 0.5 & 0.0 & 0.0 \\ 0.0 & 0.0 & 0.0 & 0.0 \\ 0.0 & 0.0 & 0.0 & 0.0 \end{bmatrix} \tag{24}$$

$Disco_1$ and $Disco_2$ demand identically from their local Gencos, viz., $Genco_1$ and $Genco_2$. Therefore, $cpf_{11} = cpf_{12} = 0.5$ and $cpf_{21} = cpf_{22} = 0.5$. It may happen that a Disco violates a contract by demanding more power than that specified in the contract and this excess power is not contracted to any of the Gencos. This

ISSN 2394 - 7780

uncontracted power must be supplied by the Gencos in the same area to the Disco. It is represented as a local load of the area but not as the contract demand. Consider scenario-1 again with a modification that Disco demands as given in Table 1 (case 1- 4). The optimum I-PDF controller parameters values for a two-area CCGT-thermal power system are tuned using LSA for various case studies (case 1- 4) and are tabulated in the Table1. In Fig 4 shows comparative transient performances of CCGT- thermal power system for given load perturbation and results are tabulated in Table 2. From the Fig 4 and Table 2, it can observe that the LSA optimized I-PDF controller performs better in diminishing the peak deviations and steady-state error as compared with PI and PDFF controller. The non-linear characteristics of CCGT and thermal system are easily suppressed by LSA optimised I-PDF controller. The settling time and peak over /under shoot (*Mp*) of the control input deviations (ΔP_c) in both the area were obtained from Fig 4 (d, e). From this Fig the corresponding various power system restoration indices $(PSRI_1, PSRI_2, PSRI_3 \; and$. are calculated and tabulated in Table 3 and 4 (case 1-4) for different CCGT power plant participation factors (apf_{22} = 0.5, 0.4, 0.3, 0.2).

Scenario 2: Bilateral based transaction

In this case, the Discos have complete freedom to contract with any Genco in its own area or some other areas. Here, the contract relationships are framed according to DPM of (25). In this case, the $Disco_1$, $Disco_2$, $Disco_3$ and $Disco_4$, demands 0.25 pu.MW, 0.15 pu.MW, 0.3 pu.MW and 0.1 pu.MW from Gencos as defined by cpf in the DPM matrix

$$DPM = \begin{bmatrix} 0.5 & 0.3 & 0.2 & 0.2 \\ 0.2 & 0.2 & 0.2 & 0.4 \\ 0.2 & 0.3 & 0.4 & 0.1 \\ 0.1 & 0.2 & 0.2 & 0.3 \end{bmatrix} \quad (25)$$

Each Gencos for CCGT-thermal system participates in AGC as defined by the following ACE participation factor $apf_{11} = apf_{12} = 0.5$ and $apf_{21} = apf_{22} = 0.5$. In CCGT-thermal system, the CCGT power plant participation factors have been considered with various participation factors like apf_{22} = 0.5, 0.4, 0.3, 0.2. The corresponding power system restoration indices are calculated from dynamic output responses of the proposed test system using LSA tuned PIFD controller is shown in Table 3 and 4 (case 5-8). Apart from the normal operating condition of the test systems few other case studies like outage Genco-2 in area 1 and uncontracted power demand in any area and Disco Participation Matrix (23) is considered. The corresponding PSRI are evaluated for the test system and tabulated in Table 3 and 4 (case 9-12). The main focus in this paper PSRI are useful for system planners for restoration planning in advance.

(i) If $1.0 \leq PSRI_1, PSRI$, then the system subject to a large steady error for step load changes. The integral control action is required based on the performance criteria. The integral controller gain of each control area has to be increased causing the speed changer valve to open up widely. Thus the speed- changer position attains a constant value only when the frequency error is reduced to zero. The proposed I-PDF controller have improved PSR indices

(ii) If $PSRI_1, PSRI$, then the system required more amount of distributed generation requirement is needed and the FACTS devices are needed to improvement tie-line power oscillations.

(iii) If $0.2 \leq PSRI_3, PSRI$, then the system required the stabilization of frequency oscillations in an interconnected power system. In deregulated system, regulation and load following are the two frequency-related ancillary services required for balancing the varying load with matching generation. In cases where a dramatic decline in frequency occurs during the restoration process, it is necessary to reduce the amount of load that are connected, which can be accomplished by the application of under load shedding scheme

(iv) If $PSRI_3, PSRI$, then the system is vulnerable and the system becomes unstable and may result to blackout. To restore the system as quickly as possible, especially for a bulk system, partitioning system into islands is necessary. Islands are resynchronizes after restoration of each island. Major actions involved in this restoration process are start up of black start units, cranking of non-black start units, restoration of islands, and synchronization of islands.

ISSN 2394 - 7780

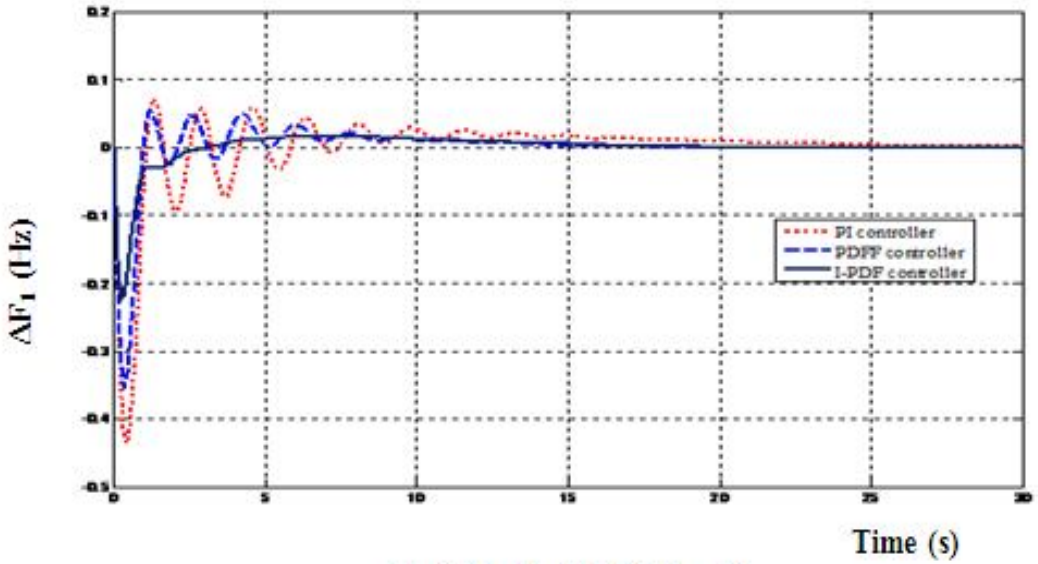


Fig-4(a): ΔF_1 (Hz) Vs Time(s)

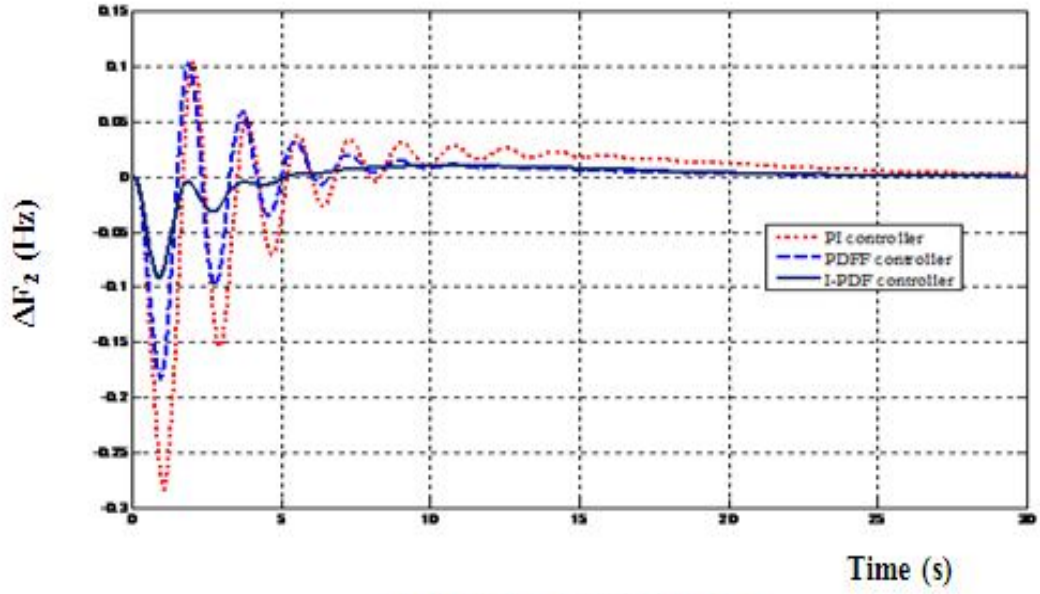


Fig-4(b): ΔF_2 (Hz) Vs Time (s)

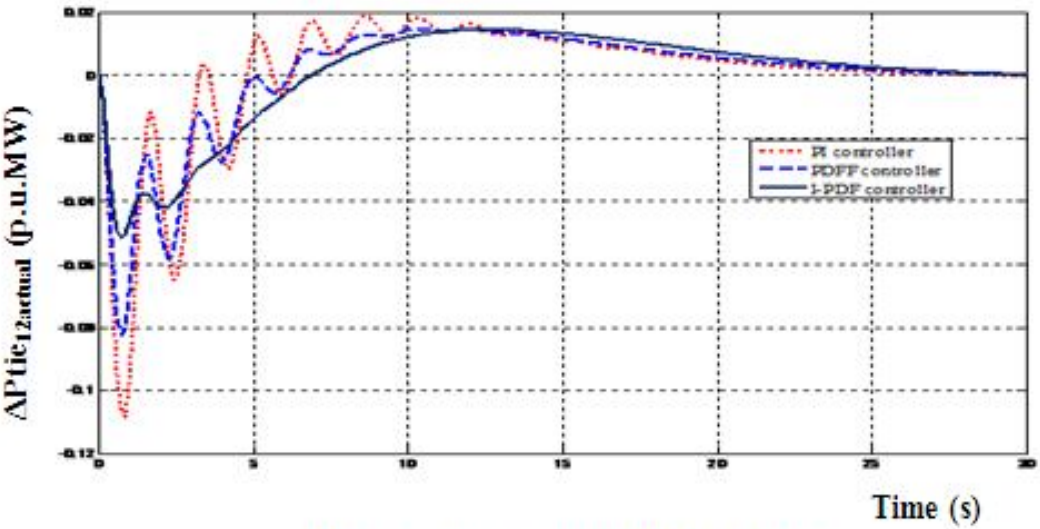


Fig-4(c): $\Delta Ptie_{12,\ actual}$ (p.u.MW) Vs Time (s)

ISSN 2394 - 7780

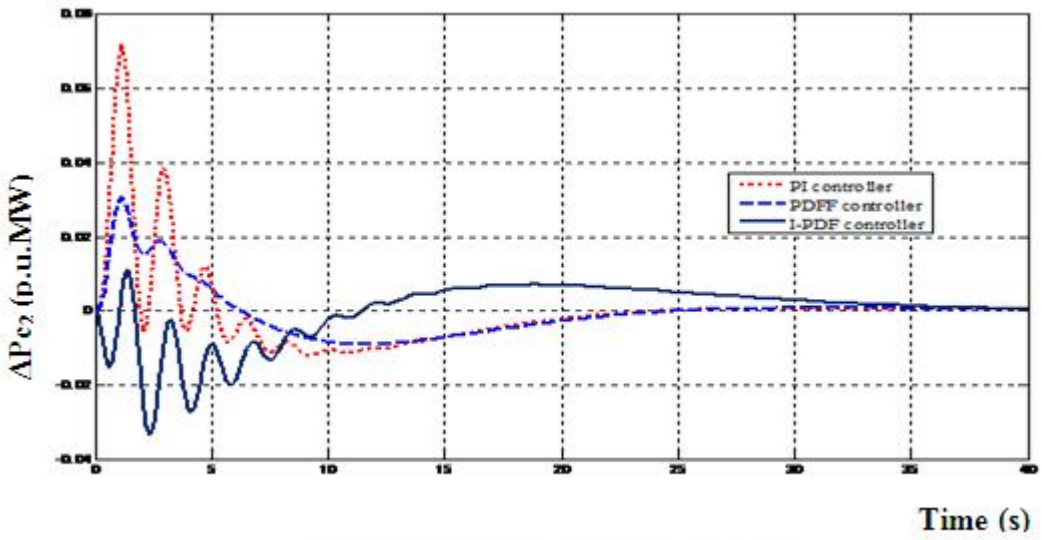


Fig 4(e): ΔPc_2 (p.u.MW) Vs Time (s)

Fig-4: Dynamic responses of the frequency deviations, tie- line power deviations, and Control input deviations for a two area CCGT-thermal system using various controllers (case-1)

Table-1: Optimized I-PDF control parameter values using LSA for two-area CCGT- thermal power system with corresponding Load demand change

Two-area CCGT-thermal system	I-PDF controller gain of area 1				I-PDF controller gain of area 2				Load demand in pu.MW				un contracted load demand pu.MW	
	K_P	K_I	K_d	N	K_P	K_I	K_d	N	$Disco_1$	$Disco_2$	$Disco_3$	$Disco_4$	area1	area 2
Case 1	0.722	0.512	0.314	86.74	0.607	0.634	0.128	91.24	0.2	0.2	0.0	0.0	0.0	0.0
Case 2	0.612	0.548	0.371	90.45	0.534	0.654	0.178	94.57	0.2	0.2	0.0	0.0	0.1	0.0
Case 3	0.745	0.569	0.412	87.11	0.697	0.672	0.206	92.78	0.2	0.2	0.0	0.0	0.0	0.1
Case 4	0.811	0.608	0.429	92.78	0.708	0.712	0.234	95.17	0.2	0.2	0.0	0.0	0.1	0.1
Case 5	0.543	0.622	0.011	32.47	0.446	0.678	0.010	40.53	0.25	0.15	0.3	0.1	0.0	0.0
Case 6	0.612	0.634	0.102	33.45	0.536	0.684	0.099	41.68	0.25	0.15	0.3	0.1	0.15	0.0
Case 7	0.645	0.657	0.123	38.49	0.512	0.692	0.117	44.71	0.25	0.15	0.3	0.1	0.0	0.15
Case 8	0.671	0.688	0.137	40.18	0.544	0.701	0.126	45.63	0.25	0.15	0.3	0.1	0.15	0.15
Case 9	0.257	0.364	0.302	45.54	0.312	0.375	0.312	36.22	0.25	0.15	0.3	0.1	0.0	0.0
Case 10	0.322	0.372	0.329	52.26	0.443	0.383	0.354	37.31	0.25	0.15	0.3	0.1	0.1	0.0
Case 11	0.337	0.378	0.333	54.91	0.476	0.392	0.342	38.96	0.25	0.15	0.3	0.1	0.0	0.1
Case 12	0.342	0.381	0.346	58.97	0.434	0.398	0.361	40.09	0.25	0.15	0.3	0.1	0.1	0.1

Table-2: Comparison of the system dynamic performance for two-area CCGT-thermal power system (case-1)

controller	Setting time (τ_s) in sec			Peak over / under shoot		
	ΔF_1	ΔF_2	ΔP_{tie}	ΔF_1 in Hz	ΔF_2 in Hz	ΔP_{tie} in p.u.MW
PI	24.51	26.78	31.78	0.441	0.271	0.111
PDFF	19.47	22.79	25.13	0.353	0.183	0.083
I-PDF	13.81	16.78	20.12	0.222	0.091	0.051

Table-3: PSRI for two-area CCGT-thermal power system power system using LSA based I-PDF controller considering CCGT power plant participation factors (apf_{22} = 0.5, 0.4)

Load demand change	PSRI for CCGT-thermal power system considering $apf_{11} = apf_{12} = apf_{21} = apf_{22}=0.5$					PSRI for CCGT-thermal power system considering $apf_{11} = apf_{12} = 0.5$, $apf_{21}=0.6$ and $apf_{22} = 0.4$				
	$PSRI_1$	$PSRI_2$	$PSRI_3$	$PSRI_4$	$\int P_{c2}$	$PSRI_1$	$PSRI_2$	$PSRI_3$	$PSRI_4$	$\int P_{c2}$
Case 1	0.912	0.984	0.124	0.009	1.197	0.923	0.991	0.126	0.012	1.178
Case 2	1.134	1.257	0.114	0.029	0.378	1.153	1.264	0.115	0.031	0.341
Case 3	1.047	1.342	0.134	0.094	2.847	1.068	1.353	0.138	0.105	2.725
Case 4	1.117	1.558	0.212	0.106	2.747	1.133	1.567	0.224	0.108	2.678

ISSN 2394 - 7780

Case 5	0.937	0.991	0.184	0.143	1.647	0.959	0.993	0.194	0.149	1.539
Case 6	1.064	1.024	0.285	0.159	1.348	1.081	1.033	0.289	0.162	1.237
Case 7	1.001	1.247	0.198	0.224	3.435	1.023	1.256	0.201	0.231	3.317
Case 8	1.078	1.347	0.297	0.239	3.644	1.094	1.362	0.302	0.242	3.534
Case 9	1.282	1.445	0.485	0.141	1.597	1.311	1.461	0.491	0.153	1.468
Case 10	1.487	1.647	0.978	0.153	1.469	1.507	1.656	0.984	0.158	1.342
Case 11	1.875	1.978	1.023	0.205	3.455	1.978	1.984	1.037	0.208	3.324
Case 12	1.964	1.991	1.097	0.261	3.647	1.988	2.011	1.108	0.272	3.523

Table-3: PSRI for two-area CCGT-thermal power system power system using LSA based I-PDF controller considering CCGT power plant participation factors (apf_{22} = 0.3, 0.2)

Load demand change	PSRI for CCGT-thermal power system considering $apf_{11} = apf_{12} = 0.5$, $apf_{21}=0.7$ and $apf_{22} = 0.3$					PSRI for CCGT-thermal power system considering $apf_{11} = apf_{12} = 0.5$, $apf_{21}=0.8$ and $apf_{22} = 0.2$				
	$PSRI_1$	$PSRI_2$	$PSRI_3$	$PSRI_4$	$\int P_{c2}$	$PSRI_1$	$PSRI_2$	$PSRI_3$	$PSRI_4$	$\int P_{c2}$
Case 1	0.973	0.995	0.131	0.017	1.065	0.988	0.996	0.142	0.021	1.059
Case 2	1.269	1.375	0.121	0.036	0.253	1.375	1.468	0.125	0.038	0.238
Case 3	1.175	1.473	0.143	0.111	2.621	1.276	1.567	0.148	0.114	2.512
Case 4	1.241	1.672	0.229	0.113	2.561	1.352	1.764	0.231	0.116	2.453
Case 5	0.986	0.995	0.198	0.154	1.423	0.991	0.997	0.199	0.161	1.312
Case 6	1.195	1.144	0.295	0.167	1.115	1.297	1.249	0.301	0.169	1.009
Case 7	1.142	1.361	0.206	0.236	3.209	1.288	1.458	0.213	0.242	3.104
Case 8	1.197	1.475	0.309	0.247	3.415	1.287	1.567	0.318	0.254	3.309
Case 9	1.235	1.573	0.498	0.159	1.347	1.371	1.657	0.502	0.163	1.231
Case 10	1.624	1.769	0.989	0.162	1.223	1.748	1.848	0.991	0.171	1.112
Case 11	2.164	2.483	1.042	0.212	3.214	2.273	2.647	1.051	0.223	3.109
Case 12	2.291	2.134	1.116	0.276	3.312	2.388	2.247	1.124	0.281	3.206

CONCLUSION

The proposed I-PDF controller parameters are obtained using Lightning Search Algorithm (LSA) optimization technique and realized in a two-area reheat thermal interconnected system incorporating CCGT plant as a diverse source has been investigated for in AGC loop. The various simulated results show that the LSA based I-PDF controller's performance is fast, more accurate and better than that of the performances of the PI, PDFF controllers. The proposed I-PDF controller adopted in the CCGT-thermal restructured power system have improved the dynamic output responses in terms of settling time and peak over/under shoot of area frequencies and tie-line power oscillations when compared with few other types of controllers. Moreover the proposed I-PDF controller in the AGC system demonstrates better dynamic performance to ensure the improvement of PSRI indices in order to offer lower restoration time with improved system reliability.

ACKNOWLEDGEMENT

The authors wish to thank the authorities of Annamalai University, Annamalainagar, Tamilnadu, India for the facilities provided to prepare this paper.

REFERENCES

[1] Shankar, R., Pradhan, S. R., Chatterjee, K., and Mandal, R. (2017). A comprehensive state of the art literature survey on LFC mechanism for power system. *Renewable and Sustainable Energy Reviews*, *76*, 1185-1207.

[2] Elgerd, O. I. (1982). Electric energy systems theory: an introduction.

[3] Shiva, C. K., and Mukherjee, V. (2016). Design and analysis of multi-source multi-area deregulated power system for automatic generation control using quasi-oppositional harmony search algorithm. *International Journal of Electrical Power & Energy Systems*, *80*, 382-395.

[4] Donde, V., Pai, M. A., and Hiskens, I. A. (2001). Simulation and optimization in an AGC system after deregulation. *IEEE transactions on power systems*, *16*(3), 481-489.

ISSN 2394 - 7780

[5] Nain, P., Parmar, K. S., and Singh, A. K. (2013). Automatic generation control of an interconnected power system before and after deregulation. *International Journal of Computer Applications*, *61*(15), 11-16.

[6] Pujara, S. M., & Kotwal, C. D. (2016). An Inclusive Review on Load Frequency Control in Deregulated Market. *International Journal on Electrical Engineering and Informatics*, *8*(3), 595.

[7] Pappachen, A., & Fathima, A. P. (2017). Critical research areas on load frequency control issues in a deregulated power system: A state-of-the-art-of-review. *Renewable and Sustainable Energy Reviews*, *72*, 163-177.

[8] Lalor, G., Ritchie, J., Flynn, D., and O'Malley, M. J. (2005). The impact of combined-cycle gas turbine short-term dynamics on frequency control. *IEEE Transactions on Power Systems*, *20*(3), 1456-1464.

[9] Saikia, L. C., and Sahu, S. K. (2013). Automatic generation control of a combined cycle gas turbine plant with classical controllers using firefly algorithm. *International Journal of Electrical Power & Energy Systems*, *53*, 27-33.

[10] Saikia, L. C., Sinha, N., & Nanda, J. (2013). Maiden application of bacterial foraging based fuzzy IDD controller in AGC of a multi-area hydrothermal system. *International Journal of Electrical Power & Energy Systems*, *45*(1), 98-106.

[11] Johnson, M. A., & Moradi, M. H. (2005). *PID control*. Springer-Verlag London Limited.

[12] Saha, D., & Saikia, L. C. (2017). Automatic generation control of a multi-area CCGT-thermal power system using stochastic search optimised integral minus proportional derivative controller under restructured environment. *IET Generation, Transmission & Distribution*, *11*(15), 3801-3813.

[13] Bhatt, P., Roy, R., and Ghoshal, S. P. (2010). GA/particle swarm intelligence based optimization of two specific varieties of controller devices applied to two-area multi-units automatic generation control. *International journal of electrical power & energy systems*, *32*(4), 299-310.

[14] Nanda, J., Mishra, S., and Saikia, L. C. (2009). Maiden application of bacterial foraging-based optimization technique in multiarea automatic generation control. *IEEE Transactions on power systems*, *24*(2), 602-609.

[15] Gozde, H., and Taplamacioglu, M. C. (2011). Automatic generation control application with craziness based particle swarm optimization in a thermal power system. *International Journal of Electrical Power & Energy Systems*, *33*(1), 8-16.

[16] Chatterjee, S., and Mukherjee, V. (2016). PID controller for automatic voltage regulator using teaching–learning based optimization technique. *International Journal of Electrical Power & Energy Systems*, *77*, 418-429.

[17] Kumar, N., Kumar, V., and Tyagi, B. (2016). Optimization of PID parameters using BBBC for a multiarea AGC scheme in a deregulated power system. *Turkish Journal of Electrical Engineering & Computer Sciences*, *24*(5), 4105-4116.

[18] Chandrasekar, K., Paramasivam, B., and Chidambaram, I. A. (2017). Evaluation of Power System Restoration Indices Using Krill Herd Algorithm Based Optimized PI^{+} Controller for a Restructured Power System with Facts Devices. ARPN Journal of Engineering and Applied Sciences, 12, 4973-4989.

[19] Shareef, H., Ibrahim, A. A., and Mutlag, A. H. (2015). Lightning search algorithm. *Applied Soft Computing*, *36*, 315-333.

ISSN 2394 - 7780

APPENDIX – A

A1. CCGT-thermal System Parameters and its considered values [12]

Parameter Details	Value
Ambient temperature (Ti)	30°C
Compressor discharge temperature (Td)	390°C
Exhaust gas temperature (Te)	532°C
Gas turbine inlet temperature (T_f)	1085°C
Compressor pressure ratio (P_{r0})	11.5
Specific heat ratio (γ)	1.4
Compressor efficiency ((η_C)	0.85
Efficiency of the plant (η_T)	0.85
Governor time constant (Tg = Tgh)	0.08 s
Turbine time constant (Tt)	0.3 s
Thermocouple 1 time constant (T_3)	15 s
Thermocouple 2 time constant (T_4)	2.5 s
First gain of radiation shield (K_4)	0.8
Second gain of radiation shield (K_5)	0.2
Ratio of fuel adjustment ((K_6)	25
Valve positioned time constant((T_V)	0.1 s
Gas fuel time constant (T_{gf})	0.4 s
Compressor volume time constant (T_{cd})	0.2 s
Tune metal heat capacitance time constant for waste recovery boiler (Tm)	5 s
Boiler storage time constant (Tb)	20 s
Inlet guide vane time constant(Tigv)	0.05 s
Kg	0.64
Ks	0.00043
Steady state regulation of the governor in Hz/ p.u. MW (R)	2.4%
Gain associated with the transfer function of the area in Hz / p.u. MW(K_{ps})	120
Area time constant in sec (Tp)	20
Synchronizing power co-efficient (T_{12})	0.545

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

POTENTIAL APPLICATION OF *AEROMONAS HYDROPHILA* IN BIODEGRADATION OF DAIRY INDUSTRY EFFLUENT

Nilam S. Patil[1] and Jaya V. Kurhekar[2]
Research Scholar[1] and Associate Professor[2], Department of Microbiology, Bharati Vidyapeeth's, Dr. Patangrao Kadam Mahavidyalaya, Sangli

ABSTRACT
In the present study, Dairy Industry Effluent was collected from ETP of Katraj Dairy Pune, Maharashtra, India. Lipases producing indigenous bacterial isolates were screened qualitatively using Tributyrin agar medium from effluent. Highest lipase producing isolate was identified as Aeromonas hydrophila GS4 strain by 16s rRNA sequencing study. Lipase production of Aeromonas hydrophila GS4 was optimized by different parameters like pH, Temperature, Carbon Source and Nitrogen Source. The optimum parameters were: pH 7, 30ºC and highest lipase production was shown for 1% starch and Ammonium Sulfate. These optimized conditions were considered for biodegradation study of lipid rich dairy industry waste using Aeromonas hydrophila GS4 for 48 hours, under constant aeration. Reduction in physicochemical parameters of effluent was observed on comparison with initial results, especially lipid content was found to be reduced. Result of present study has confirmed that Aeromonas hydrophila GS4 strain indicates potential lipid degradation ability and scope for future analysis in dairy industry waste treatment.

Keywords: Aeromonas hydrophila GS4, Biodegradation, Dairy Industry Effluent, Lipase production, Optimization.

1. INTRODUCTION

Water is one of the most important resources found on the earth. Rapid industrialization has led to the problem of industrial waste disposal. Dairy industry requires high water consumption for processing of various dairy products. Due to the increased population, demand for dairy products in India is very high. Dairy industry is expected to grow very rapidly and dairy effluent discharge without any proper treatment in natural water bodies, may lead to environmental problems (Porwal *et al*., 2015).

Approximately 65% of the dairy factory losses enter waste water discharge streams and these can have a major impact on the environment (EPA, 1997). The main sources for dairy factory waste water are the raw material (predominately milk) and product losses from leaking equipment and pipelines, spills caused by equipment overflow and malfunctioning by poor handling procedures, by products such as whey from manufacturing of cheese and casein, detergents used for cleaning and sanitation (Kolhe *et al*., 2009). Problem for effluent disposal has now attained complex dimensions and it is essential to find suitable environmental friendly way for disposal of waste.

Untreated dairy industry effluent has high amount of organic load (BOD, COD, TDS, TS, TSS, Chloride, Sulfate, Oil and grease etc. (Kolhe, 2011). For degradation of organic matter, various industries have replaced the use of the chemicals, having bad impact on the environment, by new treatments that use potential microorganisms for biodegradation of dairy effluent. Biotreatment, leading to bioconversion of the organic waste material, is probably the most cost effective technique for managing and utilizing waste (Maghsoodi *et al*., 2007).There are some reported bacterial strains isolated from dairy industrial effluents having potential biodegradation activity by synthesizing various types of enzymes like lipase, caseinase, amylase, catalase, oxidase etc. (Shivsharan *et al*., 2013). As dairy industrial effluent has large amount of lipids, there is a need to use such microbial isolates which may have potential lipase activity, helping in the reduction of organic load.

Lipase is an enzyme (E.C. 3.1.1.3) that catalyzes the hydrolysis of long chain fatty acids into free fatty acids and glycerol (Kempka *et* al., 2008). Lipase enzyme catalyzes a wide range of reactions such as hydrolysis, esterification, trans-esterification (Joseph *et al*., 2008). Nayana Krishnan reported *Bacillus coagulance, Bacillus simplex and Trichococcus species* as lipase producers isolated from dairy industry effluent and their consortium was used for biodegradation of lipid rich dairy effluent.

In the present study, screening of indigenous lipase producing bacteria from dairy industry effluent was carried out. In all, four lipase producing bacterial strains were screened qualitatively and one bacterial strain, showing the highest lipase activity, among the four, was selected for further study. The selected bacterial strain was identified as *Aeromonas hydrophila by* cultural, morphological and biochemical characters according to Bergey's Manual of Determinative Bacteriology and 16 s rRNA sequencing. The aim of the present study was to optimize lipase activity by *Aeromonas hydrophila GS4* and check its prospective use for biodegradation of dairy effluent.

ISSN 2394 - 7780

2. MATERIAL AND METHODS

2.1. Dairy industry effluent

The dairy industrial effluent was obtained from the Effluent Treatment Plant of a dairy industry located in Pune district, Maharashtra, India. The effluent samples were collected in clean and sterile glass containers, stored in ice box and transported to laboratory immediately, for further analysis. Prior to use, the effluent samples were stored at 4°C in a refrigerator to avoid any physicochemical change (APHA, 2005). The average lipid content of the effluent was observed to be between 350 to 560 mg/lit.

2.2. Isolation and Screening of Lipase producing bacteria

The lipase producing bacteria were isolated from dairy industry effluent by enrichment method. It was carried out in a 250 ml of Erlenmeyer flask containing 100 ml of sterile nutrient broth, inoculated with 10 ml of effluent sample. The flasks were kept on a rotary shaker overnight (150rpm), at 30ºC. Loop full of the enriched culture was streaked on sterile Nutrient Agar plates, incubated at 30ºC for 24 hrs. Morphologically different, isolated colonies were further streaked on fresh nutrient agar plates, for obtaining pure cultures. Isolates were studied for their cultural characters. Pure cultures were maintained on nutrient agar slants at 4 ° C.

Screening was done to find out the most potential bacterial isolate with Lipase (Lipolytic) activity. For this study, morphologically different colonies were selected for further work. The qualitative detection of lipase enzyme was carried out on Tributyrin Agar (Peptone – 0.5 %, Yeast extract -0.3 %, Ammonium nitrate – 1 %, K_2HPO_4 - 0.05 %, KH_2PO_4 - 0.05 %, Glucose -0.1 %, Tributyrin - 1%, Agar - 2 %, pH - 8) (Verma *et al*., 2014). The halo zone of hydrolysis of Tributyrin was observed on Tributyrin agar plate. The zone diameter for each isolate was measured after 24 hours of incubation period. The strain with maximum lipase activity (qualitatively) was selected for further study.

2.3 Characterization of lipase producer

The selected bacterial strain with higher Lipolytic activity was identified as *Aeromonas hydrophila* based on morphological and biochemical characters as per standard keys of Bergey's Manual of Determinative Bacteriology (Buchnan *et al*., 1974) and by molecular characterization (16s rRNA sequencing). The 16s rRNA sequence of *Aeromonas hydrophila GS4* was compared with NCBI-BLAST data bank and then it was deposited in NCBI data bank (Accession no. LC260008).

2.4 Quantitative / Titrimetric estimation of Lipase Activity

The *Aeromonas hydrophila GS4* strain was grown in Nutrient Broth with 1% Tributyrin as a substrate and incubated at 30ºC for 24 hrs. A cell free supernatant was obtained by centrifugation (8,000 rpm for 10 mints). Supernatant was used as a source of extracellular enzyme. Lipase activity was measured by Titrimetric method using Olive Oil (10% v/v) with gum Arabic (5% w/v) as a substrate, in 100 mM potassium phosphate buffer pH 7.0. The reaction mixture (100 µl of enzyme and emulsion) was incubated for 15 min at 37 ° C.

The reaction was stopped by addition of a mixture of organic solvents like 1.0 ml of Ethanol: acetone solution (1:1). The released fatty acids were estimated by titrating with 0.05 M NaOH, using phenolphthalein as an indicator. The end point was colorless to light pink (Jenson, 1983). The lipase activity was calculated using following formula – (Kumar *et al*., 2012).

Lipase activity = Volume of NaOH consumed (ml) x Molarity of NaOH / Volume of lipase (ml) x Reaction Time (min).

One unit of enzyme was defined as the amount of enzyme liberating 1 µmole fatty acid under standard conditions.

2.5 Optimization study of Lipase activity

Optimization study was carried out to check the effect of different environmental parameters like pH, temperature and nutrient supplements like Carbon source, Nitrogen source for maximum lipase production on selected potential strain. Growth and lipase production were estimated at various pH (4, 5, 6, 7, 8, 9, 10 and 11) and temperature (20, 25, 30, 37, 42, 50ºC) whereas the other parameters were unaltered. The *Aeromonas hydrophila GS4* strain was separately inoculated in a production medium with Carbon sources like 1 % Glucose, Sucrose, Starch and Maltose to check its effect.

Likewise Nitrogen sources like 1 % Ammonium sulfate, Beef extract, Peptone were used for the study. In all the production media, 1% Tributyrin was incorporated as substrate. The production of lipase enzyme was determined by quantitative assay using titrimetric method with olive oil as the substrate (Kamble, 2016).

ISSN 2394 - 7780

2.6 Biodegradation study of Dairy industry effluent using Aeromonas hydrophila GS4 strain

Optimized parameters were used for biodegradation study of dairy effluent. Culture of *Aeromonas hydrophila GS4* (10% v/v) was transferred to 90 ml of lipid rich untreated dairy effluent in an Erlenmeyer flask. The flask was kept on a rotary shaker at 30ºC for 48 hrs. During this period of treatment, effluent was sampled at designated time intervals (24, 48 hours) to study the changes in physico-chemical parameters of the treated effluent (APHA, 2005). The experiments were carried out in triplicates.

2.7Statistical analysis

The experimental data was analyzed using two way ANOVA test.

3. RESULTS AND DISCUSSION

3.1 Isolation and screening of Lipase producing bacteria

Twelve morphologically distinct bacterial colonies were isolated on Nutrient Agar medium from selective enrichment of dairy industry effluent samples. In order to screen Lipase producing strains; individual culture of each isolate was streaked on Tributyrin agar medium. Positive strains were evaluated by observation of clear zone of hydrolysis surrounding the colony. Total 4 bacterial strains namely GS1, GS2, GS3 and GS4 (Assigned names for laboratory use only) were identified as lipase producers due to their zone of hydrolysis of Tributyrin around colony. The zone of hydrolysis of Tributyrin was measured for each isolate and results were showed in (Table No.1). As per qualitative test results isolate GS1, GS2 and GS3 showed low lipase activity as compared to GS4 activity. So, isolate GS4 was used for further study.

Table No-1: Diameter of clear zone of hydrolysis around the bacterial isolates grown on Tributyrin Agar medium for 24 hours at 30ºC.

Isolate	Diameter of clear zone around the Colony (mm)
GS1	7
GS2	12
GS3	10
GS4	**22**

3.2 Phylogenetic Identification of selected bacterial strain

Phylogenetic Analysis

For the phylogenetic analysis, .DND file obtained from CLUSTAL alignment was used for the phylogram built up by using the MEGA5 software. Built phylogram was documented with close homology of the bacteria isolated (showcased with the accession number and name) with the best matched bacterial sequence and highlighted by marking in a Phylogram.

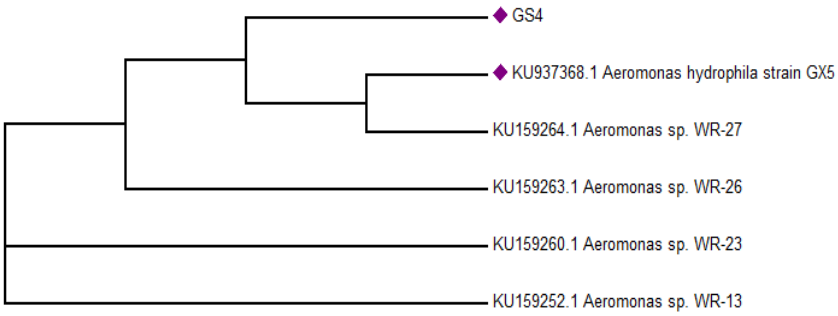


Figure No-1: Phylogram of strain *Aeromonas hydrophila GS4*

3.3 Optimization of Lipase production by Aeromonas hydrophila GS4

Effect of pH on lipase production

To optimize the pH for lipase production by *Aeromonas hydrophila GS4* strain , the cultures were grown in sterile nutrient broth with 1 % Tributyrin having different pH range from pH 4 to 11 . These tubes were incubated at 30ºC for 24 hrs. Titrimetric method was followed for quantitative estimation of lipase enzyme using olive oil as a substrate (Kamble, 2016). The effect of different pH on lipase production of *Aeromonas hydrophila GS4* showed that the highest level of lipase production was obtained at pH 7 (39.1 Units/ml). Also at pH 8 and 9 lipase production was 30.8 and 20.1 Units/ml respectively. Less than 10 Units/ml lipase production was recorded for pH 4, 5 and 6. (Figure No. 2). The results depicted bacteria showing optimum pH around 7.0 for growth and lipase production. Therefore pH 7.0 was selected for determination of other parameters.

ISSN 2394 - 7780

Effect of Temperature on lipase production

To determine the optimum temperature condition for the lipase enzyme activity, culture of *Aeromonas hydrophila GS4* strain was grown in sterile nutrient broth with 1 % Tributyrin as a substrate, adjusted to pH 7. Enzyme activity was then checked for optimum temperature by incubating at and various temperature ranges such as 20°C, 25°C, 30°C, 37°C, 42°C, 50°C respectively for 24 hrs. Quantitative estimation was done by using titrimetric method (olive oil as substrate). The lipase production at temperature 37°C, 42°C and 50°C was recorded as 27.4, 30.1 and 3.5 Units/ml respectively. Interestingly temperature 20°C, 25°C showed satisfactory lipase production. The highest lipase production was recorded for temperature 30ºC (35.0 Units/ml) (Figure No.3). Therefore 30ºC temperatures was selected as the optimum temperature range for lipase production by *Aeromonas hydrophila GS4* for determination of next parameter.

Effect of different nutrient supplements (Carbon and Nitrogen source) on lipase production

The results of lipase production by *Aeromonas hydrophila GS4* strain by utilizing various carbon sources is shown in Figure No.4. Among the tested carbon sources, 1% starch recorded the highest lipase activity (12.3 Units/ml). 1% Glucose, 1% Sucrose and 1% maltose showed 8.5, 4.3 & 7.4 Units/ml respectively. To check the effect of various nitrogen sources on lipase activity by *Aeromonas hydrophila GS4* strain was investigated by the growing bacterial strain separately in 1% Peptone, Beef extract and ammonium sulfate respectively. It was revealed that highest (55.4 Units/ml) lipase production was observed in nitrogen source ammonium sulfate supplemented medium, Peptone and Beef extract showed 47.2, 48.5 Units/ml respectively (Figure No.5).

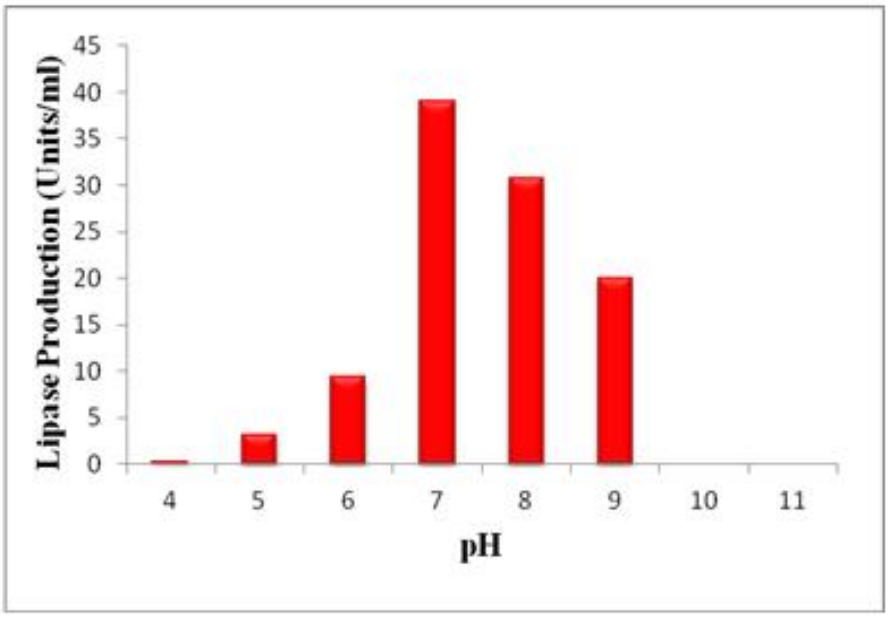


Figure No-2: Effect of pH on Lipase production of *Aeromonas hydrophila GS4*

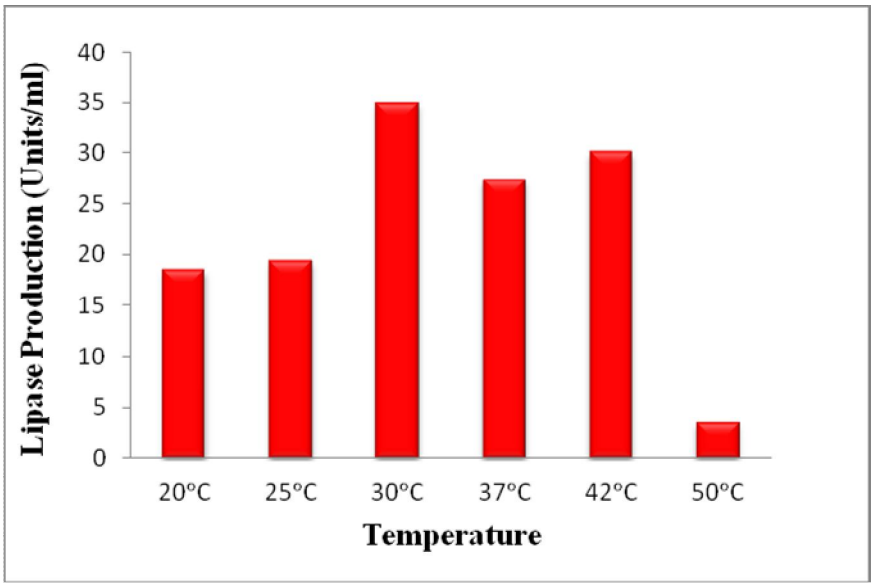


Figure No-3: Effect of Temperature on Lipase production of *Aeromonas hydrophila GS4*

ISSN 2394 - 7780

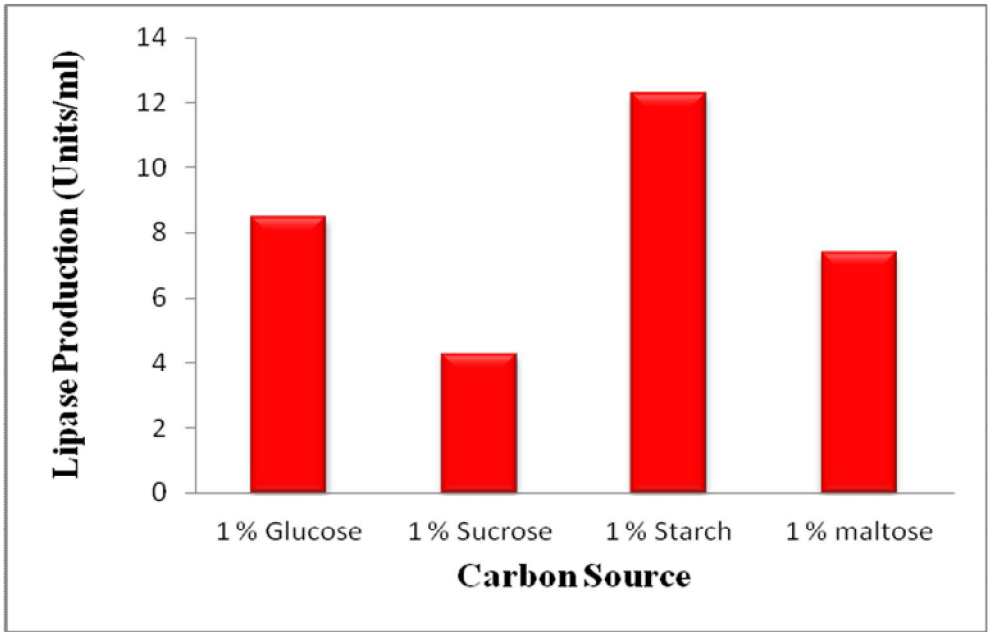


Figure No-4: Effect of different Carbon sources on Lipase production of *Aeromonas hydrophila GS4*

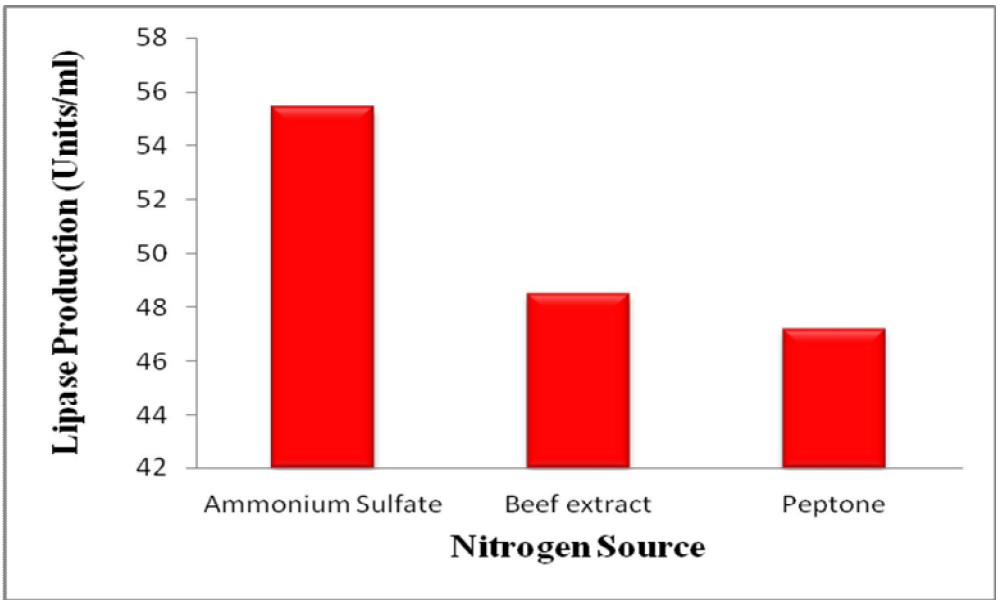


Figure No-5: Effect of different Nitrogen sources on Lipase production of *Aeromonas hydrophila GS4*

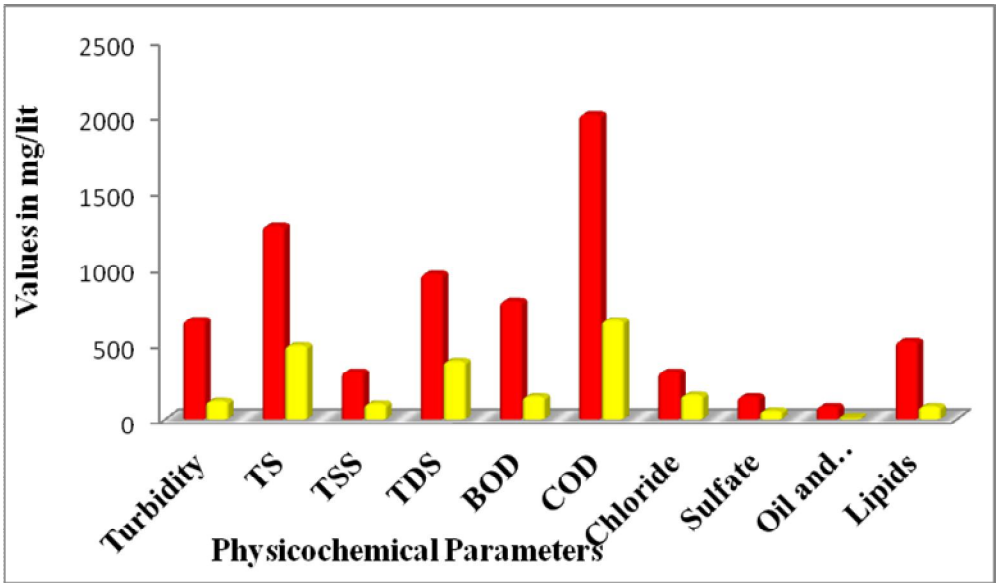


Figure No-6: Comparative study of physicochemical Parameters of effluent before and after treatment.

ISSN 2394 - 7780

3.4 Biodegradation study of Dairy industry effluent using Aeromonas hydrophila GS4 strain

At laboratory level, biodegradation was studied by using untreated lipid rich dairy waste as; the major aspect of the present work was to study reduction in lipid content. The freshly grown culture of (10 % v/v) *Aeromonas hydrophila GS4* strain was inoculated in 90 ml waste water in 250 ml capacity Erlenmeyer flask and incubated at 30°C for 48 hours; pH was adjusted at 7, as per the results of optimization study. Cell concentration was adjusted to 10^8 cells/ml. Physicochemical parameters of the waste were analyzed before and after the treatment (APHA, 2005). The BOD, COD, TS and turbidity were found reduced significantly. Especially Lipids were reduced to 7% as compared to initial value.

Table No-2: Physicochemical parameters of dairy effluent before and after the treatment of *Aeromonas hydrophila GS4*

Parameters	Before application (Untreated Effluent)	After application (Treated Effluent)
pH	8.2	7.2
Color	Milky white	Clear
Temperature	28°C	28°C
Turbidity	652.3	120.2
TS	1274	487
TSS	314	102
TDS	960	385
BOD	780	150
COD	2010	650
Chloride	314	160
Sulfate	150	55
Oil and grease	85	10
Lipids	515	85

Each value is mean of three readings. Each value is expressed as mg/lit. [Except pH and Turbidity (NTU)]

4. CONCLUSION

The present study proved that isolated culture of *Aeromonas hydrophila GS4* has potential lipid degradation ability and it reduces organic content of dairy waste water. Use of efficient microbes in treatment of dairy waste will be ecofriendly and cost effective process. More study is required to be carried out for setting experiments like in laboratory or in pilot scale before using in any industry.

ACKNOWLEDGEMENT

The Author would like to thank Dr. Mrs. J. V. Kurhekar, Head & Associate Professor, Department of Microbiology, Bharati Vidyapeeth's, Dr.Patangrao Kadam Mahavidyalaya, Sangli for providing laboratory facility and authorities of Katraj Dairy, Pune for sample availability.

REFERENCES

1. APHA-AWWA-WPCP. (2005). "Standard method for examination of water and waste water". 21st ed. Washington.
2. Buchanan, R.E., Gibbons, N.E., Cowen S.T., Holt, T.G., Liston, J., Murry, R.G., Niven, C.F., Ravin, A.W. and Stainer, R.Y. (1974). "Bergey's Manual of determinative bacteriology". Williams and Wilkins co. Baltimore.1246.
3. Environmental Protection Authority, (1997). "Environmental Guidelines for the Dairy Processing Industry". State Government of Victoria.
4. Jensen, R. (1983). "Detection and determination of lipase (acylglycerol hydrolase) activity from various sources". Lipid. 18(9):650-657.
5. Joseph, B., Ramteke, P.W., and Thomas, G. (2008). "Cold active microbial lipases: some hot issues and recent developments". Biotech. Ad. 26(5):457-470.
6. Kamble, S.N. (2016). "Environmental Microbiology – Bioremediation of Dairy Industry Waste". Lap Lambert Academic Publishing.
7. Kempka, A.P., Lipke, N.R., Pinheiro, T.L.F., Menoncin S., Treichel H., and Freire, D.M.G. (2008).31:119-125.
8. Kolhe, A.S., and Pawar, V.P. (2011). "Physico-chemical Analysis of Effluents from Dairy Industry". Recent Research in Science and Technology. 3(5):29-32.

ISSN 2394 - 7780

9. Kolhe, A.S., Ingale, S.R., and Bhole, R.V. (2009). "Effluents of Dairy technology", Int. Res. Jr. Sodh, Samiksha and Mulyankan. 5: 459-461.
10. Krishnan, N., and Valsa, A. K. (2015). "Biodegradation of Lipid Rich Dairy Effluent by Bacterial Consortium". IOSR Journal of Environmental Science, Toxicology and Food Technology. 9(9):16-20.
11. Kumar, D., Kumar, L., Nagar, S., Raina, C., Parshad, R., and Gupta, V.K. (2012). "Screening, isolation and production of lipase/esterase producing Bacillus sp. Strain DVL2 and its potential evaluation in esterification and resolution reactions". Archives of Applied Science Research. 4(4):1763-1770.
12. Maghsoodi, V., Samadi, A., and Ghobadi, Z. (2007). "Biodegradation of Effluents from dairy plant by Bacterial Isolates". Iran J. Chem. Chem. Eng.26 (1): 55-59.
13. Porwal, H.J., Mane, A.V., and Velhal, S.G. (2015). "Biodegradation of Dairy effluents by using microbial isolates obtained from activated sludge". Water Resources and Industry.
14. Shivsharan, V.S., Wani, M., and Khetmalas, M.B. (2013). "Isolation of Microorganisms from dairy effluent". British Microbiology Research Journal. 3(3):346-354.
15. Verma, S., and Sharma, K.P. (2014). "Isolation, Identification and Characterization of Lipase Producing Microorganisms from Environment". Asian Journal of Pharm and Clin Res. 7(4):219-222.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

WOMEN EMPOWERMENT DURING CONGRESS GOVERNMENT REGIME

V. Sairaja[1] and Dr. P. Palanichamy[2]
Research Scholar[1], Department of Political Science, Presidency College, Chennai
Principal[2], Department of Political Science, RV Government Arts and Science College, Chengalpattu

ABSTRACT
The struggle for social equality has a long history and is likely to continue for some time. In traditionally patriarchal societies any improvement in the status of women has far-reaching consequences and produces fundamental political changes. Therefore it is always resisted by the established powers. However, it seems certain that they will ultimately have to relent because the emancipation of women is both necessary and desirable. The feminist movement, therefore, has always been a humanist movement. Some of its representatives were reformers, others revolutionaries, but virtually all of them worked for a better, more equitable and more humane world. Much can be learned from their experiences. They often suffered ridicule, persecution, and defeat, but also won admiration, support, and victory. Gradually, they achieved many of their goals. Their opponents, on the other hand, learned that a just cause cannot be suppressed forever. The Congress Government has taken steps to empower the status of women by providing reservation for women in the legislatures and the local Governments. In this paper, an attempt has been made the efforts taken by the Congress Government to empower the status of women in India.

INTRODUCTION
Women empowerment refers to the liberation of women from religious, legal, economic, and social oppression and their escape from narrow gender roles. The struggle for social equality has a long history and is likely to continue for some time. In traditionally patriarchal societies any improvement in the status of women has far-reaching consequences and produces fundamental political changes. Therefore it is always resisted by the established powers. However, it seems certain that they will ultimately have to relent because the emancipation of women is both necessary and desirable. It will provide for a greater degree of social justice and thus benefit everyone. Indeed, from the beginning, the great "feminists" or champions of women's rights have always insisted that they worked in the interest of the whole human race. The feminist movement, therefore, has always been a humanist movement. Some of its representatives were reformers, others revolutionaries, but virtually all of them worked for a better, more equitable and more humane world. Much can be learned from their experiences. They often suffered ridicule, persecution, and defeat, but also won admiration, support, and victory. Gradually, they achieved many of their goals. Their opponents, on the other hand, learned that a just cause cannot be suppressed forever. In the following pages an attempt has been made the efforts taken to empower women in India. About 50% of the population consists of women. They could bring about a qualitative change in the governance of the country. Therefore, they need to be empowered so that their services could be fully utilized and bring about development in the country. The Congress Government has taken steps to empower the status of women by providing reservation for women in the legislatures and the local Governments. In this paper, an attempt has been made the efforts taken by the Congress Government to empower the status of women in India.

CONSTITUTIONAL PROVISIONS FOR WOMEN
The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles**.** The Constitution not only grants equality to women but also empowers the State to adopt measures of positive discrimination in favor of women. Within the framework of a democratic polity, our laws, development policies, Plans, and programs have aimed at women's advancement in different spheres. India has also ratified various international conventions and human rights instruments committing to secure equal rights of women. Key among them is the ratification of the Convention on Elimination of All Forms of Discrimination against Women in 1993.

CONSTITUTIONAL PROVISIONS
The Constitution of India not only grants equality to women but also empowers the State to adopt measures of positive discrimination in favor of women for neutralizing the cumulative socio-economic, education and political disadvantages faced by them. Fundamental Rights, among others, ensure equality before the law and equal protection of the law; prohibits discrimination against any citizen on grounds of religion, race, caste, sex or place of birth, and guarantee equality of opportunity to all citizens in matters relating to employment. Articles 14, 15, 15(3), 16, 39(a), 39(b), 39(c) and 42 of the Constitution are of specific importance in this regard.

ISSN 2394 - 7780

CONSTITUTIONAL PRIVILEGES

The Constitutional Privileges provided to women include equality before law for women (Article 14); the State not to discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or any of them (Article 15 (i)) ; the State to make any special provision in favor of women and children (Article 15 (3)); equality of opportunity for all citizens in matters relating to employment or appointment to any office under the State (Article 16); the State to direct its policy towards securing for men and women equally the right to an adequate means of livelihood (Article 39(a)); and equal pay for equal work for both men and women (Article 39(d)); to promote justice, on a basis of equal opportunity and to provide free legal aid by suitable legislation or scheme or in any other way to ensure that opportunities for securing justice are not denied to any citizen by reason of economic or other disabilities (Article 39 A); the State to make provision for securing just and humane conditions of work and for maternity relief (Article 42); the State to promote with special care the educational and economic interests of the weaker sections of the people and to protect them from social injustice and all forms of exploitation (Article 46); the State to raise the level of nutrition and the standard of living of its people (Article 47); to promote harmony and the spirit of common brotherhood amongst all the people of India and to renounce practices derogatory to the dignity of women (Article 51(A) (e)); not less than one-third (including the number of seats reserved for women belonging to the Scheduled Castes and the Scheduled Tribes) of the total number of seats to be filled by direct election in every Panchayat to be reserved for women and such seats to be allotted by rotation to different constituencies in a Panchayat (Article 243 D(3)); not less than one-third of the total number of offices of Chairpersons in the Panchayats at each level to be reserved for women (Article 243 D (4)); not less than one-third (including the number of seats reserved for women belonging to the Scheduled Castes and the Scheduled Tribes) of the total number of seats to be filled by direct election in every Municipality to be reserved for women and such seats to be allotted by rotation to different constituencies in a Municipality (Article 243 T (3)); and reservation of offices of Chairpersons in Municipalities for the Scheduled Castes, the Scheduled Tribes and women in such manner as the legislature of a State may by law provide (Article 243 T (4)).

LEGAL PROVISIONS

To uphold the Constitutional mandate, the State has enacted various legislative measures intended to ensure equal rights, to counter social discrimination and various forms of violence and atrocities and to provide support services, especially to women. They are the Employees State Insurance Act, 1948, the Plantation Labour Act, 1951, the Family Courts Act, 1954, the Special Marriage Act, 1954, the Employees State Insurance Act, 1948, the Plantation Labour Act, 1951, the Family Courts Act, 1954, the Special Marriage Act, 1954, the Hindu Marriage Act, 1955, the Hindu Succession Act, 1956 with Amendment in 2005, Immoral Traffic (Prevention) Act, 1956, the Protection of Women from Domestic Violence Act 2005, the Maternity Benefit Act, 1961 (Amended in 1995), the Dowry Prohibition Act, 1961, the Medical Termination of Pregnancy Act, 1971, the Contract Labour (Regulation and Abolition) Act, 1976, the Equal Remuneration Act, 1976, the Prohibition of Child Marriage Act, 2006, the Factories (Amendment) Act, 1986, Indecent Empowerment of Women (Prohibition) Act, 1986, the Commission of Sati (Prevention) Act, 1987, the Code of Criminal Procedure, 1973 , the Minimum Wages Act, 1948, the Guardians and Wards Act, 1860 (8 of 1890), the Indian Penal Code, 1860, the Prohibition of Eve Teasing Act 1998, the Hindu Adoptions and Maintenance Act (1956), the Christian Marriage Act, 1872 (15 of 1872), the Bonded Labour System (Abolition) Act, 1976, the Inter-State Migrant Workmen 1979, the Muslim Personal Law (Shariat) Application Act, 1937, the Hindu Minority and Guardianship Act 1956, the Indian Evidence Act 1872, the Child Marriage Restraint Act, 1929 (19 of 1929), the Foreign Marriage Act, 1969, the Indian Divorce Act, 1969 (4 of 1969), and the Juvenile Justice Act 2000.

CONSTITUTIONAL AND LEGAL MEASURES

The Outcome of the constitutional and legal measures and the initiatives undertaken under the various plans in the past for bringing improvements in the socio-economic status of women and thus achieving overall equality among men and women have certainly provided an opportunity to women to associate themselves and maximize their participation in availing the facility of education and in different categories of employment available in private as well as in public sector and various economic, social, cultural and political activities and development programs and schemes. However, the participation of women in availing different level of education, medical and health facilities and in better remunerative occupations of employment and political activities has been at a lower extent compared to men.

WOMEN EMPOWERMENT DURING THE 20TH CENTURY

Till 1996, on an average, only 5.41 percent member of Lok Sabha, the lower House of Parliament, happened to be women and the highest ever share was 7.7 percent in 8th Parliament. Up to 1991, women's average share was just 9.38 percent in the Rajya Sabha, the upper house. Till 1997 women's average empowerment was only 4

ISSN 2394 - 7780

percent in the State Assemblies. In the Central Council of Ministers only in 1961 women could cross 10 percent share. If this overall scene is seen against increasing number of women and near parity in the exercise of franchise scenario really gets harrowing. While the marginalization of women in politics seems to be a universal phenomenon, what is more, distressing is that India's record is more unpalatable compared to other developing countries. Whereas the average shares of women in executive and parliamentary posts are 5 and 10 percent respectively in developing countries the corresponding figure for India is only 3 and 7 percent[i].

Besides legislative seats, women are also utterly underrepresented in the higher decision making bodies of all political parties - in the Working Committee of the Congress, Parliamentary Board of Bharatiya Janata Party (BJP), Central Committee of Communist Party of India (Marxist) (CPM) women's proportion lingers around 10 percent only[ii]. In some party committees, women are virtually excluded and this often germinates in grumbling, though not loudly and frequently[iii]. Women may comprise a formidable section in the rank and file of almost all party but when their share in the decision-making structure is peeped at, they become rare species. This aspect alone casts far-reaching consequences for women's ascendancy in politics.

Majority of women lack resources like economic assets and party support. In a parliamentary democracy, as elections are party based, women contestants in any type of elections has the real prospect in getting through only when they are supported and sponsored by the political parties. Because of the indifferent attitude of political parties in nominating women as candidates, women are less and less represented. Women are fewer in number in political positions simply because of lack of aspiration or their incapacity. In the party-based elections, the entry of women mainly depends on the supportive gesture and ascriptive channels of parties and in these frontwoman candidates have to encounter apathy and disadvantages. The virtual absence of women in the policy-making Committees of the political parties obviously interdicts the possibility of woman candidates being nominated for any elections.[iv]

WOMEN EMPOWERMENT IN PANCHAYATI RAJ INSTITUTIONS

In the traditional caste Panchayats, Village Panchayats and in the British scheme of local governments women remained entirely excluded. When we holistically look back at the involvement and participation of women in Panchayati Raj Institutions for the period at least up to 1993 one sordid saga unfolds. Except in Andhra Pradesh, Gujarat, Maharashtra, Karnataka, and Punjab where few women sometimes got selected as members, in other States the number of woman members was either nibbling or nil.

Since the establishment of Panchayati Raj in independent India, an effort to secure and enable women to participate in the rural developmental process was evident. It was the Mehta Committee (1957), which recommended the co-option of two women from amongst those who were interested to work among women and children in each Panchayati Raj body in the suggested three tiers of Panchayati Raj. Mehta Committee (1978) also persisted with the incorporation of two women either through election or if necessary through co-option. The emphasis on and suggestion of integrating women in the Panchayati Raj Institutions was to empower them to raise any issue or voice their concern if they ever so felt or desired.

In establishing Panchayats, most State Governments appended the provision of co-option of two women in case no woman could come through direct elections. Prevalent practice during the 1960's and 1970's was the co-option of two women at best for each Panchayati Raj body, as women could not come through elections.

Co-option of few women was the only available option for women to participate. It, instead, resulted in the proverbial patronage of the dominant political and social groups and families. Those nominated women could not, nor were expected to free themselves from the clutches of the males who inducted them. As the family or the group utilized the co-option method to establish, further or retain their vested interests, it provided one convenient scope for the dominant caste/class leaders to install their family women such as wife or mother as their yoke and the very purpose of empowering women was led to falling flat.

Woman members consequently could not get any real occasion to take up the task or stamp their distinctiveness in the process. Those women were neither aware of their role or rights nor they could grasp the intricacies of Panchayati Raj process. They could not acquire political experience, take up issues/programmes concerning women, articulate demands or represent their gender. Seen in overall perspective, women's contribution to the Panchayati Raj decision-making remained out-and-out in-consequential. Eventually, the trifling number of woman members could not exercise power or gain political experience.

ISSN 2394 - 7780

RESERVATION AND WOMEN EMPOWERMENT IN PANCHAYATI RAJ INSTITUTIONS AND URBAN LOCAL GOVERNMENTS

Consequent upon the shift in emphasis on the women's question and the recommendation of the National Perspective Plan for Women (1988) reservation of one-third seats and posts in the local governments received impetus and legislative approval. Stipulating one-third reservation, the 64th constitutional Amendment Bill was introduced in the Indian Parliament on May 15, 1989. But the Bill was defeated in the upper house. Another Bill was introduced in September 1990 but it could not be taken up as the Government that introduced the Bill fell. After the general elections, a new government came to power and introduced the 73rd Constitution Amendment Bill. This Bill was referred to Joint Committee of Parliament and after incorporating suggestions of the Joint Committee the Bill was finally passed in Parliament on December 23, 1992, and came into force from April 24, 1993.

Article 243D of the 73rd Constitutional Amendment Act has made provision for reservation of seats in Panchayati Raj Institutions for the Scheduled Castes, Scheduled Tribes and women. It lays down that in every Panchayat the number of seats so reserved shall bear, as nearly as may be, the same proportion to the total number of seats to be filled by direct election in that Panchayat as the population of the SC or of the ST in that Panchayat area bears to the total population of that area and such seats shall be allotted by rotation to different constituencies in a Panchayat. Not less than 1/3 of the total number of seats reserved under the above category shall be reserved for women belonging to such categories of people. Not less than 1/3 of the total number of seats (including the number of seats reserved for women belonging to the SC and ST) of the total number of seats to be filled by direct election in every Panchayat shall be reserved for women and such seats may be allotted by rotation to different constituencies in a Panchayat. The offices of the Chairpersons in the Panchayats at any level shall be reserved for the SCs, STs and women in a manner as given in a law of the State, provided that the number of offices of Chairpersons so reserved shall bear, as nearly as possible, the same proportion to the total number of such offices in the Panchayat at any level in proportion to the population of such people to the total population of the State. It is further provided that not less than 1/3 of the total number of the offices of Chairpersons in the Panchayats at each level shall be reserved for women and that the number of offices so reserved shall be allotted by rotation to different Panchayats at each level. But the State Legislature shall have the power to extend this system of reservation for 'backward classes of citizens' at any level covering the members and Chairpersons of Panchayats at each level. All such reservations shall cease to have effect after the expiration of period of reservations as specified in Article 334 of the Constitution.[v]

With the statutory reservation provision more than one million women have now assumed seats as Members and one-third of them as Chairpersons in almost all the States and the Union Territories. The induction of women in Local Governments is in sharp contrast to their empowerment in other political strata as well as in earlier Panchayat institutions and Urban, Local Governments.

WOMEN'S EMPOWERMENT IN THE LEGISLATURES

The ugly scenes and stalemate over tabling the Women's Reservation Bill in parliament have had a very beneficial effect. They have finally brought the grim truth into sharper focus that politics has proven to be very inhospitable for women in independent India. What we are witnessing today is a worrisome phenomenon of further decline in the participation of women, not only in our legislatures but in many other of our political and public spaces. Most countries in the world have failed to give due space and empowerment to women in their political life. Women are moving in the direction of near equal participation in only a handful of countries, such as Germany, Sweden, Norway, Denmark, and Finland. In these societies women have begun to seriously alter the very nature of politics, making enduring, and substantial gains in every field. However, in all other countries, including the supposedly advanced democracies of western Europe and North America, where women exercise certain freedoms and have acquired the wherewithal for economic independence, female presence in legislatures remains small and relatively insignificant.

In India, the problem for women is more serious for several reasons. They are while in many other countries women are inching forward, in India the participation of women in politics has actually declined since the days of freedom movement, both in quantity and quality; Government and politics are more important factors in the economic, social, and power structures in India than in most other countries with stronger civil societies, and so, the effect of women's marginalization in politics is even more detrimental here the increasing violence, sexual harassment, and victimization of women at the ground level in many of our political parties have made their participation extremely hazardous now; and in order to increase the empowerment of women in the legislature, the 85th Constitutional Amendment Bill, introduced in Lok Sabha in December 1999. This Bill is seriously flawed, insofar as it mechanically provides for entry of women members to fill one-third of vacancies in Lok Sabha and Vidhan Sabhas.

ISSN 2394 - 7780

PROPOSED ALTERNATIVE WOMEN'S RESERVATION BILL

The important provisions of the proposed Alternative Bills are that a law should be enacted amending the Empowerment of the People Act, 1951, to make it mandatory for every recognized political party to nominate women candidates for election in one third of the constituencies; among seats reserved for SCs and STs also, one third of the candidates nominated by recognized parties shall be women; each party can choose where it wishes to nominate women candidates, duly taking local political and social factors into account; to prevent a party from nominating women candidates only in states or constituencies where the party's chances of winning election are weak, and to ensure an even spread of women candidates, the unit for consideration (the unit in which at least one out of the three party candidates shall be a woman) for the Lok Sabha shall be a state or union territory; for the State Legislative Assembly, the unit shall be a cluster of three contiguous Lok Sabha constituencies; in the event of any recognized party failing to nominate one-third women candidates, for the shortfall of every single woman candidate, two male candidates of the party shall lose the party symbol and affiliation and all the recognition related advantages; a law amending Articles 80 and 171 of the Constitution should be enacted providing for women's reservation of one-third of the seats, elected or nominated, to Rajya Sabha or Legislative Councils. Corresponding amendments need to be made in the Fourth Schedule of the Constitution and the Empowerment of the People Act, 1950.

CONCLUSION

While it is necessary to institute a system of reservation for women as spelled out above, this or any other system of ensuring women's presence in legislatures is not by itself sufficient if our objective is to make women equal partners in democratic politics. The problem is not just that women in the political arena are denied tickets by political parties. The fundamental problem is that given the nature of electoral politics today, the system itself creates insurmountable obstacles for women. Proposals for reservation initiated by the Congress Government for women must, therefore, be a part of a larger package of general reforms in electoral politics to improve the status of women.

REFERENCES

[i]United Nation Development Programme, Human Development Report, New York Oxford University Press, 1995, p.62.

[ii]For the elaborate position of women in the different Committees of political parties see Seminar. September 1997, p.52.

[iii]In the 16th Party Congress of the CPM, Brinda Karat took exception to the appallingly low representation of women in the party committees and opted herself out of newly elected Central Committees as a mark of protest.

[iv]Nonetheless, one critical question is: if more and more women get entry into higher adoption making Committees of the parties or even women preside over the party do women have better prospect in securing fairer candidatures in any election? Presently Congress, AIADMK, Trinamul Congress (TMC) are revolving around Sonia Gandhi, Jayalalita and Mamata Banerjee respectively. These women are unquestionably supreme, they have absolute control over party affairs and they can handpick the list of contesting candidates for any election. Have woman candidates got wider scope in these parties? Unfortunately the situation for women is no better.

[v]The First Constitution Amendment Act of 1951 had fixed it for 10 years from the commencement of the constitution. It was extended again and again, each time for 10 years. The Sixty-second Amendment Act of 1990 has increased it for next 10 years.

International Journal of Advance and Innovative Research
Volume 5, Issue 3 (VIII): July - September, 2018
ISSN 2394 - 7780

A REVIEW: NUTRITION IN CHRONIC KIDNEY DISEASE PATIENTS

Neelesh Kumar Maurya[1], Dr. Pratibha Arya[2], Shikha Kumari[3] and Prof. N. S. Sengar[4]
Research Scholar[1] and Assistant Professor[2], Institute of Home Science, Bundelkhand University, Jhansi
Research Scholar[3], Department of Foods and Nutrition, SHUATS, Allahabad
Professor[4] (D.M Nephrology), Department of Medicine, MLB Medical College, Jhansi

ABSTRACT
End-stage renal disease (ESRD) can result from a wide variety of different kidney diseases. Currently, 90% of patients reaching CKD have chronic diabetes mellitus, glomerulonephritis or hypertension. With CKD comes a myriad of problems related to the kidney's inability to excrete waste products leads to symptoms of uraemia. The treatments of CKD require dialysis or kidney transplantation. In this review, an attempt has been made to explain the nutritional management of CKD along with various dialysis treatment and the complications related to the dialysis method. It is important to maintain optimal nutritional status so that the patient will be a good candidate to respond to the treatment effectively.Kidney Patients necessitate following a blanced diet plan to retain normal protein stores and to avoid metabolic complications. This article deals with the therapeutic aspects of nutrition in CKD patients and will improve the quality of life

Keywords: ESRD, CKD, Dialysis, Nutritional management.

INTRODUCTION
The kidney is the human organ basically responsible for the filtration of nitrogenous and other metabolic waste products from the body through the urinary system and maintains the metabolism of biochemical especially haemostatics fluid, electrolyte and acid-base balance. (1)Another key biochemical function of the kidney is to help maintain blood pressure, activate vitamin D and produce erythropoietin. But, the efficiency of the kidney is a decline when there is a loss of nephron function.(2)

A chronic renal failure which is also known uremia is a drastically high level of urea in the blood which may be the end result of acute glomerulonephritis and nephrotic syndrome.(3 ,4) CRF is a slowly progressive loss of renal function over a period of month or year resulting in abnormally low glomerular filtration rate which is usually determined indirectly by the creatinine level in the blood serum.(5)

The persons with stage 4 chronic kidney disease (CKD) have advanced kidney damage with a severe decrease in the glomerular filtration rate (GFR) to 15-30 ml/min (6,7). In the management of ESRD, dialysis is used on either temporary basis or permanent basis. There may be a possibility of a kidney transplant in the near future. Dialysis is an artificial process by which nitrogenous waste products are removed from the blood in the event of kidney failure (8,9). There is two main type of dialysis – hemodialysis and peritoneal dialysis. In hemodialysis, the blood is purified outside the body via an automated machine, and in the process of peritoneal dialysis, the blood is filtered through the peritoneal membrane located in the abdomen. The common characteristic adoption of both types of dialysis is the removal of the wastes and excess fluids from the body (10).

CAUSES OF CKD
There can be several causes of CKD which includes immune complex Glomerulonephritis, chronic pyelonephritis, metabolic diseases with renal involvement as Diabetes mellitus, especially IDDM, HT, toxic substances or drugs like Paracetamol, Crocin, Diclofenac sodium, Vovron, Aspirin, Carbon tetrachloride, anti-inflammatory drugs, certain poisonous mushrooms(11,12,13). CKD may also occur from immunological reaction to drugs like certain Antibiotics. The conditions of CKD can also be due to infections causing obstructions of the urinary tract like stones calcium phosphate, calcium oxalate and uric acid. The other probable causes are hypertension, renal tubular disease, renal vascular diseases, congenital abnormalities like a polycystic disease, gout and abdominal surgical emergency, chronic malnutrition (14,15). Generally, the urine output depends upon GFR. Once renal failure occur the normal functions of kidney like regulation of body fluids, electrolytes, PH and excretion of metabolites are disrupted. (16)

COMPLICATIONS OF CKD
The major complication of CKD is Osteodystrophy leading to anaemia. This particularly occurs due to failure in controlling Ca and P levels due to a disturbance in two metabolic functions i.e. activation of Vit. D and action of parathyroid hormones (17,18). The symptoms of Osteodystrophy is generally manifested in the form of bone pain, various bone deformities, gait, tiredness, breathlessness on exertion, bleeding due to abnormal platelet f unction. CKD also affect nervous system which leads to muscle twitching, burning

ISSN 2394 - 7780

sensation in extremities and convulsions. This can be prevented by reducing phosphate in diets like restriction PO4 rich foods like milk, whole grain, bread etc (19).

COMPLICATION IN HAEMODIALYSIS

Hypotension: It is a most acute complication of the Hemodialysis. Many dialytic and patient-related factors influence blood pressure during the treatment cardiac output and blood pressure must be maintained by an increase heart rate and in some instances by an increase in myocardial contractility(20). However, the large burden of cardiovascular disease in Hemodialysis population often limits the ability of the heart to respond appropriately to the stress of fluid removal. These inherently different responses to ultrafiltration and diffusion greatly influence the maintenance of blood pressure during Hemodialysis (,21)

Cramps: Muscle cramps occur in as many as 20% of dialysis treatment. Cramps are known to be more frequent when ultra filtration rates very high. And when dialysate with low sodium concentration is employed, an indication that cramps are caused by acute extra cellular volume contraction (22)

Arrhythmias and Angina: Patient with ESRD frequently have several predisposing factors for arrhythmias. There is a high prevalence of left ventricular hypertrophy and valvular sclerosis. Coronary artery disease is common in the dialysis population, and pericardial effusions are frequently revealed by echocardiography (23,24). The reasons behind this are the rapid changes in electrolyte concentrations inherent in efficient Hemodialysis. It is not surprising that Hemodialysis may provoke cardiac arrhythmias. Angina frequently occurs during dialysis. The anaemia associated with chronic renal failure adds to the risk of episodes of angina(25).

Hypoxia: Hypoxia occurs during Hemodialysis is influenced by the nature of the buffer used in the dialysate and by the type of membrane in the artificial kidney. The arterial Pco2 in acetate buffered dialysate is low, creating a diffusion gradient from blood to the dialysate. Because carbon dioxide is removed from the blood into the dialysate, there is decreased in the respiratory drive. The second factor influencing the magnitude of hypoxia that occurs during dialysis is the type of membrane used. Hypoxia is noted when patients are dialyzed against a bioincompatible membrane such as a cellulosic membrane. (26, 27)

Hypoglycemia: Carbohydrate metabolism is quite abnormal in patients with chronic renal failure. A diabetic patient who takes a usual dose of insulin may experience hypoglycemia when undergoing dialysis against a bath with a fixed glucose concentration (that is glucose clamp) and too low for the amount of insulin being administered (28, 29). It is frequently necessary to decrease the dose of insulin on dialysis days to prevent hypoglycemic episodes. (30)

Haemorrhage: The uremic environment produces impaired platelet functioning, changes in capillary permeability and anaemia, all of which can impair homeostasis. Patient undergoing Hemodialysis still has a higher risk of the hemorrhagic event because of repeated exposure to heparin (31).Heparin is used to prevent clotting in the extracorporeal circuit. In addition to acute bleeding episodes, a patient undergoing Hemodialysis is exposed to chronic, low-grade episodes of blood loss with each dialysis treatment.(32,33,)

COMPLICATION IN PERITONEAL DIALYSIS

Cardiovascular disease: It is a major cause of death in PD patients. The rate of CVD is higher in dialysis patients than in the general population. The multifactorial atherosclerotic risk factor in PD patient includes not only the traditional risk factors of smoking, hypertension, family history, obesity but also coronary calcification, hypoalbuminemia, hyper-homocystinemia.(34,35)

Hypertension: Hypertension is very common. It occurs in 50 to 90% of PD patients. It may be explained in part by fluid retention as a result of impaired ultrafiltration(36,37). **Hyperlipidemia:** PD is associated with an increased glucose load because of constant absorption from the peritoneal cavity. Because of this glucose load, PD patient has a constant susceptibility to the development of hyperglycemia and hyperinsulinemia. This increases insulin levels result in an increase in the synthesis of triglycerides in the liver, In addition, dialysate protein loss of 5 to 15 gm per day results in the loss of all lipoproteins, with preferential loss of small molecules such as HDL.(38,39)

DIALYSIS IN ESRD

Dialysis is the procedure that replaces some of the kidney's normal function. It is performed when a person experience kidney failure, usually when more than 95% of kidney function is lost in both kidneys. Dialysis keeps the body balanced by removing waste products including salt and excess fluid, maintaining a safe level of blood chemicals such as Na, K & Cl and controlling blood pressure (40). It is of two types:-

ISSN 2394 - 7780

- Hemodialysis
- Peritoneal dialysis

Hemodialysis: It is widely performed. Assess to the vascular system is by means of Scribner shunts, atriovenous fistulas, and grafts. The actual dialyzer may be of parallel plate, coil, or hollow fibre type. Body solutes &excessive body fluid can be easily cleared by using dialysate fluids of the known chemical composition. In this process blood passes by the semipermeable membrane of the artificial kidney and waste products are removed by diffusion and restore the body's chemical balance. Non dialyzed uremic patients can digest 0.5 to 0.6 gm per kg. body wt. protein. Clinically stable patients can ingest 1.13 gm. per day protein and 23 to 24 kcal per kg body wt. per day.(42)

DIETARY MANAGEMENT OF CKD

Energy: Energy requirement of the renal patients is based on their sex, height, weight, and type of work (sedentary or moderate).Sufficient non-protein calories in the form of carbohydrates and fats is essential to spare protein for protein synthesis and energy needs 32- 38 kcal/kg/day for adults and 100-150 kcal/kg/day in case of children. Generally, 300-400gm Carbohydrate should be provided daily preferably in the form of simple carbohydrates like sugar, honey, glucose etc.(41,)

Protein: 0.5-0.8gms/kg body weight of protein per day is required with 60-70% as high biological value protein. This requirement is to reduce azotemia hyperkalemia and acidosis. Sources should include Essential Amino Acids from milk egg etc. Protein requirement ranges from 20-60 gm/day of high biological value,50%from animal sources and 50%from plant sources. (42)

Carbohydrates: Sufficient amount of carbohydrate to meet the energy requirement to prevent starvation ketosis, reduce catabolism of protein, to have protein sparing action. (43).Generally, 300-400 gms/ day in form of refined and complex carbohydrate are preferred.(44)

Fats: Unsaturated fats are preferred to saturated fat .The ratio of PUFA: SFA should be 1:1. Emulsified fat like cream, butter are preferred(45).

Sodium: Ideal intake-1-2mmol/kg (infant) 40-60 mmol/day older child or 500mg -2.0 gms/day in adults (46, 47). Strict restriction is required if hypertension and oedema.2 mmol/kg body weight/day & diuretic until crises are over. Diminished kidney function leads to sodium imbalance; any sudden increase in sodium intake cannot be excreted and may cause more edema (48, 49, 50)

Potassium: Potassium level in CRF can be either elevated or depressed. Vomiting and diarrhea leads to hypokalemia in which small dose of potassium may be needed (51). Severe Glomerular filtration failure results in hyperkalemia which leads to increase in serum potassium level resulting in cardiac arrest (52, 53,54). So potassium rich food like tomato, juices, coffee, tea, cocoa, potassium rich vegetables should be avoided. Potassium intake should be 1500mg/day (35-40mEq/day (55, 56).

Phosphorus, Sulphate, Organic Acid: There deficiency leads to reduced nephron function and reduced filtration and excretion of these material leads to acidosis (57,58)

Calcium and phosphorus: When GFR falls 20-30% below normal hyperphosphatemia occurs. Hyperthyroidism leads to hypocalcemiaresulting in osteodystrophy. Phosphorus intake is restricted 800-1200mg/day(59,60). Phosphate binding agents may be used if required to reduce absorption. Calcium supplements are also recommended. Calcium intake of 1 to 2 gms/ day is advised (61,62). Do not start calcium supplements, unless phosphate is restricted, to avoid soft tissue calcification. Calcium carbonate supplements can help buffer metabolic acidosis. Multivitamin supplements are required .Supplement of vitamin D3 may be recommended based on needs (63,64).

Water: Fluid is limited to urinary output +-500 ml per day. Total intake must account for additional fluids in the foods consumed and in water derived from metabolism of food nutrients and fecal fluids losses (65,66,67).

Vitamins: Limitations in protein and mineral consumption of vitamin deficiency diet. Multivitamin supplement should be providing to correct osteodystrophy vitamin D should be supplemented other vitamins like folic acid and B_6 should also be provided. Vitamin E prevents oxidate stress in dialysis patients.(68,69,70,71,72)

DIETARY MANAGEMENT OF HEMODIALYSIS

Energy: 35 kcal per kg ideal body weight (table-2) .Excessive body weight and protein energy malnutrition should be avoided (73). The prescribed amount of calories has protein sparing action and also it reduces protein catabolism and starvation keto acidosis (74).

ISSN 2394 - 7780

Protein: Protein requirement increases due to the dialysate losses and catabolism in hemodialysis patients NKF-DOQI suggests the mean protein requirements for 1.2 g/kg/day in HD patients, respectively (42). According to ESPEN, adjusted diet protein should be consumed as 1.1-1.2 g / kg / day and should be high in the biological value (of animal origin) of 50 % protein in hemodialysis patients (Table 1)

Sodium: When patients drink too much fluid it may actually dilute their Na may be high. Too much Na and water raise blood pressure and results in water retention, pulmonary edema (75). When sodium intake is high check fluid status, if high fluid gains, tell patient to eat fewer salty foods. Eat less salt in diet and fluid. Check fluid status to check whether patient is probably drinking too much Fluid. Limit wt. gains to under 4% of body wt. and ask them to eat fewer salty foods & to limit fluid to 3 cups + urine output. If low fluid gains, make sure they are gaining about 1.5 kg body wt. and are not dehydrated.2 to 3 gm per day sodium should be given. Sodium benzoate, potassium meta bisulphate added as preservative in pickles, squashes and canned food should be avoided. Commercial soft drinks, proprietary drinks, dry foods like fish, fruits and soup cubes should be avoided(76,77).

Potassium: 2 to 3 gm per day of potassium is recommended (78, 79). When the kidneys do not work properly, potassium builds up in the body and cause the heartbeat unevenly and stop suddenly (80, 81). Too little potassium can also be dangerous. Leaching of vegetables is done to reduce potassium content (82, 83).

Phosphorus: 1to 1.2 gm per day of phosphorus is recommended (84,). It is a minerals found in all the foods but especially present in milk products (85, 86). There must be a balanced between the calcium and phosphorous in the body (87, 88). To maintain calcium phosphorous balance, protein and phosphorous intake needs restriction (89,90).

Fluid intake: In dialysis there is danger of both water intoxication from overloading and dehydration due to little water intake or vomiting or diarrhea (91,92). Fluid intake should monitor carefully. 24 hrs urine output + 500 to 700 ml fluid is sufficient in condition of Oliguria (93, 94).

Table-1: Protein Requirement and Dietary Allowance for Indian Infants, Boys, Girls and Adults on Hemodialysis

	Requirent g/protein/ kg/d	**Body weight (Kg)**	**for HD Patient Total daily Requirement g protein/d + 0.4 g/kg/d & +0.2 for adults**	**Requirement g protein/d**	**Body weight (Kg**	**for HD Patient Total daily Requirement g protein/d + 0.4 g/kg/d and +0.2.g/kg for adults**
Infant 1-5 months	2.2	5.0	11.0			
Infant 6-9 months	1.69	7.9	16.5			
Infant 9-12 months	1.69	8.8	18.39			
Boys			Girls			
1-2 years	1.47	10.3	19.26	1.47	9.6	17.9
2-3 years	1.25	12.8	21.1	1.25	12.1	19.9
3-4 years	1.16	14.8	23.0	1.16	14.5	22.6
4-5 years	1.11	16.5	24.9	1.11	16.0	24.1
5-6 years	1.09	18.7	27.8	1.09	17.7	26.3
6-7 years	1.15	20.4	31.62	1.15	20.0	31.0
7-8 years	1.17	22.7	35.6	1.17	22.3	35.0
8-9 years	1.18	25.2	39.8	1.18	25.0	39.5
9-10 years	1.18	28.0	44.2	1.18	27.6	43.6
10-11 years	1.18	30.8	48.6	1.18	31.2	49.2
11-12 years	1.16	34.1	53.1	1.15	34.8	53.9
12-13 years	1.15	38.0	58.9	1.14	39.0	54.6
13-14 years	1.15	43.3	67.1	1.13	43.4	66.4
14-15 years	1.14	48.0	73.9	1.12	47.1	71.5
15-16 years	1.13	51.5	78.7	1.09	49.4	73.6

ISSN 2394 - 7780

16-17 years	1.12	54.3	82.5	1.07	51.3	75.4
17-18 years	1.10	56.5	84.75	1.06	52.8	75.9
Adult male	1.0	60	72			
Adult female	1.0	55	66			

Guidelines for Dialysis Centre. Directorate General of Health Services. Government of India

*Values are based on ICMR published Indian standards. In terms of mixed Indian vegetarian diet protein PDCAAS varies from 77.4 to 79.0% for different age groups.

*In children protein loss is inversely proportional to age. Hence protein requirement/d +0.4/kg/d = 0.4 is the increment to achieve positive nitrogen balance.

RECOMMENDED DIETARY NUTRIENT INTAKE FOR HEMODIALYSIS PATIENTS ARE SHOWN BELOW IN TABLE -2 (42, 73, 96, 97).

Nutrients	Recommended intake
Dietary protein intake (DPI)	• 1.2 g/kg/d for clinically stable patients (at least 50% should be of high biological value)
Daily energy intake (DEI)	• 35 kcal/kg/d if <60 years • 30–35 kcal/kg/d if 60 years or older
Total fat	25–35% of total energy intake
Saturated fat	<7% of total energy intake
Polyunsaturated fatty acids	Up to 10% of total calories
Monounsaturated fatty acids	Up to 20% of total calories
Carbohydrate	Rest of calories (complex carbohydrates preferred)
Total fiber	"/>20–25 g/d
Minerals and Water (Range of Intake)	
Sodium	750–2000 mg/d
Potassium	2000-2750 mg/d
Phosphorus	800-1000 mg/d
Calcium	<1000 mg/d
Magnesium	200–300 mg/d
Iron	10-18 mg/d
Zinc	15 mg/d
Selenyum	55 µq/d

ISSN 2394 - 7780

Nutrients	Recommended intake
Water	Usually 750–1500 mL/d
Vitamins (Including Dietary Supplements)	
Vitamin B1 (thiamin)	1.1–1.2 mg/d
Vitamin B2 (riboflavin)	1.1–1.3 mg/d
Pantothenic acid	5 mg/d
Biotin	30 µg/d
Niacin	14–16 mg/d
Vitamin B6 (pyridoxine)	10 mg/d
Vitamin B12	2.4 µg/d
Vitamin C	75–90 mg/d
Folic Acid	1–5 mg/d
Vitamin A	800-1000 µg/d
Vitamin D	1000-1500 IU
Vitamin E	400–800 IU

PERITONEAL DIALYSIS

Peritoneal dialysis is used electively or when circumstances prohibit chronic hemodialysis (98). In this dialysis improved soft catheters can be used repeatedly in comparison to Hemodialysis. In this type the patient's blood is cleaned within the body. The blood stays in the blood vessels which line the patient's abdominal space (99).

DIETARY MANAGEMENT IN PERITONEAL DIALYSIS

Table-3: Recommendations for protein and energy supply in adult patients on routine Hemodialysis and CAPD (100).

	ESPEN	NKF
Protein intake (g/kg BW/day	1.2–1.4 (450% HBV)	1.2 (450%HBV) Hemodialysis
CAPD	1.2–1.5 (450% HBV)	1.2–1.3 (450% HBV)
Energy intake (kcal/kg BW/day)		
Haemodialysis and CAPD*	35	<60 yr 35 <60 yr 30

ESPEN, European Society for Clinical Nutrition and Metabolism; NKF, National Kidney Foundation; CAPD, chronic ambulatory peritoneal dialysis. Including energy supply (glucose) from dialysis. HBV = high biological value.

ISSN 2394 - 7780

Table-3: Mineral requirements of patients on HD, haemodialysis; CAPD, chronic ambulatory peritoneal dialysis (101)

Phosphate (mg/d)	800–1000
Potassium (mg/g)	2000–2500
Sodium (g/d)	1.8–2.5
Fluid (ml)	1000+urine volume

*Individual CKD patient's requirements may differ in acute conditions

Energy intake of 25 kcal per kg body weight per day, the protein intake of 1.2 to 1.3 gm per kg per day (11). (≥ 50% of high biological value), 30 gm of fat per day, PUFA: SFA- 1:1(101), cholesterol intake ≤ 300mg per day, sodium intake of 750 to 1000 mg per day, potassium intake of40 to 70 mEq per day, phosphorus intake of 8 to 17 mg per kg per day, calcium intake of1400 to 1600 mg per day, iron intake sufficient to maintain serum iron level and zinc intake of 15mg per day is recommended(102,103).

CONCLUSION

The hemodialysis therapy should be deal with by a multidisciplinary team, as recommended for other high risk populations. A part of medical nutrition therapy is to provide nutrition education and periodic counseling by dietitians. For effective intervention, dietitians should present a guide for educating HD patients about individual nutritional needs. This guide should provide information about food sources, nutrients and usage exchange food lists. Adapting to patients requirements of intakes should be based on their laboratory values. Patients may be predisposed to receiving lower than recommended amounts of energy and macro-nutrients to the diet and patients who received information or counseling about their diet must be followed up closely by renal dietitians.

REFERANCES

1. Evans, David H., Peter M. Piermarini, and Keith P. Choe. "The Multifunctional Fish Gill: Dominant Site of Gas Exchange, Osmoregulation, Acid-Base Regulation, and Excretion of Nitrogenous Waste." Physiological Reviews 85.1 (2005): 97–177. Crossref. Web.
2. Sands, J.M., and J.W. Verlander. "Functional Anatomy of the Kidney ." Comprehensive Toxicology (2018): 1–26. Crossref. Web.
3. Nigwekar, Sagar U., and Ravi Thadhani. "Vitamin D Receptor Activation: Cardiovascular and Renal Implications." Kidney International Supplements 3.5 (2013): 427–430. Crossref. Web.
4. Menon, Shina et al. "Vitamin D Insufficiency and Hyperparathyroidism in Children with Chronic Kidney Disease." Pediatric Nephrology 23.10 (2008): 1831–1836. Crossref. Web.
5. Coresh, Josef et al. "Decline in Estimated Glomerular Filtration Rate and Subsequent Risk of End-Stage Renal Disease and Mortality." JAMA 311.24 (2014): 2518. Crossref. Web.
6. Hering, D. et al. "Renal Denervation in Moderate to Severe CKD." Journal of the American Society of Nephrology 23.7 (2012): 1250–1257. Crossref. Web.
7. Levey, Andrew S. et al. "Definition and Classification of Chronic Kidney Disease: A Position Statement from Kidney Disease: Improving Global Outcomes (KDIGO)." Kidney International 67.6 (2005): 2089–2100. Crossref. Web.
8. Oshima, Shinji et al. "The Use of an Artificial Skin Model to Study Transdermal Absorption of Drugs in Inflamed Skin." Biological & Pharmaceutical Bulletin 35.2 (2012): 203–209. Crossref. Web.
9. Oshima, Shinji et al. "The Use of an Artificial Skin Model to Study Transdermal Absorption of Drugs in Inflamed Skin." Biological & Pharmaceutical Bulletin 35.2 (2012): 203–209. Crossref. Web.
10. Dhondt, Annemieke et al. "The Removal of Uremic Toxins." Kidney International 58 (2000): S47–S59. Crossref. Web.
11. Blackshear, Joseph L. "Identification of Risk for Renal Insufficiency From Nonsteroidal Anti-Inflammatory Drugs." Archives of Internal Medicine 143.6 (1983): 1130. Crossref. Web
12. Whelton, Andrew. "Nephrotoxicity of Nonsteroidal Anti-Inflammatory Drugs: Physiologic Foundations and Clinical Implications." The American Journal of Medicine 106.5 (1999): 13S–24S. Crossref. Web.

ISSN 2394 - 7780

13. Gutierrez, Alberto, Jonas Bergström, and A. Alvestrand. “Hemodialysis-Associated Protein Catabolism with and Without Glucose in the Dialysis Fluid.” Kidney International 46.3 (1994): 814–822. Crossref. Web.

14. Whelton, Andrew. “Nephrotoxicity of Nonsteroidal Anti-Inflammatory Drugs: Physiologic Foundations and Clinical Implications.” The American Journal of Medicine 106.5 (1999): 13S–24S. Crossref. Web.

15. Mindell, Joseph A., and Glenn M. Chertow. “A PRACTICAL APPROACH TO ACUTE RENAL FAILURE.” Medical Clinics of North America 81.3 (1997): 731–748. Crossref. Web..

16. Davies, M. R. “Low Turnover Osteodystrophy and Vascular Calcification Are Amenable to Skeletal Anabolism in an Animal Model of Chronic Kidney Disease and the Metabolic Syndrome.” Journal of the American Society of Nephrology 16.4 (2005): 917–928. Crossref. Web.

17. Moe, S. et al. “Definition, Evaluation, and Classification of Renal Osteodystrophy: A Position Statement from Kidney Disease: Improving Global Outcomes (KDIGO).” Kidney International 69.11 (2006): 1945–1953. Crossref. Web.

18. Burn, D. J., and D. Bates. "Neurology and the kidney." *Journal of Neurology, Neurosurgery & Psychiatry* 65.6 (1998): 810-821. 20.Leypoldt, John K. et al. “Relationship Between Volume Status and Blood Pressure During Chronic Hemodialysis.” Kidney International 61.1 (2002): 266–275. Crossref. Web.

19. Mazzuchi, Nelson, Enriqueta Carbonell, and Juan Fernández-Cean. “Importance of Blood Pressure Control in Hemodialysis Patient Survival.” Kidney International 58.5 (2000): 2147–2154. Crossref. Web.

20. Hinoshita, Fumihiko et al. “Effect of Orally Administered Shao-Yao-Gan-Cao-Tang (Shakuyaku-Kanzo-to) on Muscle Cramps in Maintenance Hemodialysis Patients: A Preliminary Study.” The American Journal of Chinese Medicine 31.03 (2003): 445–453. Crossref. Web.

21. Maier, Lars S. “A Novel Mechanism for the Treatment of Angina, Arrhythmias, and Diastolic Dysfunction: Inhibition of Late INa Using Ranolazine.” Journal of Cardiovascular Pharmacology 54.4 (2009): 279–286. Crossref. Web..

22. Khan, Abdur Rahman et al. “Impact of Cell Therapy on Myocardial Perfusion and Cardiovascular Outcomes in Patients With Angina Refractory to Medical TherapyNovelty and Significance.” Circulation Research 118.6 (2016): 984–993. Crossref. Web.

23. Kimura, Ken-ichi et al. “Cardiac Arrhythmias in Hemodialysis Patients.” Nephron 53.3 (1989): 201–207. Crossref. Web.

24. Holdstock, L. et al. “Four-Week Studies of Oral Hypoxia-Inducible Factor-Prolyl Hydroxylase Inhibitor GSK1278863 for Treatment of Anemia.” Journal of the American Society of Nephrology 27.4 (2015): 1234–1244. Crossref. Web.

25. Campos, Israel et al. “Intradialytic Hypoxemia in Chronic Hemodialysis Patients.” Blood Purification 41.1-3 (2016): 177–187. Crossref. Web.

26. Sun, Chiao-Yin, Chin-Chan Lee, and Mai-Szu Wu. “Hypoglycemia in Diabetic Patients Undergoing Chronic Hemodialysis.” Therapeutic Apheresis and Dialysis 13.2 (2009): 95–102. Crossref. Web.

27. Takahashi, A. et al. “The Mechanism of Hypoglycemia Caused by Hemodialysis.” Clinical Nephrology 62.11 (2004): 362–368. Crossref. Web.

28. Shinohara, K. “Insulin Resistance as an Independent Predictor of Cardiovascular Mortality in Patients with End-Stage Renal Disease.” Journal of the American Society of Nephrology 13.7 (2002): 1894–1900. Crossref. Web.

29. Vázquez, Eduardo et al. “Ought Dialysis Patients with Atrial Fibrillation Be Treated with Oral Anticoagulants?” International Journal of Cardiology 87.2-3 (2003): 135–139. Crossref. Web.

30. Brunet, Philippe et al. “Pharmacodynamics of Unfractionated Heparin During and After a Hemodialysis Session.” American Journal of Kidney Diseases 51.5 (2008): 789–795. Crossref. Web.

31. Hafner, G. et al. “Laboratory Control of Minimal Heparinization During Haemodialysis in Patients with a Risk of Haemorrhage.” Blood Coagulation & Fibrinolysis 5.2 (1994): 221–226. Crossref. Web.

ISSN 2394 - 7780

32. Go, Alan S. et al. “Chronic Kidney Disease and the Risks of Death, Cardiovascular Events, and Hospitalization.” New England Journal of Medicine 351.13 (2004): 1296–1305. Crossref. Web.

33. Levin, Adeera. “THE CLINICAL EPIDEMIOLOGY OF CARDIOVASCULAR DISEASES IN CHRONIC KIDNEY DISEASE: Clinical Epidemiology of Cardiovascular Disease in Chronic Kidney Disease Prior to Dialysis.” Seminars in Dialysis 16.2 (2008): 101–105. Crossref. Web.

34. Georgianos, Panagiotis I., and Rajiv Agarwal. “Epidemiology, Diagnosis and Management of Hypertension Among Patients on Chronic Dialysis.” Nature Reviews Nephrology 12.10 (2016): 636–647. Crossref. Web.

35. Georgianos, Panagiotis I., Pantelis A. Sarafidis, and Carmine Zoccali. “Intradialysis Hypertension in End-Stage Renal Disease Patients.” Hypertension 66.3 (2015): 456–463. Crossref. Web.

36. Querfeld, U. et al. “Hyperlipidemia in Pediatric Patients Undergoing Peritoneal Dialysis.” Pediatric Nephrology 2.4 (1988): 447–452. Crossref. Web.

37. Chan, Man Kam, Zachariah Varghese, and John F. Moorhead. “Lipid Abnormalities in Uremia, Dialysis, and Transplantation.” Kidney International 19.5 (1981): 625–637. Crossref. Web.

38. Kopple, JD. “Dietary Protein and Energy Requirements in ESRD Patients.” American Journal of Kidney Diseases 32.6 (1998): S97–S104. Crossref. Web.

39. Karalis, Maria. “Low Protein Products.” Journal of Renal Nutrition 13.1 (2003): E1–E3. Crossref. Web.

40. Brunet, Philippe et al. “Pharmacodynamics of Unfractionated Heparin During and After a Hemodialysis Session.” American Journal of Kidney Diseases 51.5 (2008): 789–795. Crossref. Web.

41. National Kidney Foundation. KDOQI Clinical Practice Guidelines for Nutrition in Chronic Renal Failure. Am J Kidney Dis. 2000;35(suppl 2):S1–S140. [PubMed]

42. Merrill, John P. “The Use of the Artificial Kidney in the Treatment of Uremia.” Journal of Urban Health 75.4 (1998): 911–918. Crossref. Web.

43. A Saxena, A Gupta “Manual of Nephrology” health science publisher, New Delhi 2016 –page -288-289.

44. Huang, Xiaoyan et al. “Dietary Fat Modification in Patients with Chronic Kidney Disease: n-3 Fatty Acids and Beyond.” Journal of Nephrology 26.6 (2013): 960–974. Crossref. Web.

45. Henrich, William L. et al. “Competitive Effects of Hypokalemia and Volume Depletion on Plasma Renin Activity, Aldosterone and Catecholamine Concentrations in Hemodialysis Patients.” Kidney International 12.4 (1977): 279–284. Crossref. Web.

46. Waikar, Sushrut S., Gary C. Curhan, and Steven M. Brunelli. “Mortality Associated with Low Serum Sodium Concentration in Maintenance Hemodialysis.” The American Journal of Medicine 124.1 (2011): 77–84. Crossref. Web.

47. Block, G. A. et al. “Effect of Tenapanor on Interdialytic Weight Gain in Patients on Hemodialysis.” Clinical Journal of the American Society of Nephrology 11.9 (2016): 1597–1605. Crossref. Web.

48. Schork, A. et al. “Association of Plasminuria with Overhydration in Patients with CKD.” Clinical Journal of the American Society of Nephrology 11.5 (2016): 761–769. Crossref. Web.

49. Sarkar, Shubho R. et al. “Assessment of Body Composition in Long-Term Hemodialysis Patients: Rationale and Methodology.” Journal of Renal Nutrition 15.1 (2005): 152–158. Crossref. Web.

50. Murphy, S. C., S. Agger, and P. M. Rainey. “Too Much of a Good Thing: A Woman with Hypertension and Hypokalemia.” Clinical Chemistry 55.12 (2009): 2093–2096. Crossref. Web.

51. Steen, Bertil. “Hypokalemia-Clinical Spectrum and Etiology.” Acta Medica Scandinavica 209.S647 (2009): 61–66. Crossref. Web.

52. Karnik, Jwala A., et al. "Cardiac arrest and sudden death in dialysis units." *Kidney international* 60.1 (2001): 350-357.

53. Bleyer, A. J., et al. "Characteristics of sudden death in hemodialysis patients." *Kidney international* 69.12 (2006): 2268-2273.

ISSN 2394 - 7780

54. Herzog, Charles A., J. Michael Mangrum, and Rod Passman. "Non-Coronary Heart Disease In Dialysis Patients: Sudden Cardiac Death and Dialysis Patients." *Seminars in dialysis*. Vol. 21. No. 4. Oxford, UK: Blackwell Publishing Ltd, 2008.

55. Sahay, Manisha, Rakesh Sahay, and Manash P. Baruah. "Nutrition in chronic kidney disease." *Journal of Medical Nutrition and Nutraceuticals* 3.1 (2014): 11.

56. Kraut, Jeffrey A., and Glenn T. Nagami. "Metabolic Acidosis of Chronic Kidney Disease." *Textbook of Nephro-Endocrinology*. 2008. 457-481.

57. ARTHUR, CHOI KIM MING. "URINARY CITRATE IN CHINESE PATIENTS WITH NEPHROLITHIASIS." (1998).

58. Gal-Moscovici, Anca, and Stuart M. Sprague. "Endocrinology and Dialysis Jean L. Holley, Series Editor: Osteoporosis and Chronic Kidney Disease." *Seminars in dialysis*. Vol. 20. No. 5. Oxford, UK: Blackwell Publishing Ltd, 2007.

59. Cano, N. J. M., et al. "ESPEN Guidelines on Parenteral Nutrition: adult renal failure." *Clinical Nutrition* 28.4 (2009): 401-414.

60. Block, Geoffrey A., and Friedrich K. Port. "Re-evaluation of risks associated with hyperphosphatemia and hyperparathyroidism in dialysis patients: recommendations for a change in management." *American Journal of Kidney Diseases* 35.6 (2000): 1226-1237.

61. Torres, Armando, et al. "Treatment with intermittent calcitriol and calcium reduces bone loss after renal transplantation." *Kidney international* 65.2 (2004): 705-712.

62. Kraft, Michael D. "Phosphorus and calcium: a review for the adult nutrition support clinician." *Nutrition in Clinical Practice*30.1 (2015): 21-33.

63. Souberbielle, Jean-Claude, et al. "Vitamin D and musculoskeletal health, cardiovascular disease, autoimmunity and cancer: Recommendations for clinical practice." *Autoimmunity reviews* 9.11 (2010): 709-715.

64. Scales, Katie, and Julie Pilsworth. "The importance of fluid balance in clinical practice." *Nursing Standard* 22.47 (2008).

65. Broscious, Sharon K., and Judith Castagnola. "Chronic kidney disease acute manifestations and role of critical care nurses." *Critical care nurse* 26.4 (2006): 17-27.

66. Bostom, A. G. et al. “Controlled Comparison of L-5-Methyltetrahydrofolate Versus Folic Acid for the Treatment of Hyperhomocysteinemia in Hemodialysis Patients.” Circulation 101.24 (2000): 2829–2832. Crossref. Web.

67. Lindner, Armando et al. “Vitamin B6 Metabolism and Homocysteine in End-Stage Renal Disease and Chronic Renal Insufficiency.” American Journal of Kidney Diseases 39.1 (2002): 134–145. Crossref. Web.

68. Matias, P. J. et al. “Cholecalciferol Supplementation in Hemodialysis Patients: Effects on Mineral Metabolism, Inflammation, and Cardiac Dimension Parameters.” Clinical Journal of the American Society of Nephrology 5.5 (2010): 905–911. Crossref. Web.

69. Descombes, Eric, Alfred B. Hanck, and Gilbert Fellay. “Water Soluble Vitamins in Chronic Hemodialysis Patients and Need for Supplementation.” Kidney International 43.6 (1993): 1319–1328. Crossref. Web.

70. Ross, Edward A. et al. “Vitamin B6 Requirements of Patients on Chronic Peritoneal Dialysis.” Kidney International 36.4 (1989): 702–706. Crossref. Web.

71. Galli, Francesco et al. “Vitamin E, Lipid Profile, and Peroxidation in Hemodialysis Patients.” Kidney International 59 (2001): S148–S154. Crossref. Web.

72. Mahan, L. Kathleen, and Janice L. Raymond. *Krause's food & the nutrition care process 14th edition.* St.Louis, Missouri, Elsevier Health Sciences, (2017):715.

73. Therrien M, Byham-Gray L, Beto J. A review of dietary intake studies in maintenance dialysis patients. *J Ren Nutr.*2015; 25(4): 329-338.

ISSN 2394 - 7780

74. Rakova, Natalia, et al. "Increased salt consumption induces body water conservation and decreases fluid intake." *The Journal of clinical investigation* 127.5 (2017): 1932-1943.

75. Kallenbach, Judith Z. *Review of Hemodialysis for Nurses and Dialysis Personnel-E-Book*. Elsevier Health Sciences, 2015.

76. Gutch, Charley Franklin, Martha H. Stoner, and Anna L. Corea. *Review of hemodialysis for nurses and dialysis personnel*. Mosby, 1979.

77. Cupisti, Adamasco, et al. "Dietary approach to recurrent or chronic hyperkalaemia in patients with decreased kidney function." *Nutrients* 10.3 (2018): 261.

78. Levin, Adeera, et al. "Guidelines for the management of chronic kidney disease." *Canadian Medical Association Journal* 179.11 (2008): 1154-1162.

79. Braglia, Amy. *Dietary knowledge of and compliance with potassium restriction in maintenance hemodialysis patients*. California State University, Long Beach, 2007.

80. Noori, Nazanin, et al. "Dietary potassium intake and mortality in long-term hemodialysis patients." *American journal of kidney diseases* 56.2 (2010): 338-347.

81. Bethke, P. C., and S. H. Jansky. "The effects of boiling and leaching on the content of potassium and other minerals in potatoes." *Journal of food science* 73.5 (2008): H80-H85.

82. Abraham, Georgi, et al. "Malnutrition and nutritional therapy of chronic kidney disease in developing countries: the Asian perspective." *Advances in renal replacement therapy* 10.3 (2003): 213-221.

83. Block, Geoffrey A., and Friedrich K. Port. "Re-evaluation of risks associated with hyperphosphatemia and hyperparathyroidism in dialysis patients: recommendations for a change in management." *American Journal of Kidney Diseases* 35.6 (2000): 1226-1237.

84. Spinozzi, Nancy S. "Chronic renal disease." *Handbook of Pediatric Nutrition*. Aspen Publishing, 1993. 476.

85. Pereira, Paula C. "Milk nutritional composition and its role in human health." *Nutrition* 30.6 (2014): 619-627.

86. Hill, Kathleen M., et al. "Oral calcium carbonate affects calcium but not phosphorus balance in stage 3–4 chronic kidney disease." *Kidney international* 83.5 (2013): 959-966.

87. Ayus, J. C., et al. "Phosphorus balance and mineral metabolism with 3 h daily hemodialysis." *Kidney international*71.4 (2007): 336-342.

88. Cupisti, Adamasco, et al. "Dietary habits and counseling focused on phosphate intake in hemodialysis patients with hyperphosphatemia." *Journal of Renal Nutrition* 14.4 (2004): 220-225.

89. Sherman, Richard A., and Ojas Mehta. "Dietary phosphorus restriction in dialysis patients: potential impact of processed meat, poultry, and fish products as protein sources." *American Journal of Kidney Diseases* 54.1 (2009): 18-23.

90. Spinazzé, Silvia, and Dirk Schrijvers. "Metabolic emergencies." *Critical reviews in oncology/hematology* 58.1 (2006): 79-89.

91. Ayus, J. Carlos, Robert Levine, and Allen I. Arieff. "Fatal dysnatraemia caused by elective colonoscopy." *Bmj* 326.7385 (2003): 382-384.

92. Glassford, Neil J., and Rinaldo Bellomo. "The role of oliguria and the absence of fluid administration and balance information in illness severity scores." *Korean Journal of Critical Care Medicine* 32.2 (2017): 106-123.

93. Brooks, David K. "The modern treatment of anuria and oliguria." *Postgraduate medical journal* 34.397 (1958): 583.

94. Guidelines for Dialysis Centre. Directorate General of Health Services,Government of India (2010): 108-110

95. Therrien M, Byham-Gray L, Beto J. A review of dietary intake studies in maintenance dialysis patients. *J Ren Nutr.*2015; 25(4): 329-338.

ISSN 2394 - 7780

96. Soucy M. The impact of alternative medicine therapies on the nutrition and well-being of the chronic kidney disease (CKD) stage 5 patient. *Renal Nutrition Forum.* 2008. 27(2): 1-7.

97. Kolff, W. J. "Dialysis in treatment of uremia: artificial kidney and peritoneal lavage." *AMA archives of internal medicine*94.1 (1954): 142-160.

98. Ende, Norman. "Infarction of the bowel in cardiac failure." *New England Journal of Medicine* 258.18 (1958): 879-881.

99. Toigo, G., et al. "Expert Working Group report on nutrition in adult patients with renal insufficiency (part 1 of 2)." *CLINICAL NUTRITION-QUARTERLY-* 19.3 (2000): 197-208.

100. Cano, N., et al. "ESPEN guidelines on enteral nutrition: adult renal failure." *Clinical Nutrition* 25.2 (2006): 295-310.

101. Huang, Xiaoyan, et al. "Dietary fat modification in patients with chronic kidney disease: n-3 fatty acids and beyond." *J Nephrol*26.6 (2013): 960-74.

102. Alpers, David H. *Manual of nutritional therapeutics*. Lippincott Williams & Wilkins, 2008.

MANUSCRIPT SUBMISSION

GUIDELINES FOR CONTRIBUTORS

1. Manuscripts should be submitted preferably through email and the research article / paper should preferably not exceed 8 – 10 pages in all.
2. Book review must contain the name of the author and the book reviewed, the place of publication and publisher, date of publication, number of pages and price.
3. Manuscripts should be typed in 12 font-size, Times New Roman, single spaced with 1" margin on a standard A4 size paper. Manuscripts should be organized in the following order: title, name(s) of author(s) and his/her (their) complete affiliation(s) including zip code(s), Abstract (not exceeding 350 words), Introduction, Main body of paper, Conclusion and References.
4. The title of the paper should be in capital letters, bold, size 16" and centered at the top of the first page. The author(s) and affiliations(s) should be centered, bold, size 14" and single-spaced, beginning from the second line below the title.

   First Author Name1, Second Author Name2, Third Author Name3

   1Author Designation, Department, Organization, City, email id

   2Author Designation, Department, Organization, City, email id

   3Author Designation, Department, Organization, City, email id
5. The abstract should summarize the context, content and conclusions of the paper in less than 350 words in 12 points italic Times New Roman. The abstract should have about five key words in alphabetical order separated by comma of 12 points italic Times New Roman.
6. Figures and tables should be centered, separately numbered, self explained. Please note that table titles must be above the table and sources of data should be mentioned below the table. The authors should ensure that tables and figures are referred to from the main text.

EXAMPLES OF REFERENCES

All references must be arranged first alphabetically and then it may be further sorted chronologically also.

- **Single author journal article:**

Fox, S. (1984). Empowerment as a catalyst for change: an example for the food industry. *Supply Chain Management*, *2*(3), 29–33.

Bateson, C. D.,(2006), 'Doing Business after the Fall: The Virtue of Moral Hypocrisy', Journal of Business Ethics, 66: 321 – 335

- **Multiple author journal article:**

Khan, M. R., Islam, A. F. M. M., & Das, D. (1886). A Factor Analytic Study on the Validity of a Union Commitment Scale. *Journal of Applied Psychology*, *12*(1), 129-136.

Liu, W.B, Wongcha A, & Peng, K.C. (2012), "Adopting Super-Efficiency And Tobit Model On Analyzing the Efficiency of Teacher's Colleges In Thailand", International Journal on New Trends In Education and Their Implications, Vol.3.3, 108 – 114.

- **Text Book:**

Simchi-Levi, D., Kaminsky, P., & Simchi-Levi, E. (2007). *Designing and Managing the Supply Chain: Concepts, Strategies and Case Studies* (3rd ed.). New York: McGraw-Hill.

S. Neelamegham," Marketing in India, Cases and Reading, Vikas Publishing House Pvt. Ltd, III Edition, 2000.

- **Edited book having one editor:**

Raine, A. (Ed.). (2006). *Crime and schizophrenia: Causes and cures.* New York: Nova Science.

- **Edited book having more than one editor:**

Greenspan, E. L., & Rosenberg, M. (Eds.). (2009). *Martin's annual criminal code:Student edition 2010.* Aurora, ON: Canada Law Book.

- **Chapter in edited book having one editor:**

Bessley, M., & Wilson, P. (1984). Public policy and small firms in Britain. In Levicki, C. (Ed.), *Small Business Theory and Policy* (pp. 111–126). London: Croom Helm.

- **Chapter in edited book having more than one editor:**

Young, M. E., & Wasserman, E. A. (2005). Theories of learning. In K. Lamberts, & R. L. Goldstone (Eds.), *Handbook of cognition* (pp. 161-182). Thousand Oaks, CA: Sage.

- **Electronic sources should include the URL of the website at which they may be found, as shown:**

Sillick, T. J., & Schutte, N. S. (2006). Emotional intelligence and self-esteem mediate between perceived early parental love and adult happiness. *E-Journal of Applied Psychology, 2*(2), 38-48. Retrieved from http://ojs.lib.swin.edu.au/index.php/ejap

- **Unpublished dissertation/ paper:**

Uddin, K. (2000). A Study of Corporate Governance in a Developing Country: A Case of Bangladesh (Unpublished Dissertation). Lingnan University, Hong Kong.

- **Article in newspaper:**

Yunus, M. (2005, March 23). Micro Credit and Poverty Alleviation in Bangladesh. *The Bangladesh Observer*, p. 9.

- **Article in magazine:**

Holloway, M. (2005, August 6). When extinct isn't. *Scientific American, 293*, 22-23.

- **Website of any institution:**

Central Bank of India (2005). *Income Recognition Norms Definition of NPA.* Retrieved August 10, 2005, from http://www.centralbankofindia.co.in/ home/index1.htm, viewed on

7. The submission implies that the work has not been published earlier elsewhere and is not under consideration to be published anywhere else if selected for publication in the journal of Indian Academicians and Researchers Association.

8. Decision of the Editorial Board regarding selection/rejection of the articles will be final.

PUBLICATION FEE

The International Journal of Advance & Innovative Research is an online open access journals, which provides free instant, worldwide and barrier-free access to the full-text of all published manuscripts to all interested readers in the best interests of the research community. Open access allows the research community to view, any manuscript without a subscription, enabling far greater distribution of an author's work than the traditional subscription based publishing model. The review and publication fee of a manuscript is paid from an author's research budget, or by their supporting institutions.

As costs are involved in every stage of the publication process, like manuscript handling form submission to publication, peer-review, copy-editing, typesetting, tagging and indexing of articles, Electronic composition and production, hosting the final article on dedicated servers, electronic archiving, server and website update and maintenance and administrative overheads, each author is asked to pay certain fee as follows.

- The publication fee for the Online journal is Rs 1100. If the author wants a printed copy of the journal, then additional Rs.500/- have to be pay (which includes printing charges of the journal, hard copy of publication certificate for all authors, packaging and courier charges).

- The publication fee for the Online journal is Rs $50. If the author wants a printed copy of the journal, then additional $50 have to be pay (which includes printing charges of the journal, hard copy of publication certificate for all authors, packaging and courier charges).

The principal author will get one complimentary copy of journal (online / print) based on fee paid along with publication certificate (e copy / hard copy) after publication of the paper.

The publication fee, you can be deposited directly or can be transferred online in favour of "**Empyreal"** , **Current Account no 125505000329**, SWIFT No : ICICINBBCTS, IFS code : ICIC0001255, MICR No : 110229116, Branch code : 001255, Address: ICICI Bank, Plot No C-7, Sector-13, Opp. Jaipuria School, Vasundhara, Ghaziabad – 201012, Uttar Pradesh, India. You can also transfer the publication fee through Paytm at Mobile no : 9999817591

If anybody do not have funds to pay publication fee, he/she will have an opportunity to request the Editor for fee waiver through the Head of his/her Institution/Department/University with the reasons, because IARA does not want fee to prevent the publication of worthy work, however fee waivers is granted on a case-to-case basis to authors who lack funds. To apply for a waiver author/s must request during the submission process. Any request received thereafter will not be considered.

Indian Academicians and Researchers Association
1, Shanti Path ,Opp. Darwin Campus II, Zoo Road Tiniali, Guwahati, Assam
email : info@iaraedu.com / submission@iaraedu.com

INDIAN ACADEMICIANS & RESEARCHERS ASSOCIATION

Major Objectives

- To encourage scholarly work in research
- To provide a forum for discussion of problems related to educational research
- To conduct workshops, seminars, conferences etc. on educational research
- To provide financial assistance to the research scholars
- To encourage Researcher to become involved in systematic research activities
- To foster the exchange of ideas and knowledge across the globe

Services Offered

- Free Membership with certificate
- Publication of Conference Proceeding
- Organize Joint Conference / FDP
- Outsource Survey for Research Project
- Outsource Journal Publication for Institute
- Information on job vacancies

Indian Academicians and Researchers Association

Shanti Path ,Opp. Darwin Campus II, Zoo Road Tiniali, Guwahati, Assam

Mobile : +919999817591, email : info@iaraedu.com www.iaraedu.com

EMPYREAL PUBLISHING HOUSE

- Assistant in Synopsis & Thesis writing
- Assistant in Research paper writing
- Publish Thesis into Book with ISBN
- Publish Edited Book with ISBN
- Outsource Journal Publication with ISSN for Institute and private universities.
- Publish Conference Proceeding with ISBN
- Booking of ISBN
- Outsource Survey for Research Project

Publish Your Thesis into Book with ISBN "Become An Author"

EMPYREAL PUBLISHING HOUSE

Zoo Road Tiniali, Guwahati, Assam

Mobile : +919999817591, email : info@editedbook.in, www.editedbook.in