Volume 4, Issue 3(4), March 2015

International Journal of Multidisciplinary Educational Research

Published by
Sucharitha Publications
Visakhapatnam – 530 017
Andhra Pradesh – India
Email: victorphilosophy@gmail.com
Website: www.ijmer.in

Editorial Board

Typeset and Printed in India
www.ijmer.in

IJMER, Journal of Multidisciplinary Educational Research, concentrates on critical and creative research in multidisciplinary traditions. This journal seeks to promote original research and cultivate a fruitful dialogue between old and new thought.

C O N T E N T S

Volume 4 **Issue 3(4)** **March 2015**

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Editor-in-Chief

ISSN: 2277-7881; Impact Factor -2.735

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH

Visakhapatnam -530 003, Andhra Pradesh – India, www.ijmer.in

Editorial ……..

Provoking fresh thinking is certainly becoming the prime purpose of International Journal of Multidisciplinary Educational Research (IJMER). The new world era we have entered with enormous contradictions is demanding a unique understanding to face challenges. IJMER's contents are overwhelmingly contributor, distinctive and are creating the right balance for its readers with its varied knowledge.

We are happy to inform you that IJMER got the high Impact Factor 2.972, Index Copernicus Value 5.16 and IJMER is listed and indexed in 34 popular indexed organizations in the world. This academic achievement of IJMER is only author's contribution in the past issues. I hope this journey of IJMER more benefit to future academic world.

In the present issue, we have taken up details of multidisciplinary issues discussed in academic circles. There are well written articles covering a wide range of issues that are thought provoking as well as significant in the contemporary research world.

My thanks to the Members of the Editorial Board, to the readers, and in particular I sincerely recognize the efforts of the subscribers of articles. The journal thus receives its recognition from the rich contribution of assorted research papers presented by the experienced scholars and the implied commitment is generating the vision envisaged and that is spreading knowledge. I am happy to note that the readers are benefited.

My personal thanks to one and all.

(Dr.Victor Babu Koppula)

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ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
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HUMAN RIGHTS BEREFT OF CONJUGAL RIGHTS: NEED FOR ENLIGHTENED PRISON MANUEL

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"The prison gates are not an iron curtain between the prisoner and human rights".

Justice Krishna Iyer

A crime has been defined by Salmond as an act deemed by law to be harmful for society as a whole although its immediate victim may be an individual. Thus "a murderer injures primarily a particular victim, but its blatant disregard of human life puts it beyond a matter of mere compensation between the murder and the victim's family"[1]Those who commit such acts, if convicted, are punished by the State and the object or criminal justice is to protect the society against criminals by punishing them under the existing penal law. Thus punishment can be used as method of reducing the incidence of criminal behaviour either by deterring the potential offenders or by incapacitating and preventing them from repeating the offence or by reforming them into law abiding citizens. The theories of punishment therefore contain generally policies regarding handling of crime and criminals. The four accepted theories are deterrence, retribution, incapacitation / prevention and reformation/rehabilitation[2]. It is a known fact that punishment always carries with it a stigma, which fetters the normal liberty of individual. It has become an integral part of law enforcement for securing social control. Punishment is inevitable for recidivists who are habitual law breakers. The tendency among recidivists to repeat crime is due to their inability to conform to the accepted norms of society. Investigations

[1] Salmond: Jurisprudence 12th Edn. P.92
[2] Prof..V.Paranjape, Criminology and Penology, 8th Edn, P.117

reveal that it is the mental depravity of offenders which makes them delinquent and therefore a system of clinical treatment seems inevitable for the correction of such offenders. However, for this purpose there is a need for compartmentalisation of offenders on the basis of age, sex, gravity of offence and mental condition. This object is achieved by scientific classification of criminals into different categories, such as the first offenders, habitual offenders, recidivists, juvenile delinquents, insane criminals and sex offenders. Thus punishment should be a sort of social surgery since criminal is essentially product of conflict between the interests of society[3].

Classification of Prisoners: - Prisoners shall be classified as[4]:

1. Civil Prisoners
2. Criminal Prisoners
3. Under-trial Prisoners
4. Convicted Prisoners
5. Habitual Offenders
6. Non-Habitual Offenders,
7. Political Prisoners;
8. Detenus;
9. Condemned Prisoners; and
10. Lunatic Criminals and non-criminals.
11. The above prisoners can again be classified into male and female prisoners.

No non-criminal lunatic shall be confined in any correctional home and no court or any authority shall make an order committing a non-criminal lunatic to a correctional home for custody except in a case

[3] Ibid, P.121.
[4] Nitai Roy Chowdhury & Nirmal Kanti Chakrabarti, "Indian Prison Laws and Correction of Prisoners", Deep & Deep Publications Pvt.Ltd., New Delhi-110027, P.373

where immediate arrangement cannot be made for lodging such lunatic in a lunatic asylum or in any other place.

History of Prisons: - It was Abdul Fazal, one of the learned ministers of Akbar, who gave an interpretation that the Muslim rulers could award imprisonment to offenders and a number of forts were used to confine offenders and on the birth of Salim, the Emperor out of his joy ordered all the prisoners be released. In 1600A.D, the Portugese constructed the Church prisons at Goa, with nearly 200 separate cells. Under East India Company Rule, there were 143 Civil jails, 75 Criminal jails and 68 mixed jails, with a total accommodation for 75,100 had been built in Bengal, North West Provinces, Madras and Bombay[5]. It was only in the nineteenth century that imprisonment became the main form of punishment. Under section 42 of the Prisoners Act, 1900, the State Government has been empowered to appoint places within the State and places in other States with their consent where transportation prisoners could be lodged for undergoing their sentences. It is obvious that the expression confinement means the prisoners' detention in the place for the purpose of executing or carrying out their sentence[6].

The management and administration of prisons falls exclusively in the domain of the State governments, and is governed by the Prisons Act, 1894 and the Prison manuals of the respective state governments. Thus, states have the primary role, responsibility and authority to change the current prison laws, rules and regulations. Prison establishments in India comprise 8 categories of jails. The most common and standard jail institutions are Central Jails, District Jails and Sub Jails. The other types of jail establishments are Women Jails, Borstal Schools, Open Jails, Special Jails and other jails[7].

[5] Ibid P.24 & 28
[6] http://en.wikipedia.org/wiki/Prisons_in_India visited on 18/2/2015
[7] http://en.wikipedia.org/wiki/Prisons_in_India visited on 19/2/2015

In ***G.V. Godse v. State of Maharashtra***[8] the Supreme Court explained the legal position about imprisonment for life as follows, "A prisoner sentenced to life imprisonment is bound in law to serve the life term in prison, unless the said sentence is commuted or remitted by appropriate authority under the relevant provisions of the Indian Penal Code or the Code of criminal Procedure".

Imprisonment for Life- a different type:- In the following cases, Imprisonment for life is awarded but for different periods:-

1. In ***Shri Bhagwan v. State of Rajastan***[9] Supreme Court held that "in the interest of justice, we commute the death sentence imposed upon the appellant and direct that the appellant shall undergo the sentence of imprisonment for life. We further direct that the appellant shall not be released from the prison unless he had served out at least **20 years of imprisonment** including the period already undergone by the appellant".
2. In ***State of Maharashtra v. Sandeep @Babloo Prakash Khairnar***[10] Supreme Court held that, "considering the facts and circumstances, we set aside the death sentence and direct that for murders committed by him, he shall serve out at least **20 years of imprisonment** for life including the period already undergone by him".
3. In ***Ram Anup Singh and others v. State of Bihar***[11] a three bench judge of the Supreme Court held as follows, "Therefore, on a careful consideration of all the relevant circumstances we are of the view that the sentence of death is not warranted in this case. We, therefore, set aside the death sentence awarded by the trial Court and confirmed by the High Court to appellants.

[8] AIR 1961 SC 600
[9] (2001)6SCC 292
[10] (2002) 2 SCC 35
[11] (2002)6 SCC 686

We instead sentence them to suffer rigorous imprisonment for life with the condition that they shall not be released before completing an actual term of **20 years** including the period already undergone by them".

4. In ***Nazir Khan and others v. State of Delhi***[12], Supreme Court concluded that "considering the gravity of the offence and the dastardly nature of the acts and consequences which have flown out and, would have flown in respect of the life sentence, incarceration for the period of **20 years** would be appropriate. The accused appellants would not be entitled to any remission from the aforesaid period of 20 years".

5. In **Swamy Shraddananda @Murali Manohar Mishra v. State of Karnataka**[13] where the appellant was sentenced to death for committing murder of his wife and the High Court affirmed the sentence and dismissed his appeal. But the three-judge bench of Supreme Court "**substituted the death sentence by imprisonment for life and directed that he shall not be released from prison till the rest of his life**".

6. In Haru Ghosh v. State of West Bengal[14]Supreme Court held that "we do not propose to send the appellant/accused for the rest of his life; however we observe that the life imprisonment in case of the appellant/accused shall not be less than 35 years of actual jail sentence, meaning thereby the appellant would have to **remain in jail for minimum 35 years".**

7. In ***Ramraj @Nanhoo @Bihnu v. State of Chhattisgarh***[15], Supreme Court held that "in the present case, the facts are such that the petitioner is fortunate to have escaped the death

[12] (2003) 8 SCC 461
[13] Appeal (Crl) 454 of 2006 decided on 18th May 2007
[14] (2009) 15 SCC551
[15] (2010) 1 SCC 573

penalty. We do not think that this is a fit case where the petitioner should be released on completion of 14 years imprisonment. The petitioner's case for premature release may be taken up by the concerned authorities after he completes **20 years** imprisonment, including remissions earned."

8. In ***Dilip Premnayan Tiwari v. State of Maharashtra***[16], three convicted had killed three persons and grievously injured two others, leaving for dead. Supreme Court observed that "the crime in the nature of 'honour killing' and reduced the death sentence to imprisonment for life with a direction that they should not be released until they complete **25 years** of actual imprisonment and **20 years** for the third criminal of that case".

9. In ***Sebastain v. State of Kerala***[17] where the criminal had raped and killed a 2 year old child and he was prosecuted for such offence earlier also. The sentence of death awarded was reduced to **imprisonment for the rest of his life**".

10. In ***Neel Kumar @Anil Kumar v. The State of Haryana***[18] Supreme Court held as follows, "Thus in the facts and circumstances of the case, we set aside the death sentence and award life imprisonment. The appellant must serve a **minimum of 30 years in jail** without remissions, before consideration of his case for pre-mature release".

11. In Sandeep v. State of U.P[19] the Supreme Court observed that, "the imposition of death sentence to the accused Sandeep was not warranted and while awarding life imprisonment, we hold that the he must serve a **minimum of 30 years in jail** without

[16] (2010)1 SCC 775
[17] (2010) 1 SCC 58
[18] (2012) 5 SCC 766
[19] (2012) 6 SCC 107

remissions before consideration of his case for premature release".

From the above judgments of the Supreme Court of India, it can be seen that either **imprisonment for the rest of his life or 20 years to 35 years** of minimum imprisonment in jail is awarded in these cases.

Punishment for Rape:- The Criminal Law(Amendment) Act 2013[20], which came into force on 3rd February 2013, has increased the punishment for rape, as follows:-

(a). Sec. 376:- Whoever, being a police officer, public servant, member of armed force**,** management/staff of remand home or hospital; a relative, teacher or guardian commits rape shall be punished with rigorous imprisonment for a term which shall not be less than **10 years**, but which may extend to **imprisonment for life, which shall mean imprisonment for the remainder of that person's natural life** and shall also be liable to fine.

(b). Sec. 376A:- Whoever commits rape and in the course of such commission inflicts an injury which causes death of the woman or causes the woman to be in a persistent vegetative state, shall be punished with rigorous imprisonment for a term which shall not be less than **20 years**, but which may extend to **imprisonment for life, which shall mean imprisonment for the remainder of that person's natural life or with death.**

(c). Sec 376D:- Where a woman is raped by one or more persons constituting a group or acting in furtherance of a common intention, each of those persons shall be deemed to

[20] Act No 13 of 2013, which came into force on 3rd Feb 2013.

have committed the offence of rape shall be punished with rigorous imprisonment for a term which shall not be less than **20 years** but which may extend to **imprisonment for life, which shall mean imprisonment for the remainder of that person's natural life** and with fine.

(d). Sec 376E:- Whoever has been previously convicted of an offence punishable under section 376 or 376A or 376D and is subsequently convicted of an offence punishable under any of the said sections shall be punished with **imprisonment for life, which shall mean imprisonment for the remainder of that person's natural life** or **with death**.

Supreme Court of India in ***Air India Etc. Etc v. Nergesh Meerza & Others***[21] struck down the discriminatory Rules of Indian Airlines. An Air Hostess in Indian Airline challenged certain provisions of their service rule wherein an Air Hostess could have the job up to 35years of age, but can be terminated if she gets married within 4 years of her recruitment or on her first pregnancy, as unreasonable and invalid. It was contended that the termination of the services of Air Hostess on the ground of pregnancy or marriage within four years is manifestly unreasonable wholly arbitrary and violative of Art. 14 (5). Having taken the Air Hostess in service and after having utilised her services for four years to terminate her service by the Management if she becomes pregnant amounts to compelling the poor Air Hostess not to have any children and thus interfere with and divert the ordinary course of human nature. The termination of the services under such circumstances is not only a callous and cruel act but an open insult to Indian womanhood the most sacrosanct and cherished institution. Such a course of action is extremely detestable and abhorrent to the notions of a civilised society. Apart from being grossly

[21] AIR 1981SC 1829

unethical, it smacks of a deep rooted sense of utter selfishness at the cost of all human values, is clearly violative of Art. 14. The Supreme Court held that "this provision compelled the Air Hostess not to have children which is against the human nature".

Naz Foundation v. Govt. of NCT of Delhi[22] is a landmark Indian case decided by a two-judge bench of the Delhi High Court, which held that treating consensual homosexual sex between adults as a crime is a violation of fundamental rights protected by Indian Constitution.. Court decriminalized homosexual intercourse between consenting adults, throughout India, where Section 377 of the Indian Penal Code was adjudged to violate the fundamental right to life and liberty and the right to equality as guaranteed by the Constitution of India.[23]. The verdict resulted in the decriminalization of homosexual acts involving consenting adults, throughout India.

But, a medical team inspecting conditions at Delhi's Tihar Jail reported a high incidence of homosexual activity among its inmates. It recommended that prisoners be given condoms to minimise chances of HIV/AIDS transmissions. The authorities felt that distributing condoms would amount to an admission of the prevalence of homosexual activity within the prison walls. And that they could be held responsible for promoting an activity which the law considered an offence[24].

HIV/AIDS in Prisons:- The HIV/AIDS epidemic ravaged prison populations, with penal facilities around the world reporting grossly disproportionate rates of HIV infection and of confirmed AIDS cases. Inmates around the world frequently died of AIDS while incarcerated,

[22] 160 Delhi Law Times 277 (Delhi High Court 2009)
[23] https://loveisnotaboutgender.wordpress.com/2011/08/18/homosexuality-in-india-2/ visited on 22/2/2015
[24] http://www.telegraphindia.com/1051214/asp/atleisure/story_5596468.asp visited on 22/2/2015

often deprived of even basic medical care" (Human Rights Watch Report 2001). In countries like India, Indonesia and Thailand, HIV prevalence in prisons is between two and 15 times greater in the prison populations than in the general community. This could be on account of risky heterosexual or homosexual encounters, voluntary or coerced, injecting drug use, interpersonal violence or on account of practices like tattooing (reported from the other countries). TB/HIV co-infection is also well known (WHO 2007). HIV prevalence in prisons in India is much higher than in the community (1.7–6.9%, compared with 0.36%). Among female prisoners, prevalence levels of 9.5–14.2% have been reported. Most prisoners bring in HIV infection when they enter the prison. High risk sexual behaviours are common in prisons, and combined with a lack of poor knowledge of HIV/other STI transmission and a paucity of services makes this a very hidden and difficult problem to tackle. The tedious prison environment, crowding and hostility, lack of occupation of mind and body and just plain boredom lead to accumulated frustration and tension. This environment leads to high risk activities such as use of drugs and unprotected sex. A study from Thailand shows that of 689 male inmates, one quarter reported ever having sex with men; of them, more than 80% reported sex with men during incarceration. Sex between men is reported to be common in prisons in India, though homosexuality is illegal in India. In a study conducted in Arthur Road Jail, 71.6% of 75 employees and 677 inmates said that they thought sex between men was common in prisons. Eleven per cent of inmates and staff engaged in homosexual activity in prisons. A study in a district jail near Delhi found that 28.8% of 184 male inmates had a history of sex with men[25].

Right to Conjugal Rights:- Recently a petition came up before the Punjab and Haryana High Court, *Jasvir Singh &Another v.State of*

[25] http://www.nimhans.kar.nic.in/prison/chapter_2.pdf visited 22/2/2015

Punjab &Others[26], wherein the petitioners, husband and wife were awarded death sentence for kidnapping and brutally murdering a 16 year old minor for ransom, which was confirmed by the High Court. The Hon'ble Supreme Court dismissed their appeal but commuted the death sentence awarded to petitioner No.2 (wife) into life imprisonment. The petitioners now seek enforcement of their perceived right to have conjugal life and procreate within the jail premises. The issues raised by them are indeed of paramount public importance. The petitioners are currently lodged in the Central Jail at Patiala in separate cells. They seek a command to the Jail authorities to allow them to stay together and resume life for the sake of progeny and make all arrangements needed in this regard. The petitioners also refer to the well regulated concept of 'conjugal visitations' successfully implemented in the advanced countries like the USA, Canada, Australia, UK, Brazil, Denmark and Russia etc. The following issues were emerged for determination:-

i. Whether the right to procreation survives incarceration, and if so, whether such a right is traceable within our Constitutional framework?

ii. Whether penalogical interest of the State permits or ought to permit creation of facilities for the exercise of right to procreation during incarceration?

iii. Whether 'right to life' and 'personal liberty' guaranteed under Article 21 of the Constitution include the right of convicts or jail inmates to have conjugal visits or artificial insemination (in alternate)?

iv. If question No.(iii) is answered in the affirmative, whether all categories of convicts are entitled to such right(s)?

[26] CWP No.5429 of 2010 (O&M) decided on 29.05.2014

Court in this case relied upon ***Sunil Batra-1***[27], wherein Justice Krishna Iyer considered the core issue, whether a prison *ipso facto* outlaw the rule of law, lock out the judicial process from the jail gates and declare a long holiday for human rights of convicts in confinement or the prison total eclipses judicial justice for those incarcerated under the orders of a judicial Court? The *dictum* very emphatically espoused the cause of jail-inmates holding that "*Prisons are built with stones of Law' (sang William Blake) and so, when human rights are hashed behind bars, constitutional justice impeaches such law. In this sense, courts which sign citizens into prisons have an onerous duty to ensure that, during detention and subject to the Constitution, freedom from torture belongs to the detenu".*

In ***D. Bhuvan Mohan Patnaik Others v. State of Andhra Pradesh &Others***[28]**.**declared that "*convicts cannot be denied the protection of fundamental rights which they otherwise possess, merely because of their conviction*". In ***Sunil Batra-II***[29] delved deeper into the petrifying effects of loneliness of jail-inmates and observed, "*Visits to prisoners by family and friends are a solace in insulation; and only a dehumanised system can derive vicarious delight in depriving prison inmates of this humane amenity. Subject, of course, to search and discipline and other security criteria, the right to society of fellow-men, parents and other family members cannot be denied in the light of Art. 19*". In ***Francis Coralie case***[30]*also,* it was held that *"the prisoner or detenue has all the fundamental rights and other legal rights available to a free person, save those which are incapable of enjoyment by reason of incarceration*".

[27] Sunil Batra vs. Delhi Administration &Ors., (1978) 4 SCC 494s
[28] (1975) 3 SCC 185
[29] Sunil Batra v. Delhi Administration, (1980) 3 SCC 488
[30] Francis Coralie Mulin v. The Administrator, Union Territory of Delhi, (1981) 1 SCC 608

Punjab and Haryana High Court in the present case accepted the contention that "right to life includes right to 'create life' and 'procreate' and this fundamental right does not get suspended when a person is sentenced and awarded punishment thereby limiting him to stay in the jail" and State of Punjab is directed to constitute the Jail Reforms Committee formulate a scheme for creation of an environment for conjugal and family visits for jail inmates and shall identify the categories of inmates entitled to such visits".

With imprisonment, a radical transformation comes over a prisoner, which can be described as prisonisation. He loses his identity. He is known by a number. He loses personal possessions. He has no personal relationships. Psychological problems result from loss of freedom, status, possessions, dignity and autonomy of personal life. The intimate culture of prison turns out to be dreadful. The prisoner becomes hostile by ordinary standards. Self-perception changes, 'Crime not only turns admirable, but the more professional the crime, more honour is paid to the criminal'[31].

In **Sunil Batra**[32], life in prison is portrayed:.

> "For years and years, prisoners do not see a child, a woman, or even animals. They lose touch with the outside world. They brood and wrap themselves in angry thoughts of fear and revenge and hatred; forget the good of the world, kindness and joy". Oscar Wilde says : "*Every prison that men build is built with bricks of shame and bound with bars, lest Christ should see, how men, their brothers maim*".

The U.N. Congress on Prevention of Crimes and Treatment of Offenders (1955) observed[33]:

[31] Chettur Sankaran Nair, J. In A Convict Prisoner In The Central ... v. State Of Kerala 1993 CriLJ 3242
[32] AIR 1980 SC 1579: (1980 Cri LJ 1099),

> "*The purpose and justification of a sentence of imprisonment or a similar measure is ultimately to protect Society against crime. This can be achieved only if the period of imprisonment is used to ensure, as far as possible, that upon his return to society, the offender is not only willing, but able to lead a law abiding and self-supporting life. To this end, the institution should utilise all the: remedial, educational, moral, spiritual and other forces*."

Conclusion:- Prisons existed from ancient days. Segregating criminals from society to protect it is an acknowledged necessity of every civilised State. Yet, unduly harsh treatment is not favoured by civilised States. To those who do not believe in improving prison conditions or in the conservation of basic human rights in custody, Pandit Jawaharlal Nehru wrote in *India and the World*. Prison Land. (pp.108-129)

> ".Another error which people indulge in is the fear that if gaol (*jail*) conditions are improved people will flock in! This shows a singular ignorance of human nature. No one wants to go to prison however good the prison might be. To be deprived of liberty and family life and friends and home surroundings is a terrible thing. It is well known that the Indian peasant will prefer to stick to his ancestral soil and starve rather than go elsewhere to better his condition. ***To improve prison conditions does not mean that prison life should be made soft; it means that it should be made humane and sensible[34].***

In the present day situation, when 20 to 35 years of imprisonment or till the natural death of the prisoner is awarded to the convicts, when

[33] A Convict Prisoner In The Central ... v. State Of Kerala, 1993 Cri L J 3242

[34] http://www.humanrightsinitiative.org/publications/prisons/prisons_visiting_system_inIndia.pdf 19/2/2015

they come out of prison after the completion of the term, in their middle age /old age, they may face the stigma of being identified as jail birds and thereby ostracism by society. Others are destined never to be released also curse their fate. Spouses of such convicts also suffer, but not due to their faults. Conjugal rights are deprived all in forms to convicts and their spouses. Their natural instincts to beget children when denied, it violates their human rights. So conferring on them restoration of conjugal rights in restraint mode or not so frequently would alleviate their woes to a great extent. Moreover to reduce the offence of homosexuality in jails and to reduce loneliness and to improve the mental condition of prisoners, conjugal visits are helpful. A prisoner, who has invited incarceration by his conduct, cannot expect the same freedom as free citizens. Yet, such restricted freedom could be granted on the basis of sound considerations made by the State, for which Prison Manuel should be amended incorporating conjugal rights to the prisoners.

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

PROFESSIONAL DEVELOPMENT OF TEACHERS THROUGH TELECONFERENCES

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Introduction

What is Professional development of Teachers? Why is professional development of teachers important? What are the factors that contribute for professional development? How quality initiatives of Andhra Pradesh Sarva Shiksha Abhiyan (SSA) contributing for professional development of Teachers? What is the role of Distance Education initiatives for professional development of Teachers? How to make use of Teleconferencing as a mode of effective Teacher Training strategy for professional development teachers? What are the experiences of Andhra Pradesh, SSA in making use of Teleconferences as mode of Professional Development of Teachers? The present paper through light on the issues raised.

Professional Development of Teachers and It's Importance

Universalisation of Elementary Education (UEE) in the national context and "Education for All"(EFA), in the global context are the stated goals of Education. To achieve this, several initiatives were taken in terms of access, enrolment, retention and quality education. Quality Education depends on quality of the teachers in terms of their work culture and professional development. To provide' quality education qualified arid professional teachers are required. Because "the quality of a nation reflects the quality life of its citizens, the quality life is depend as on the quality of education provided to them, the quality education is relay upon the quality teachers, the quality teachers are out come of the quality of the teacher education" (Mahender Reddy Sarsani, 2006, p.6). According to Indian Education Commission (1964-66), "of all the different factors which influence the

quality of education and its contribution to national development; the quality, competencies and charter of teachers are undoubtedly the most significant. Nothing is more important than securing a sufficient supply of high quality recruits to the teaching profession, providing them with the best possible professional preparation and creating satisfactory conditions of work in which they can be fully effective". Teacher play's a vital role in providing quality education. Qualified teachers were appointed in all these days and near total access ensured in Andhra Pradesh. The Teacher pupil ratio in Andhra Pradesh is less than 1:40.

However mere appointment of qualified teachers will not result in quality teaching and learning. Because pre-service "Teacher Education" programmes available in the country are hardly adequate to turn a trainee in to profession. Professionalism for a global society demands teachers to be innovative in their attitude, flexible in their approach and reflective and inquisitive in their mind always refreshing themselves with day-to-day increase of knowledge in their subject area. Professionalism therefore implies professional preparation of teachers and their professional development throughout the process of quality training (Nellaiyappan, 2005). "Successful professional - development experiences have a noticeable impact on teacher's work, both in and out of the classroom, especially considering that a significant number of teachers through the world are under-prepared for their profession " (Eleonora villegas - Reimers, 2003, p 19). Therefore Professional Development of in service Teachers is very important.

It is essential to improve the professional skills of teachers, in the context of changing times in the education system. Eleonora villegas - Reimers (2003) says that, professional development of teachers is a lifelong process with the initial preparation that teacher receive and continues until retirement. "Professional development, in a broad sense, refers to development of a person in his or her professional role. More specifically, "Teacher development is the professional growth a

teacher achieves as a result of gaining increased experiences and examining his or her teaching systematically" (Glatthorn, 1995, p 41). Professional development includes formal experiences (such as attending workshops and professional meetings, mentoring, etc.,) and informal experiences (such as reading professional publications, watching television documentaries, related to an academic discipline, etc.,) (Ganser, 2000)" (tleonora Villegas -Reimers -p 11).

Professional development is broader than the career development, staff development and in- service training. Professional development must be viewed from the content of experiences, the processes by which the professional development will oosur and the contexts in which it will take place.

In specific terms professional development includes acquiring requisite/additional qualifications, in-service Teacher Trainings, attending work shop & seminars, publishing research articles, taking up of action research, taking part in the activities of professional organizations and involving ail monitoring activities in and outside of the school. Professional development of Teacher must result in developing new competencies/skills and it should give a°direction to quality learning. NCTE (1998) has identified few teaching competencies. They are 1. Contextual, 2. Conceptual, 3. Content, 4. Transactional, 5. Related to Educational activities, 6. To develop Teaching learning material, 7. Evaluation, 8. Management, 9, Related to working with parents, 10. To work with community and other agencies.

There is a shift in role of Teachers from behaviorist to constructivist frame work. This can be examined and compared as:

The Teacher Was/Is		The Teacher's role is Becoming More.
A deliverer of		A facilitator of learning; a guide on the

information, a sage on stage		side, a living example and a leader
A teacher of the text book		A teacher whose lessons are driven by reality and up to date information resources and vision.
A Coordinaior of group work.		An information manager, building collaborative teams and a Reflective Practitioner.
A ruler in a benevolent dictatorship.		A knowledge navigator, celebrating and developing patterns for life-long learning and a catalyst of change filed with reflective thinking.
An educational island.		A member of learning community composed of technology assistant.-media specialist, Teachers. Administrators, parents, on line experts and students and a living example for others to imbibe.

(Source: Sree Rama Murthy.M, 2006, P. 67)

Therefore the new perspective of professional development-can be-defined as a long term and collaborative process and must be contextual, this process ultimately linked to school reforms.

Factors contributing for professional development of Teachers

Most effective professional development takes place when there are meaningful interactions not only among teachers themselves but also between teachers, administrators, parents and other Community members. The opportunities which provides to a teacher who enters with a certain knowledge base and who will acquire new knowledge and experiences based on that prior knowledge will leads to meaningful

professional development. The most effective form of professional development is that which is based in schools and is related to the daily activities of teachers and learners. The programmes, activities designed in this direction will definitely contribute for professional development of teachers. However teacher professional development programmes are only effective if teachers actually adopt the strategies advocated by the programs.

In the changing context teaching is a process which makes the children" think and try out what they are learning A teacher has to shift away from his/her traditional stance of "informing" to that of "eliciting" and "guiding". The teacher role is facilitating construction of knowledge and engaging children by raising the right kind of questions and organizing well chosen activities and tasks-. "Active engagement involves enquiry, exploration, questioning, debates, application and reflection leading to theory building and creation of ideas/positions. Schools must provide opportunities to question, enquire, debate, reflect and arrive at concepts or create new ideas" (NCF, 2005). To take this challenge professional development programmes in terms of in-service trainings, workshops, etc., should be designed in this direction. These programmes no doubt contribute for professional development of teachers.

Distance Education initiatives and professional development of Teachers

Researches shows that traditional teacher Professional Development does not support enactment, i.e., teacher's knowledge not transformed in to classroom. Teachers say that these workshops leave them ili-equipped to enact what they learned. Researches confirms teacher's impressions. Joyce & showers (2002) found that enactment is minimal for what is often considered high-powered teacher professional development, where presentations, discussion, demonstrations and

practice session are included, only when classroom- - based coaching is added to professional development experiences is there significant enactment.

Traditional professional development programmes has to be redesigned in the context of globalization. Technology can be utilized as a tool for professional development. Distance Education initiatives (such as Teleconferences, Video Conferences, Radio lessons, Print, Audio-Video & Multimedia etc.,) are strengthening the training of elementary school teachers in general and professional development- in particular. Through Distance Education initiatives the unreached can be reached with quality training inputs without any transmission loss. It providing work-place based training without dislocating the functionaries. Distance Education has been accepted globally as on alternative to formal professional development programmes. Therefore instead of organizing formal in service training programmes for professional development teachers a space should be provided with Distance Education initiatives to prepare the teacher to fulfill the learners demands in the context of globalization.

Professional Development through Teleconferences:

Many attempts were made through in service teacher training programmes to improve the quality of teachers. The programmes such as the Programme of Mass orientation for School Teachers (PMOST), Special Orientation for Primary Teachers (SOPT) were under taken for the capacity building of Teachers. PMOST and SPOT initiated and implemented during 1986-1990 and 1993-97 respectively. In service teacher trainings on activity based learning in Andhra Pradesh Primary Education Project (APEP) and in DPEP were under taken in a large scale. All these training programmes were organized in cascade mode which resulted a great amount of transmission loss at each stage (cf: Dr. Mohan B. Menon, 1997, p.25). The transmission loss in training inputs resulting in effective implementation of the designed quality

initiatives. The Training Strategies limited to cascade mode will suffer with non availability of quality resource persons and there will be quality dilution in transmission due to the time gap between multi level trainings. Therefore "for effective implementation of in- service training programmes it is necessary to evolve integrated strategies using both distance and face - to - face based methodologies. Such an integrated approach will require various institutions at apex, regional and grass foot levels to come together so that one could evolve situatable networking of resources available in these institutions. It may be noted that training of teachers and other functionaries such as Head Teachers, personnel in the BRCs and CRCs and DIETs could be done very effectively by using these integrated strategies and through suitable networking system" (Mohan B. Menon, 1997, p. 26). To overcome the limitations of cascade model and to adopt integrated approach by using technology only one option is left i.e., "TELECONFERENCE".

Teleconferencing in Andhra Pradesh:

Under the Distance Education Programme of the SSA, Andhra Pradesh is one of the states which making use of Teleconference extensively for professional development of teachers and field functionaries of project. "Teleconferences were organized through Direct Reception system (DRS) sponsored by the DEP of IGNOU and DPEP. These terminals were established in all DIETs of Andhra Pradesh". (Shankar.P,2006, p. 155). This was in the year 2000-2001. There was only one Teleconference point in the entire district. It had its own limitations. This problem was overcome with MANATV - KUBAND.

SAPNET - MANATV

Society for Andhra Pradesh Network (SAPNET) is a major, communication infrastructure initiative of Department of !T&C,

Government of Andhra Pradesh. SAPNET runs 5 Television Channels under the name MANATV with a purpose to provide Distance Learning, Agriculture Extension, Rural Development, Tele Medicine and e-governance. On 8the July, 2000 a MOU was signed with ISRO. Out of 5 Channels 2 Channels are being used for school education. Pre recorded programmes through Ch - IV and LIVE Programmes (Interactive) through Ch - II. Up-linking of the signal for experimental transmissions commenced from MCF, Hasan in Karnataka on 1st November, 2000. The earth station (Hub) was installed and commissioned on the campus of Dr. B.R, Ambedkar, Open University on 1st April, 2007. On 22nd March, 2003, SAPNET was registered under the societies Registration act.

WIDE NET WORK

In the initial stage it had 2005 terminals including 586 school points in the state. However Andhra Pradesh Sarva Shiksha Abhiyan Commissioned BHEL to install Receiving only Terminals (RoTs) in all Block Resource Centers (BRC), Cluster Resource Centers (CRCs) and DIETs during the year 2007-08. Now total 7963 RoTs are being established. This wide network gives one terminal within the distance of 10 - 15 km in the mandals (Blocks). State Level, District Level, Block Level and Cluster Level institutions and persons now connected with this network.

Mode of Training in Tele Conferencing:

The training programmes will be organized in 2 way Audio and one way video mode. The expert panelists Resource Persons session wise sit at teaching end i.e., Studio all the participants/Target group will sit at learning/receiving end. (CRC, BRC, DIET terminal Points).

One responsible person DRG/CRC Coordinator/BRC Coordinator will coordinate/monitor the Teleconference at the learning ends. He/she makes arrangements for Teleconferences and records the attendance of

the participants and also in the end collects the feedback on Teleconference in the prescribed format. He/she also responsible to coordinate the discussions/interactions at learning end and alternative measures will be taken in the cases of power failure and system failure, in the training unit cost itself a provision for providing generator is made and in the case of system failure the resource persons already trained for this purpose will continue the remaining sessions with face to face interaction based on the •training material (module). However such cases are not noticed.

Teleconferencing Involves may training strategies

- Panel Discussion/Group Discussion.
- Participants Interaction with Panelists.
- Group discussion among the participants in the specified session at the learning end.
- Presentation/demonstrations by experts/panelists (both live and recorded) at teaching end (Display of CDs of best practices).
- Self - Study/Tele - material at the learning end (study of supplied modules, formats, instructions etc.,).
- Development of Material at the learning end if needed.
- Question - Answer session to clarify doubts at learning end by experts through phone and fax.
- Tele Monitoring by experts.
- Brain storming.

Quality initiatives of AP, SSA - Professional Development of Teachers:

National Curriculum frame work (2005) recommends a paradigm shift in the teaching learning process from behaviorist perspective to constructivist perspective in which students develop their own thinking and develop new ideas and actions, reactions through experiences. In this school and teacher facilitate for a process in which the child can construct the knowledge to become independent thinkers and capable of solving their everyday problems. As the teachers were trained in a behaviorist model, AP, SSA through its quality initiatives bringing a paradigm shifts from behaviorism to constructivism to make the teachers to understand their changing role.

Andhra Pradesh, Sarva Shiteha Abhiyan taking up several quality initiatives to promote quality education by exploring innovative means for professional development of teachers. AP, SSA'imparting, quality training programmes through Teleconferences and modular approach.

The following quality initiatives are taken up by AP, SSA

1. Children's language improvement Programme (CLIP) during 2005-06

2. Computer Aided Learning (CAL)

3. Multi Lingual Education for Tribal Children (MLE)

4. Children's Learning Acceleration Programme for Sustainability (CLAPS) 2006-07

5. CLAPS & INNOVATIONS (2007-08)

6. Accreditation of Schools by process indicators (Star grading).

7. Public Demonstration on Children performance (2006-07)

   a. Pathanothsavam (Reading festival)

b. Bhashothsavam (Language festival)

8. Chinnarula Sabha (Children convention 2007-08).
9. Special strategies for Class I & II.
10. Library Week (August 2007)
11. Children Literature (24th October, 2006)
12. Teacher convention on Quality Initiative programmes (Action Researches, small scale researches by teachers & teacher educators).
13. Development of Interactive teaching-learning material and organizing MELAS (Telugu, Maths & Science Melas)

All these quality initiatives of AP, SSA contributed to professional development of teacher, why because it directly addressed the classroom instruction to enhance the achievement levels of students. All these quality initiatives are based on constructive perspective.

Details of Teleconference Programmes in Andhra Pradesh

Andhra Pradesh, Sarva Siksha Abhiyan Organised several Teleconferences

The list of such programmes presented below.

S. No.	Name of the Programme	Objective of the Programme	Date of the Programme	Participants	Number benefited
1.	Nesthan Badiki Ra (Friend Come lo School)	Enrolment of OSC	10.04 2006	MEOs. MRPs. DPO Officials	6374
?	BADIBATA '	Enrolment Drive	29.05.2006	MEOs, MRPs. DPO Officials	5374
3.	Training for computer Lileracy	Training for computer Literacy	24.07 2006 to 26.07.2006 (Two hours each day)	Computerization School Teachers	674
4	CHILDREN'S LEARNING ACCEL LARATORY PROGRAMME (CLAPS)	Improving the Reading. Writing and Arithmetic Competencies among students	2.08 2006	MEOs, MRPs. School Complex Head Masters	11343
5.	Orientation to RBC Instructors	Effective functioning of RBCs	17.08.2006 to 18.03.2006	RBC Instructors	3213
6.	One day orientation to school complex HMs	Training for Organizing School Complex Meetings.	9^{m} and 19$^{'''}$ August. 2006 Organising School Complex Meeting	School Complex HMs	7673
7.	Orientation lo RPs on CLAPS PSAJPS	Orientation to RPs cn CLAPS	21.09.2006 to 22 09 2006	Resource Teachers	2800
8	Training on D1SE	One day Orientation on DISE	25 11 2006	All MEOs and Three Teachers from each	11200

				mandal	
9.	Orientation Programme for VVs (Vidya Volunteers)	Orienlation Programme for Vidya Volunteers	21.12.2006 to 22.12.2006	Vidya Volunteers	22000
10.	Training on CLAPS Monitoring formats	Monitoring of CLAPS	21.11.2006	DRP'S, MEOs and CRC Coordinators	11200
11.	Orientation Programme on NPEGEL for Head Masters, Saipanches and MEOs	Orientation Programme on NPEGEL for HMs and Sarpanches and MEOs to bring awareness on NPEGEL activities	18.01.2007	HMs sarpanches and MEOs	6854
12.	One day Orienlation Programme on English Teacher Training to Resource Persons	Training Programme lor Resource Persons in English Language	19.01.2007	Resource Persons in English Subject	5322
13.	Orientation on Preparation of SSA AWP&B 2007-08	Training on preparation AWP&B	12.02.2007	School Complex Head Masters, MEOs, APCs and Sectoral Officers of SSA and DIET Faculty members	9220
14.	Orientation on School Complex Themes	Training on School Complex agenda items	15.02.2007	School Complex Head masters and MEOs	5211
15	Orientation to Urdu Medium Teachers on CLAPS	Orientation to Urdu Medium Teachers on CLAPS	17 02.2007	Urdu Medium Teachers	1622
16.	Orientation Programme on CLAPS	Orientation Programme on CLAPS_	21 06.2007	MEOs and DRPs	4513

17.	Organization of School Complex Meeting	Orientation Programme on Organizing School Complex meeting	12.07.2007	School Complex HMs and MEOs	6818
18.	Training on "Innovations"	Oriental ion Programme on implementation of : "Innovations".	13.07.2007	Assl. Secretaries & Resource Persons	5214
19.	Implementation of Innovative Programmes in Schools (Urdu)	Orientation to Urdu Teachers on Teaching Strategies and Implementation of Innovative Programmes in schools	1807 2007	Urdu Teachers/DRPs	2618
20.	Orientation on CLAPS	Orientation on CLAPS	9.08.2007	School Complex Head Masters, Asst Secretaries and Subject experts	6312
21.	Orientation on CLAPS Primary	Orientation on CLAPS Primary	9.08.2007 (afternoon session)	Subject Resource Persons and Asst. Secretaries on School Complexes	6311
22	Orientation on CLAPS UP Stage	Orientation on CLAPS UPS Stage	10.08.2007	School Complex Head Masters	5112
23.	Orientation to Urdu Teachers on CLAPS and Innovative Programmes	Orientation to Urdu Teachers on CLAPS and Innovative programmes	17.08.2007	Urdu Teachers and DRPs	3500
24	Orientation on Children Projects ¡	Orientation on Children Projects	6.09 2007	DRPs	5612
25.	Orientation to Hindi	Orientation to Hindi	13.09.2007	Hindi Pandils	8450

	Pandits on CLAPS	pandits on CLAPS			
26.	Orientation to Vidya Volunteers	Orientation to Vidya Volunteers	6 10 2007	Vidya Volunteers	22200
27.	Orientation on DISE formats	Orientation on OISE Formats	8.10.2007	MEO. HMs and Sectoral Officers	5800
28.	Orientation Jo urdu teachers on CLAPS	Orientation to Urdu Teachers on-CLAPS	16.10 2007	Urdu Teachers	2450
29.	Orientation to Mandal Level Monitoring Team Members on Monitoring Schools	Orientation to ' Mandal Level Monitoring Team members on monitoring of schools	22.11.2007	Mandal level monitoring team members	5600
30.	Teleconferences on Vignana Mela	Orientation to RPs on preparation of Science Exhibits (Vignana Mela)	6.12 2007	I Resource Persons	483
31.	Learning Mela	Orientation on preparation of Interactive Learning Material	7.12.2007 '	Teachers subject wise	483
32.	Teleconference on Preparation of AWP&B 2008-09	Orientation on preparation of AWP&3	10.01:2008	MPPs. ZPTCs. MEOs. MPTCs, One NGO. 2 HMs. 2 Women / Sarpanches, 1 Teacher. 1 Self help group member. 1 ORG from each mandal	5640
33	Teleconferences	Orientation to C and D Grade Schools in CLAPS	25.01.2008	RPsof40days schedule for C and Q Grade Schools	.2200

34.	Teleconference to Urdu Teachers on CLAPS	Orientation lo C and D Grade Schools in CLAPS	10.03.2008	Urdu Teachers	2800
35.	Teleconference lo C and D Grade School Teachers	Orientation for C and D Grade Schools in CLAPS	11.03 2008	C and D Grade Teachers	23511
36.	Teleconference on External Evaluation of CLAPS	Training on conducting of External Evaluation •Of-CLAPS	12.03.2008.		3500

(source AP-SSA-Hyderabad)

The same type of programmes are continuing in the state. The present academic year 2014-15 teleconferences are organizes on transaction of new text books, new lesson plans, model lesions and CCE.

Video Conferences

Several Video conferences were also organized in addition to Tele Conferences Video conference are organized in 2 way Audio and video mode.' In each district of Andhra Pradesh, the facility of Video Conferencing at Collectorate is utilized for this purpose.

Objective of Video Conference

- To review the ongoing training programmes
- To take up panel discussions with field functionaries on different aspects of training programmes.

Videoconferences Organized

- To review on Teacher Training Programmes at District and Mandal Level to APCs, AMOs and Principals of DIETs on 15th May, 2006. (Number of participants - 623) .' .
- Implementation of CLAPS for Primary and Upper Primary to MEOs, MPs, DIET Lecturers, APCs and Principal DIET on 13lh July, 2006 (Number af Participants - 3233)
- Review on SSA Interventions with APCs, Sectoral Officers and District Educational Officers on 15lh July, 2006. (Number of Participants- 153).
- Review on School Monitoring strategies with Sectoral Officers, MEOs, MRPs and APCs on 18th August, 2006 (Number of Participants- 4323).

Conclusion

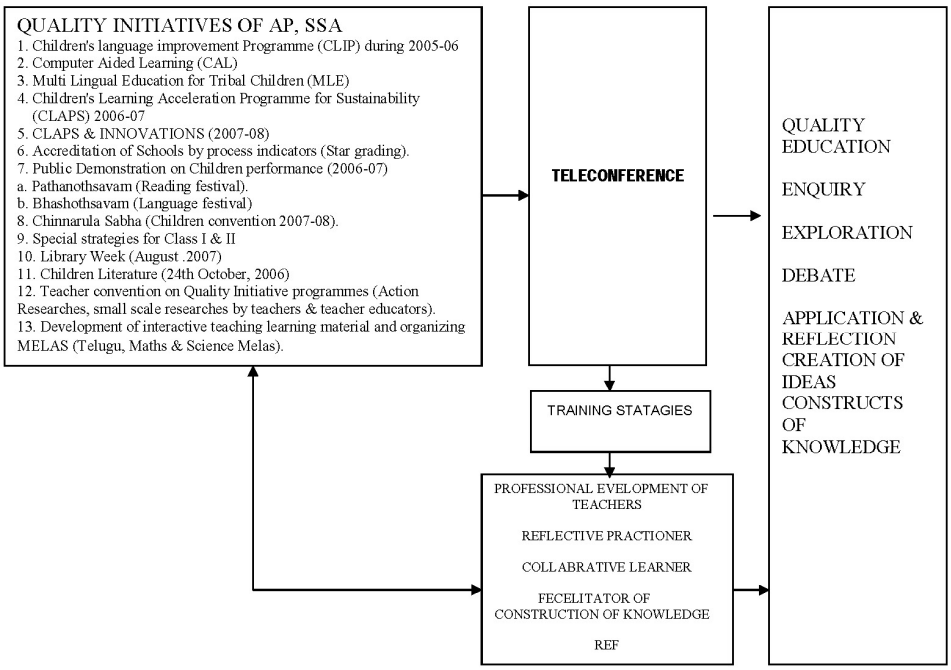
During the year 1973-74 under half a Million scheme, a massive teacher recruitment was taken $_0$ place in Andhra Pradesh some of them are now holding key Administrative positions in different levels like Mandal Educational Officers, School Complex Head Masters in the field and responsible for implementation of SSA interventions. All these teachers under gone trainings, of behavioristic perspective both in pre-service and in in-service.

After 90s in regular intervals teacher selections were taken place in Andhra Pradesh. All the teachers appointed after 90s are highly qualified with the post graduation degrees in their subjects and trained mostly in colleges of education instead of DIETs. They were trained in Blooms Taxonomy Teachers trained at Colleges of Education, appointed in' the Primary Schools were not trained to teach Primary Classes. Their pre-service and in-service programmes are mostly of behaviorist model. Keeping this situation in view, Andhra Pradesh Sarva Shiksha Abhiyan designed Professional development programme to implement quality initiatives through Teleconference as one of the training strategy. A detailed discussion already carried on this.

The quality initiatives of AP, SSA having basic characteristics of constructivism pedagogy as advocated by NCF - 2005 and they provided a chance to explore, reflect on and develop own practice for teachers. It also broken the isolation and created a space to share experiences and insights with others in the field and given opportunity to research on and reflect on children and their expected development. The programmes like pathanothsavam, Bhoshothsavam, Chinnarula Sabha, Learning Mela, Vignanamela, Library Week given an opportunity to work with community. It has become a kind of social audit on children's performance. Teaching- Learning Process made as a collaborative and teacher has become a reflective practitioner.

Based on the empirical evidences about the extensive use of Teleconference and theoretical frame work in designing quality initiatives in constructive paradigm, one can say that all these initiatives contributed for professional development of teachers in Andhra Pradesh is vital.

PROFESSIONAL DEVELOPMENT OF TEACHERS A GRAPHICAL REPRESENTATION



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A STUDY OF EMOTIONAL INTELLIGENCE AND ADJUSTMENT OF PROSPECTIVE TEACHERS

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Introduction

Emotional Intelligence of prospective teachers includes self-awareness, empathy, self-motivation, emotional stability, managing relations, integrity, self-development, value orientation, commitment and altruistic behaviour. Emotionally intelligent teachers help students with Improved Motivation, Enhanced Innovation, Increased Performance, Effective Use of Time and Resources, Improved Leadership Qualities and improved team work. An effective, successful teacher is one who can handle his or her negative feelings in an authentic, real and healthy way. People with higher emotional intelligence are more satisfied in their life and they perceived better problem solving ability (Bastia et al. 2005).

It all began 2000 years ago when Plato wrote “All learning has emotional base”. Since then, scientists, educators, and philosophers have worked to prove (or) disprove the importance of emotions in the life process. Emotions are personal experiences that arise from complex interplay among physiological, cognitive and situational variables. Emotions if properly used are an essential tool for successful and fulfilling life. But if emotions are out of control, it can result in disaster. In day-to-day life, they affect our relations with other people, our self-identity and our ability to complete a task. Emotional process is not an isolated phenomenon rather it is integrated with the various aspects of life process. It is constantly influencing and influenced by other processes going on at the same time.

EMOTIONAL INTELLIGENCE

The term emotional intelligence was coined by Peter Salovey and John Mayer (1990) and they defined emotional intelligence as "the ability to monitor one's own and other's feelings, to discriminate among them, and to use this information to guide one's thinking and actions".

More specifically, Mayer and Salovey (1990) divided emotional intelligence abilities into four areas in their four-branch model as:

(i) Perceiving and expressing emotions (ii) Assimilating emotions in thought, (iii) Understanding emotions and (iv) Reflectively regulating emotions.

The concept was then popularised by Daniel Goleman in 1995 and defined emotional intelligence as, "the capacity for recognising our own feelings and those of others, for motivating ourselves, for managing emotions well ourselves and in our relationships."

He emphasised that emotional intelligence is a set of skills, attitudes, abilities and competencies that determine the individual's behaviour, reaction, state of mind, coping style and communication style. These factors directly affect the level of success, satisfaction, ability to connect to the other people as well as the individual ability to cope with stress, level of self-esteem, perception of control and overall level of mental and emotional wellbeing.

Goleman's outlines five main emotional intelligence constructs.

(a) Self-awareness: Knowing your emotions, recognizing feelings and discriminating between them. Being able to discuss and communicate emotions, empathise, motivate, inspire, encourage others and make intelligent decisions. The ability to manage and take responsibility for one's own emotions, self-motivation and personal happiness and, recognising the difference between feelings and actions.

(b) Mood Management: Handling feelings and react appropriately. Frustration tolerance and anger management, eliminating group disruptions to express anger without violence and have more positive feelings about self, school and family and better at handling stress.

(c) Self Motivation: "Gathering up" feelings and directing yourself towards a goal, despite self-doubt, inertia and impulsiveness. Able to focus on task, responsible, attentive and improved scores on achievement task, friendly, sociable, helpful and skillful in dealing with people and open about their feelings.

(d) Empathy: Recognizing feelings in others and tuning into their verbal and non-verbal cues. Better able to take another person's perspective, improved empathy and sensitive to other's feelings, better at listening to others.

(e) Managing Relationships: Handling interpersonal interaction, conflict resolution and negotiations more popular and outgoing, maintaining relationships, friendly with peers, social and harmonious, cooperative and democratic in dealing with others.

Cooper and Sawaf (1997) defined emotional intelligence as the ability to sense, understand and effectively apply the power of acumen of emotions as a source of human energy, information, connection and influence.

This was further refined by Richard Boyatzis, Goleman and Rhee in the year of 2000. Two more domains were added such as self-esteem and confidence, interpersonal skills.

Finally Emotional Intelligence has included seven basic competencies:

1. Self-Awareness and Appraisal 2. Self-Regulation and Responsibility 3. Self- Motivation

4. Empathy and Acceptance of others 5. Social- Skills 6. Self-Esteem and Confidence 7. Inter-Personal Relations.

In general we can define emotional intelligence as the accumulation of all cognitive, non-cognitive and non-physical capabilities, competencies and skills a person has, that help him/her to deal with the demands and pressures of everyday life.

Adjustment

The term adjustment is often used as a synonym for accommodation and adaptation. Strictly speaking, the term denotes the results of equilibrium, which may be affected by either of these processes. It is used to emphasise the individual's struggle to a long or survive in his or her social and physical environment.

Adjustment includes two important factors i.e. individual and the environment. Individual includes heredity and biological factors, psychological factors, and the quality of socialisation etc. Whereaes, the environment includes all the social factors.

The process of adjustment becomes still more complicated when his interaction with one situation comes into conflict with the requirements of the other situation. One situation may give rise to pleasure while the other may give rise to pain. The resulting tension may cause disturbance in his psyche , produce uncomfortable physical symptoms or may even lead to abnormal behaviour.

According to Shaffer (1961) "Adjustment is the process by which living organism maintains a balance between its need and the circumstances that influence the satisfaction of these needs".

According to Gates, Jerslid and others (1970) "Adjustment is a continual process by which a person varies his behaviour to produce a more harmonious relationship between himself and environment."

Criteria for good adjustment

No universal criteria can be set for all times because criteria involve values judgment which differs from culture to culture and from generation to generation within the same culture. Broadly, four criteria have been evolved by psychologists to judge the adequacy of adjustment. These are as following:

1) Physical health. The individual should be free from physical ailments like headache, ulcers, indigestion and impairment of appetite. These symptoms in individual have sometimes psychological origin and may impair his physical efficiency.

2) Psychological comfort. One of the most important facts of adjustment is that individual has no psychological diseases as obsession, compulsion, anxiety and depression etc. these psychological diseases if occur excessively cause to seek professional advice.

3) Work efficiency. The person, who makes full use of his occupational or social capacities, may be termed as will adjust in his social set up.

4) Social acceptance. Everybody wants to be socially accepted by other persons. If a person obeys social norms, beliefs and set of values, we may call him well adjusted but if he satisfies his needs by antisocial means then he is called maladjusted. But we see that societies differ in deciding the universally acceptable criteria of good behaviour, for example, in our country smoking and drinking are supposed to be antisocial but there are societies where these activities are quite normal for social adjustment.

Areas of Adjustment

We can categorise the overall adjustment of an individual into three spheres, namely personal, social and occupational. These are as following:

(a) Personal Adjustment: Personal adjustment is concerned with an individual's adjustment to his self. Now question arises as to what does the term 'self' mean with regard to personal adjustment. The total individuality incorporating various aspects of his growth and development, personality traits and characteristics and satisfaction of his basic needs may essentially be included in the body of the term 'self'. In this sense, the extent to which one remains satisfied with what he owns in terms of his physical and mental development and other personality characteristics and his basic needs remain gratified, he may be called adjusted within the sphere of personal adjustment.

(b) Social Adjustment: This sphere of adjustment is concerned with one's adjustment to his social surroundings. Such adjustment is as much essential as one's adjustment with his self. In all circumstances, one should feel reasonably satisfied with what he gets in term of his social environment. In this sense, one's adjustment with his social set up, started from his parents, home and family and extended to the neighborhood, state, county and encircling whole world, is quite essential for the welfare of his own and the society.

(c) Occupational Adjustment: How far are we satisfied with our world of work. From the very beginning, parents aspire for a good occupation or profession for their children. They plan their education accordingly. However, entering into the profession or occupation of one's choice or being in tune with their abilities and capacities depend on a lot of factors. Whatsoever it may be, once chosen one should learn to adjust and adapt to the needs and requirement of one's profession or occupation. His success in his field of work will depend to a large extent on the sense of satisfaction he feels in performing various duties in his job. He must be reasonably satisfied and should get along well with the men and material resources available in his world of work. Such satisfaction, adaptation and adjustment to one's occupation automatically help in attaining the desired objectives in his personal

and social life leading to the overall adjustment to one's self and the environment.

B.Ed. students are the future teachers and their emotional intelligence and adjustment can definitely play a significant role in the development of students whom they are going to teach. So it is essential to know the emotional intelligence and adjustment of B.Ed. Pupil-teachers. A number of researches have been conducted to assess emotional intelligence and adjustment. Some of the studies are given below.

Review of related Literature

Shakuntala and Satapathy (1999) studied on teacher adjustment and found that female teachers were better adjusted than male teachers.

Annaraja and Jose (2005) conducted a study on emotional intelligence of B.Ed. trainees and found that male and female B.Ed trainees did not differ in their self awareness, self control, social skills and emotional intelligence.

Amirtha & Kadhiravan (2006) conducted a study on influence of personality on the emotional intelligence of teachers and study revealed that gender, age and qualification influenced the emotional intelligence of school teachers.

Patil & kumar (2006) conducted a study on emotional intelligence among student teachers in relation to sex, faculty and academic achievement and concludes that there is no significant difference between emotional intelligence of gender (male& female) and stream (art & science) student teachers.

Sameer (2008) conducted a study on self-esteem and emotional intelligence among B.Ed trainees of Tsunami affected coastal belt and found that there is no significant difference between the group of students based on stream of study, marital status, and age.

Devi (2010) studied on emotional intelligence in relation to self-concept, achievement motivation and academic achievement of student-teachers of Punjab and found that emotional intelligence of male student teachers was significantly higher than the emotional intelligence of female student-teachers. Science group have shown higher emotional intelligence than student-teachers of humanities group.

Gupta (2010) conducted a study of social intelligence, intelligence, self confidence and attitude towards education of prospective teachers and found that no significant difference in the dimensions as well as overall emotional intelligence on the basis of gender, stream and social category of prospective teachers.

Dahiya (2012) made a study on construction and standardization of emotional intelligence inventory for school teachers and mentioned that most of the teachers possess average level of intelligence. Female teachers are more emotionally intelligent than male teachers. Science stream teachers are more emotionally intelligent than general stream teachers. Secondary teachers are having high level of emotional intelligent than higher secondary teachers.

Soundar (2012) conducted a study of emotional maturity and adjustment of B.Ed. trainees in Cuddalore District and found that score of adjustment of male trainees have higher than the female Trainees.

Hassan, Pheng &Yew (2013) studied in philosophical perspectives on emotional intelligence, self efficacy and job satisfaction among secondary school teachers and mentioned in his article emotional intelligence play an important role for teachers to establish the good relationship with others who around them in the teaching profession because they aware their own emotion and able to adjust it accordingly to different contexts.

Nisha &. Budhisagar (2013) conducted a study of emotional intelligence of higher secondary school teachers of Madhya Pradesh and found that

there is no significant difference in mean scores of emotional intelligence of male and female teachers.

Reddy & Sankar (2013) found gender has significant influence on emotional intelligence of teacher trainees. Female trainee teachers have high emotional intelligence than male trainee teachers.

Thilagavathy (2013) conducted a study on adjustment and emotional intelligence of high school teachers in Tiruvarur and found that the adjustment of high school teachers is good and satisfactory. The emotional intelligence of high school teachers is high. The male and female high school teachers differ significantly in their adjustment scores. The female teachers have secured greater mean value than male teachers. Male and female high school teachers differ significantly in their emotional intelligence scores. The female teachers have secured greater mean value than male teachers. The correlation analysis reveals that a positive and significant relationship exists between adjustment and emotional intelligence.

Ghaonta & Kumar (2014) conducted a study on emotional intelligence in relation to gender, stream and social intelligence of prospective teachers and found that there is no significant effect of gender on emotional intelligence '. There is no significant effect of academic stream on emotional intelligence. There is no significant combined interaction effect of gender and academic stream on emotional intelligence. There is no significant combined interaction effect of gender, academic stream and social intelligence on emotional intelligence of prospective teachers' is not retained.

Pushpa & Yeshodhara (2014) conducted a study on emotional intelligence and self concept of B.Ed Students and found that female B.Ed Students are significantly different from male B.Ed students in their emotional intelligence. Emotional intelligence among B.Ed Students does not differ significantly with regard to their stream. It

was also found that there is significant positive correlation between emotional intelligence and self-concept.

Need and importance of the study

Teachers are the future destiny makers of our nation. If a teacher is well adjusted and good emotional intelligence, he can easily understand others feelings or emotions which help him to predict future behaviour according to situation. If the teacher has a self –ideal means he will become role model to students. Fundamentally human beings are creatures of feelings and emotions. Our emotions control our behaviour; emotion in the organism is a dynamic internal adjustment that operates for the satisfaction and welfare of the individual and society. Mere acquisition of degree and position are not a great thing but the conduct and character are very important. To behave in this manner the teacher should have the self perception himself which leads him to understand professional and personal life.

Every human being seeks adjustment to various situations. He constantly makes efforts to adjust himself to his surroundings because a wholesome adjustment is essential for leading a happy life and gaining satisfaction. As the prospective teachers are the future teachers who may face lot of emotional and adjustment problems. it is better to train them in these directions so as to make them emotionally intelligent and adjusted. An emotionally intelligent and adjusted teacher no doubt possess all the capacities to make use of the opportunities and available resources for students welfare and also social welfare. A lot of researches have been carried out by considering these variables. However no such study found yet conducted on prospective teachers of Chhattisgarh. In present context with this background the researcher made an attempt to study about the emotional intelligence and adjustment of prospective teachers.

Statement of the Problem

The present study is entitled as "A study of Emotional Intelligence and Adjustment of Prospective Teachers".

Objectives of the Study

The following objectives have been formulated for the study:

1. To study main and interaction effect of gender and stream on Emotional Intelligence of the prospective teachers.
2. To study main and interaction effect of gender and stream on Adjustment of the prospective teachers.
3. To study the correlation between Emotional Intelligence and Adjustment of the prospective teachers.

Hypothesis of the study

H_{01}: There will be no significant effect of gender and stream on Emotional Intelligence of prospective teachers.

H_{02}: There will be no significant interaction effect of gender and stream on Emotional Intelligence of prospective teachers.

H_{03}: There will be no significant effect of gender and stream on Adjustment of prospective teachers.

H_{04}: There will be no significant interaction effect of gender and stream on Adjustment of prospective teachers.

H_{05}: There will be no significant correlation between Emotional Intelligence and Adjustment of the prospective teachers.

Delimitations of the study

The present study has been delimited in the Department of Education, Faculty of Social Science, Guru Ghasidas Vishwavidalaya, Koni,

Bilaspur state of Chhattisgarh, which included the B.Ed trainees of session 2014-15.

Methodology

The methodology used in conducting the present study is discussed on the following topics:

Design of the study

This study was, by and large, a descriptive survey type of study.

Sample

Inorder to conduct the study stratified random sampling technique has been employed. The sample comprised of 71 prospective teachers out of which 55 were male and 16were female. Again 40 were selected from science stream and 31were from non-science stream.

Tools of the Study

Emotional Intelligence Scale:

This tool was developed and standarlised by Anukool Hyde, Sanjyot Pethe,Upindar Dhar (2002). This tool is suitable for self-report measures of emotional intelligence. It contains 34 items in five point scale. Total emotional intelligence score range from 34 to 170.

Adjustment Inventory for College Students (AICS)

Developed and standardised by A.K.P. Singha and R.P. Singh (1995). This scale measures adjustment on the basis of Home, Health, Social, and Education dimension of adjustment. It contains 87 positive and 15 negative i.e. total 102 items in two point scale. Total AICS score range from 0 to 102.

Statistical Technique Used:

Percentage, Two Way Analysis of Variance (ANOVA) and coefficient of Correlation were used.

Analysis and interpretation of data

H_{01}: There will be no significant effect of gender and stream on Emotional Intelligence of prospective teachers.

H_{02}: There will be no significant interaction effect of gender and stream on emotional intelligence of prospective teachers.

Table No. 01

Summary of analysis of variance of Emotional Intelligence

Source of variance	Sum of square	df	Mean square	F-ratio
Gender	464.713	1	464.713	3.118
Stream	56.852	1	56.852	.381
Gender x Stream	8.631	1	8.631	.058
Error variance	9986.21	67	149.048	
Total	1295632	71		

* 'F' Value for df = 1/67 at .05 level = 4.00

Table No. 01 reveals that the calculated value of 'F' ratio for the main effect of gender of prospective teachers on emotional intelligence is 3.118.However table value for for df 1 and 67at 0.05 level is 4.00, which is less than the table value at 0.05 level of significance. Hence null hypothesis is not rejected.Thus it can be interpreted that gender of prospective teachers don't put on significant effect on emotional intelligence. In other words it can also stated that Male and female prospective teachers are not different from each other in their emotional intelligence.

The F-ratio for the main effect of stream (science and non-science) on emotional intelligence of prospective teacher is 0.381. However table value for for df 1 and 67at 0.05 level is 4.00, which is less than the table value at 0.05 level of significance. Hence null hypothesis is not

rejected. Thus it is concluded that non-science and science prospective teachers have not significantly different in their emotional intelligence.

So, far the interaction effect of gender and stream is concerned the calculated value of 'F' ratio for the emotional intelligence scores of prospective teacher is .058. However table value for for df 1 and 67at 0.05 level is 4.00, which is less than the table value at 0.05 level of significance. Hence null hypothesis is not rejected. Thus it is interpreted that male and female prospective teachers of science and non- science stream don't interact significantly. It can also be concluded that emotional intelligence is independent with respect to gender and stream.

H_{03}: There will be no significant effect of gender and stream on Adjustment of prospective teachers.

H_{04}: There will be no significant interaction effect of gender and stream on Adjustment of prospective teacher.

Table No. 02

Summary of analysis of variance of Adjustment

Source of variance	Sum of square	df	Mean square	F-ratio
Gender	39.539	1	39.539	.287
Stream	21.001	1	21.001	.152
Gender x Stream	80.9	1	80.9	.587
Error variance	9324.274	67	137.825	
Total	67870.0	71		

* 'F' Value for df = 1/67 at .05 level = 4.00

Table No. 02 shows that the calculated value of 'F' ratio for the main effect of gender of prospective teachers on adjustment is .287. However table value for for df 1 and 67at 0.05 level is 4.00, which is less than the table value at 0.05 level of significance. Hence null hypothesis is not

rejected. Thus it can be interpreted that gender of prospective teachers don't put on significant effect on adjustment. In other words it can also stated that Male and female prospective teachers are not different from each other in their adjustment.

The F-ratio for the main effect of stream (science and non-science) on adjustment of prospective teacher is 0.152, However table value for for df 1 and 67at 0.05 level is 4.00, which is less than the table value at 0.05 level of significance. Hence null hypothesis is not rejected.Thus it is concluded that non-science and science prospective teachers have not significantly differed in their adjustment.

So, far the interaction effect of gender and stream is concerned the calculated value of 'F' ratio for the adjustment scores of prospective teachers is .587. However table value for for df 1 and 67at 0.05 level is 4.00, which is less than the table value at 0.05 level of significance. Hence null hypothesis is not rejected. Thus it is interpreted that male and female prospective teachers of science and non- science stream don't interact significantly. It can also be concluded that adjustment is independent with respect to gender and stream.

H_{05}: There will be no significant correlation between Emotional Intelligence and Adjustment of the prospective teachers.

Table No.03

Correlation between Emotional Intelligence and Adjustment

Group	Variable	Number	df	r
Prospective Teachers	Emotional Intelligence	71	69	.08
	Adjustment			

*Table value df, 69 at 0.05 level = .232

Table No. 03 revealed that, emotional intelligence and adjustment of prospective teachers are positive correlated. Calculated value is 0.08, which is less than table value 0.232 at 0.05 level of significance. Hence hypothesis no.5 is i.e. There will be no significant correlation between

emotional intelligence and adjustment of prospective teachers is accepted.

Major finding of the study are as follows-

- Male and female, Science and non-science Prospective Teachers don't put significant effect on emotional intelligence.
- There is no significant interaction effect of gender and stream on emotional intelligence of prospective teachers.
- Male and female, Science and non-science prospective teachers don't put significant effect on adjustment.
- There is no significant interaction effect of gender and stream on adjustment of prospective teachers.
- There is a positive correlation between emotional intelligence and adjustment of the prospective teachers.

Educational Implications

- Emotional Intelligence skills are needs to be nurtured and to be used by teachers in their classrooms teaching, for enhancing their teaching competency and professional performance.
- An emotionally intelligent teacher helps the students to improve their academic performance.
- Learning and using emotional intelligence and adjustment skills help the teachers in their personal and professional development.
- Each department of education should encourage teachers to develop emotional intelligence skills and adjustment ability. It helps to promote efficiency of department as places of learning. Department should add emotional intelligence and adjustment in their curriculum and provide activities for the development

of emotional intelligence and adjustment ability like parent teachers associations, artistic expression groups, school visits etc.

- The teacher should attend workshops, seminars, educational fairs and should use emotional intelligence and adjustment skills in classroom teaching.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

RIGHT TO EDUCATION IN INDIA AND ETHIOPIA: CONSTITUTIONAL PERSPECTIVES

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Education is the birth right of any individual person and attainment of education is natural for everyone. Recognizing the worth of right to education, means recognizing worth and beauty of human life. It is education that charts out the path for human welfare and progress. Right to education is often referred to as ''a multiple right'' because its enjoyment enhances other human rights .Right to education is enumerated under several international human rights instruments, but it is codified in greatest detail in the international covenant on economic social and cultural rights(ICESCR). This article intended to provide constitutional an overview on the status of right to education both under the constitution of India and Ethiopia. In doing so it employed both descriptive and comparative approaches.

The purpose of this article is not to evaluate practical efficacy and compliance, but just to provide general insight into the right to education under current constitutions of both Ethiopia and India. Indeed, regarding right to education. Its purpose is not to discuss each and every issue in detail, but only to forward an overview and offer some insights.

Conceptualizing right to education

In English the term "Education" has been derived from two Latin words Educare (Educere) and Educatum. "Educare" means to train or mould. It again means to bring up or to lead out or to draw out, propulsion from inward to outward. The term "Educatum" denotes the

act of teaching. It throws light on the principles and practice of teaching. The term Educare or **Educere mainly indicates** development of the latent faculties of the child.[1]. In a wider sense Education means,

"All activities by which a human group transmits to its descendants a body of knowledge and skills and a moral code which enable that group to subsist*"*[2]

Whereas, in narrower sense, education connotes teaching and instruction in specialised institutions.

To be more precise, it means formal teaching or instruction, comprising primary, secondary and higher education[3]. From these two aspects of definition, the significance of education can be drawn. It is the way by

Which institutions (be it primary, secondary or tertiary with their diverse stream) facilitate to realize their existence in the society. In other words, all the basic necessities that human beings need to survive and develop in the society can be by far achieved, if he or she has proper Orientation to education. This proposition may appear to be a bit exaggerating if we consider the People are subsisting even being completely illiterate, but if we set a close insight as to their life, we would found that their life is being roam around the cycle stagnation. Therefore, education plays a vital role in formulating a human ability as well as developing the condition of the society. It should be emphasised, it is an interactive process. Merely attending educational institutions, without learning anything, does not amount to education

[1] in University of Delhi) <https://sol.du.ac.in/Courses/UG/StudyMaterial/16/Part1/ED/English/SM-1.pdf> accessed 3 June 2014

[2] 1 Klaus Dieter Beiter, *the Protection of the Right to Education by International Law, Including a*
Systematic Analysis of Art 13 of the ICESCR, Martinous Nifhoff publisher, Leiden/Boston, 2006, p.18

[3] Ibid

Education implies the entire process of social life by means of which individuals and social groups learn to develop consciously within, and for the benefit of, the national and international communities, the whole of their Personal capacities, attitudes, aptitudes and knowledge.3

By the same token, the European Court of Human Rights has tried to define education from two dimensions i.e. both in its wider sense and narrower sense as "education in its widest sense refers to the whole process whereby, in any society, adults endeavour to transmit their beliefs, culture and other values to the young".4 Whereas, in its narrower sense, education is defined as: "teaching or instruction referring in particular to the transmission of knowledge and to intellectual development". It means a formal institutional instruction which could be national, provincial or local education system, whether public or private.5 Most of the international institutions use the term education in this sense. For example, Article 1 (2) of UNESCO's Convention against Discrimination in Education (CADE) of 1960 defines education as "*all types and levels of education, including access to education, the standard and quality of education, and the condition under which it was given."* [4].

We can perceive, similar notion from the dictum of the famous case of Brown v. Board of Education, what has been asserted in this case is that "*in these days, it is doubtful that any child may reasonably be expected to succeed in life if he [or she] is denied the opportunity of an education."* [5]

Here it would help much to quote what had been said about Education by Mahatma Gandhi and Nelson Mandela:

[4] Satish Kumar and Sajjad Ahmad, meaning, Aims and Process of Education (Lecture 1 at School of Open Learning
of Article 13 of the International Covenant on Economic, Social and Cultural Rights (1st edn Martinus Nijhoff
Publishers, Leiden 2006) 20
[5] Yoram rabim ???

" Live as if you were to die tomorrow. Learn as if you were to live forever. "

- Mahatma Gandhi.

''Education is the most powerful weapon which you can use to change the world''

Nelson Mandela

Therefore, the implication of education has to be understood in such, a way that people could effectively utilize this weapon. But in order to ensure effective utilization of such weapon each and every state need to design an appropriate legal and policy framework and put into practice in a way that people could gained all rounded capacities and utilize them for development . This indispensable character has brought Right to Education into centre human rights discourse.

The substantial number of international human rights instrument, national legislations and policy frameworks recognize the significance of Right to education. In particular international instruments extensively depicted the various dimensions of Right to Education. In order to realize right to education as a means of development all these aspects of the right has to be incorporated in an implementation stage.

Moreover, Education is both a human right in itself and an essential means of realizing other human rights. In particular, It has vital role in empowering the most vulnerable sections of the society such as women and children, safeguarding children from exploitative and hazardous labour and sexual exploitation, protecting the environment, promoting human rights and democracy and controlling unhealthy population growth. Education, as an empowerment right, is fundamental way of which economically and socially marginalized adults and children can pull themselves out of poverty and achieve the way to participate fully in their communities. With the international classification of human

rights in to civil and political rights in one side and economic, social and cultural rights on the other side, education, with its many features, belongs to both groups of rights[6].

This makes Right to education core or multiple fundamental human Right. It is protected under more than at least 140 countries and a large number of international and regional instruments. Such as; Universal Declaration of Human Right (UDHR), International Covenant on Civil and Political Rights (ICCPR), International Covenant on Economic, Social and Cultural Rights (ICESCR), Convention on the Right of the Child (CRC), Convention on the Elimination of all forms of Discrimination Against Women (CEDAW), African Charter on Human and Peoples Right (ACHPR), African Charter on the Right and Welfare of the Child (ACRWC), etc. These instruments in one way or the other, point out the essential natures of right to Education.

The realization of this right entails the participation of three organs; state, parents, and children. Without the collaboration of these three bodies it is impossible to achieve the best benefit from education.

Right to education uner the constitutions of Ethiopia and India: Comparative constitutional perspectives.

The current Ethiopian constitution has been entered into force since, 21, August 1995, in stark break from its predecessors, the FDRE Constitution establishes an ethnic based Federal state consisting of regional states delineated on the basis of settlement patterns, language , identity, and consent of the people concerned. The constitution also

Drouglas Hodgson, *The Human Right to Education*, Faculty of Law, The University of Western Australia Art1 (a) of UNESCO's Recommendation concerning *Education for International Understanding,*
Co-operation, Pease and Education Relating to Human Rights and Fundamental Freedoms of 1974
[6]Ibid

represents a major breakthrough in terms of human rights. It was crafted to respond to the underlying causes that triggered the widespread conflict and the ultimate downfall of the Dergue military Junta in 1991.It addresses the volatile issues of ethnicity and self determination. it is with this mindset that the drafters of the constitution articulated the common objective of " building a political community founded on the rule of law and capable of ensuring a lasting peace guaranteeing a democratic order. Unlike its predecessor which vehemently promoted a unitary system, the current Constitution emphasizes, tolerates and even encourages diversity and attempts to address it through an ethnic-based federal system. The relevance accorded to human rights is reflected from the outset by the preamble of the Constitution of Federal Democratic of Ethiopia, which emphatically affirms that "the full respect for individual and People's fundamental rights" as a condition precedent and foundational Principles for the success of this sparkling ambition.13

This part of the article presents an overview of the peculiar features and application of the Constitution of Federal Democratic Republic of Ethiopia. Regarding human rights and briefly discusses issues of interpretation. Moreover, the rights guaranteed by the Constitution are highlighted followed by a conclusions and brief recommendations.

The constitution of Federal Democratic Republic of Ethiopia

The Constitution has a preamble and is divided into eleven chapters. It is the supreme law of the land and any law, customary practice, or a decision of an organ of a state or a public official that contradicts with the Constitution will be voided automatically. Therefore, all citizens, organs of the government, political organizations, etc are under obligation to respect and obey the Constitution. The three generation rights happen to be found in the Constitution. Although, there is no direct provision, devoted to right to education, an indirect inference can be made.

Article 36 of the constitution is dedicated to rights of a child. Article 36(1) (d) of the Constitution reads as "Not *to be subject to exploitative practices, neither to be required nor permitted to perform work which may be hazardous or harm to his or her education, health or well-being*". Reading this sub-article at the first glance we understand about the prohibition of child labour abuse in the Constitution. Indirectly it also protects a child's right to education by prohibiting any imposition of burden of work on the child and also not permitting him/her to perform work that puts his/her education at risk.

Similarly, Article 36(1) (e) also recognizes the child right to be free from Corporal punishment, or cruel and inhuman treatment in schools. Article 41 of the Constitution is composed of socio-economic rights collectively. Article 41(3) states that, "*Every Ethiopian national has the right to equal access to publicly Funded, social services*". In this case education could be one of the publicly funded social Services. According to this sub-article, children with intellectual disability have the right to get access to education in equal basis same to their peers without disabilities.

Likewise, Article 41(4) obliges state to allocate ever increasing resources to provide health, education, and other social services to the public.

The government of Ethiopia is under the Constitutional obligation to allocate available resources in order to make education available, accessible, acceptable and adoptable to all.

Article 25 of the Constitution guarantees the right to equality. It reads as: *"All persons are equal before the law and are entitled to equal protection of the law without discrimination. And the law shall guarantee to all persons equal and effective protection without discrimination on the grounds of race, nationality... or other status"*

Although, there is no article that specifically devoted to right to education, an indirect reference can be made to the above provisions of the Constitution. However, the very limited and indirect nature of provisions provided in FDRE Constitution regarding the right to education can adversely affect the full realization and enjoyment of the right to education.

This article, argues that right to education should have been more emphasized under the constitution of Federal Democratic Republic of Ethiopia.

Let see and compare it with the constitution of India regarding right to education. The Constitution (Eighty-sixth Amendment) Act, 2002 inserted Article 21-A in the Constitution of India provides free and compulsory education of all children in the age group of six to fourteen years as a Fundamental Right in such a manner as the State may, by law, determine. The Right of Children to Free and Compulsory Education (RTE) Act, 2009, which represents the consequential legislation envisaged under Article 21-A, means that every child has a right to full time elementary education of satisfactory and equitable quality in a formal school which satisfies certain essential norms and standards. Right to education is more explicit under the constitution India, under Article 21-A. **which goes "***The State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may, by law, determine*"[7]. And subsequently, the right to education Act came into effect on 1 April 2010. The title of the right to education Act incorporates the words 'free and compulsory'. 'Free education' means that no child, other than

[7] Article 21A, Constitution of India, amended by The Constitution (Eighty-Sixth Amendment) Act,
2002 (brought into force on April 1, 2010), "The State shall provide free and compulsory education
to all children of the age of six to fourteen years in such manner as the State may, by law,
determine."

a child who has been admitted by his or her parents to a school which is not supported by the appropriate Government, shall be liable to pay any kind of fee or charges or expenses which may prevent him or her from pursuing and completing elementary education. 'Compulsory education' casts an obligation on the appropriate Government and local authorities to provide and ensure admission, attendance and completion of elementary education by all children in the 6-14 age group[8]. With this, India has moved forward to a rights based framework that casts a legal obligation on the Central and State Governments to implement this fundamental child right as enshrined in the Article 21A of the Constitution, in accordance with the provisions of the RTE Act.

The Right to education Act provides for the:

- Right of children to free and compulsory education till completion of elementary education in a neighbourhood school.
- It clarifies that 'compulsory education' means obligation of the appropriate government to provide free elementary education and ensure compulsory admission, attendance and completion of elementary education to every child in the six to fourteen age group. 'Free' means that no child shall be liable to pay any kind of fee or charges or expenses which may prevent him or her from pursuing and completing elementary education.
- It makes provisions for a non-admitted child to be admitted to an age appropriate class.
- It specifies the duties and responsibilities of appropriate Governments, local authority and parents in providing free and

[8] The Right of Children to Free and Compulsory Education Act or Right to Education Act (RTE), is an Act of the Parliament of India enacted on 4 August 2009, which describes the modalities of the importance of free and compulsory education for children between 6 and 14 in India under Article 21A of the Indian Constitution. India became one of 135 countries to make education a fundamental right of every child when the act came into force on 1 April 201

compulsory education, and sharing of financial and other responsibilities between the Central and State Governments.

- It lays down the norms and standards relating inter alia to Pupil Teacher Ratios (PTRs), buildings and infrastructure, school-working days, teacher-working hours.
- It provides for rational deployment of teachers by ensuring that the specified pupil teacher ratio is maintained for each school, rather than just as an average for the State or District or Block, thus ensuring that there is no urban-rural imbalance in teacher postings. It also provides for prohibition of deployment of teachers for non-educational work, other than decennial census, elections to local authority, state legislatures and parliament, and disaster relief.
- It provides for appointment of appropriately trained teachers, i.e. teachers with the requisite entry and academic qualifications.
- It prohibits (a) physical punishment and mental harassment; (b) screening procedures for admission of children; (c) capitation fee; (d) private tuition by teachers and (e) running of schools without recognition,
- It provides for development of curriculum in consonance with the values enshrined in the Constitution, and which would ensure the all-round development of the child, building on the child's knowledge, potentiality and talent and making the child free of fear, trauma and anxiety through a system of child friendly and child centred learning

Moreover, due regard should also be given to Article 9(4) of the FDRE Constitution which reads as: *"All international agreements ratified by Ethiopia are an integral part of the law of the land".* So, in Ethiopia

ratified international instruments should be passed certain procedure to become part of the law of the land.[9] Accordingly, ratified human right instruments such as, UDHR, ICESCR, CRC, ACRWC, etc and their provisions are made part of the law of the land. International Human rights *the procedures international instruments have to pass to be part of the law of the land are; first the House of Federation has the power to ratify international instruments, then according to the Proclamation No.4/1987, Article 25(5) the executive has only the power make the agreement and sign the instruments. After that the signed instrument will be presented to the House of People Representative and the house will ratify it by following the same procedure it uses to ratify domestic laws. Then finally, it will be presented to the President for signature but if he didn't sign within 15 days the international treaty will become part of the law of the land.* It is therefore, as we have seen Right to education is fundamental constitutional right in India. In contrast, this is not the case under the constitution of Federal Republic of Ethiopia. I strongly would argue that nothing more than right to education for the countries like Ethiopia. Moreover, Ethiopia as signatory state to International covenants on economic social and cultural rights it is obliged to fulfil this Obligation.

Therefore, although the combined application of the above Constitutional provisions with those of various international and regional human rights instruments ratified by Ethiopia have Paramount basic legal importance in guarantying the recognition of the right to education under the Ethiopian legal system. It is important to scrutinize how far those instruments are being effectively implemented?. This question would be part of my PhD Research question and definitely I would come up with finds.

[9] Constitution of Federal Democratic Republic of Ethiopia article 9(1).

Findings and Recommendations

Right to education is the birth right of any individual and attainment to education is natural for everyone, like receiving the Air or water to sustain one's life. This reveals that right to education is constitutionally guaranteed justifiable legal right in India.

Right to education has got dual aspects; the personality development of an individual; and promotion of respect for human rights. From the classical human rights instruments (Bill of rights) to specific convention (e.g. convention against discrimination in education) and the other international human rights instruments. Right to education embodies the principles of universality, indivisibility and interdependence of all human rights. Thus the right to education has a particularly close connection with the right to work, right to health and right to freedom of expression and information and so on.

There is no direct provision, devoted to right to education, but an indirect inference can be made from the constitution of Federal Democratic Republic of Ethiopia.

In contrast, Right to free and compulsory education is constitutionally guaranteed right in India. Under article 21-A of the Constitution of India which states ''provides *The State shall provide free and compulsory education to all children of the age of six to fourteen years in such manner as the State may, by law..''* Moreover, the government of India has enacted further legislation called right to education act, 2009.

Right of Children to Free and Compulsory Education (RTE) Act, 2009, represents the consequential legislation envisaged under Article 21-A, means that every child has a right to full time elementary education of satisfactory and equitable quality in a formal school which satisfies certain essential norms and standards.

The passing of the Right of Children to Free and Compulsory Education (RTE) Act 2009 marks a historic moment for the children of India. Few countries in the world have such a national provision under their basic law. This article recommends that Ethiopia should amend its constitution so as to make primary education constitutionally guaranteed right as an entitlement.

Finally, Ethiopia should amend its constitution and make right to education constitutionally guaranteed justiciable right. Moreover it needs to have free and compulsory primary education enforcing legislations both at federal and state levels. This would serve as a building block to ensure that every child in Ethiopia has his or her legal right to education (as an entitlement) to get a quality elementary education.

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PHYSICO-CHEMICAL PROPERTIES OF SEEDS OF PONGAMIA PINNATA (L.) PIERRE

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Introduction

Currently due to gradual depletion of world petroleum reserves and the impact of environmental pollution of increasing exhaust emissions, there is an urgent need to develop alternative energy resources, such as biodiesel fuel. Vegetable oil is a promising alternative because it has several advantages; it is renewable, environment-friendly and produced easily in rural areas, where there is an acute need for modern forms of energy. Therefore, in recent years several researches have studied the use of vegetable oils as fuel in engines as biodiesel.

Several workers has made efforts to study properties of different plants in the view of bio diesel. Ahmad et. Al., (2003), Ahmed et. al., (2004), Aiman (1970) and Akhtar (1996) worked various parts of Pongania plant for various extraction studies.

Materials and methods

Pongamia is native to a number of countries including India, Malaysia, Indonesia, Taiwan, Bangladesh, Sri Lanka and Myanmar. It has also been naturalised in parts of eastern Africa, northern Australia and Florida. Pongamia is a medium-sized, fast-growing tree or shrub (15–25 m tall). It has been described as briefly deciduous or evergreen with a drooping or spreading branching habit and broad crown (Orwa et al. 2009). The bark is grey or grey-brown and smooth or with faint vertical fissures.

Pongamia has a varied habitat distribution and can grow in a wide range of conditions. Typically it is found in coastal areas, along limestone and rock coral outcrops, along the edges of mangrove forests, tidal streams and rivers. It is hardy and can survive in temperatures from -5°C to 50°C and altitudes from 0 to 1200 m. Due to its deep roots it is also drought tolerant and is found in areas with rainfall from 200 to 2500 mm a year. It grows well in both full sun and partial shade and can grow in most soil types. Seedlings and saplings require water for early root establishment.

The present study has been made to know the physical and chemical properties of seeds of *Pongamia pinnata* (L.)

Results and discussion

Physical analysis

Moisture content of the seed

The initial moisture content of the seed was found to be 0.02 ±0.01% d.b. The four other moisture levels obtained after conditioning the seeds were 3.78 ±0.53, 4.01 ±0.72 and 2.82 ±0.34 % d.b., respectively. The investigations were carried out at the above moisture levels to determine the effect of moisture content on the physical and mechanical properties of *P pinnata* seed.

Seed size and shape studies

Figure shows the suspension line of *J.curcas* seeds, air speed needed for suspending different weight fraction of seeds, and the 3 groups of 100 seeds were selected based on average weight. The variation of the seed length, width, thickness and geometric mean diameter was studied. Length increased from 17mm to 19 mm, the width from 10mm to 12mm, and the Thickness from 0.8 to 0.9mm. These could be of important consideration in the theoretical determination of the seed volume at different moisture contents.

Chemical analysis

Physical, mechanical and chemical properties of seed and kernel are needed for the design of equipment to handle, transport, process, store and assessing the product quality. In the oil industry, different processes must be done before oil extraction occurs. When *Pongamia pinnata* fruits arrive for oil extraction different processes are conducted before: (a) dehulling, separating hull from nut, (b) deshelling, separating shell from kernel, (c) drying and then (d) oil extraction. The aim of this study was to investigate the physical, mechanical and chemical properties of *Pongamia pinnata* L. seeds, as part of optimization of de-shelling and oil extraction of *P pinnata* L. The considered parameters oil content, iodine value, peroxide value, saponification value and acid value. These parameters will be useful in designing of handling and processing equipment.

Chemical properties: The chemical properties of oil are amongst the most important properties that determines the present condition of the oil. Free fatty acid and peroxide values are valuable measures of oil quality. The iodine value is the measure of the degree of unsaturation of the oil.

Table shows the physicochemical properties of the *P. pinnata* seed oil compared to other biofuel oil like soya and castor seed oil. *P. pinnata* seed oil in this study contained high oil content as per the data analyzed below. The iodine value of the *P. pinnata* seed oil was 348.3 ± 0.22 (mg/g) which is higher than the other biofuel oil. The oil analysis shows a high iodine value may be due to its high content of unsaturated fatty acids. As a crude oil, the peroxide value of *P. pinnata* seed oil showed a low value of 1.2 ± 0.44 milli equivalence/kg. The high iodine value and oxidative stability showed that the seed oil upholds the good qualities of plant oil and semi-drying oil purposes (Eromosele et al. 1997). The acid value and free fatty acid content of the Pongamia oil are low in general. The saponification value of *P. pinnata* seed oil (214.86 **±** 0.25 mg/g) was higher. The slightly higher value of unsaponifiable matter in the Soxlhet method may be due to the ability of the solvent to extract other lipid associated substances like, sterols, fat soluble vitamins, hydrocarbons and pigments (Bastic et al., 1978; Singh et al., 1996).

Table 1. Chemical Analysis of seed oils of sixth month old plant

Sl No.	Parameters	Values of Pongamia curcas	Values of Soya oil	Values of Castor oil
1.	Oil Content	**32.5 ± 0.5 %**	25 ± 0.2 %	27.5 ± 0.5 %
2.	Acid value (mg KOH/g)	**1.4 ± 0. 25**	1.12 ± 0.5	2.24 ± 0.1
3.	Peroxide value (mg KOH/g)	**1.2 ± 0.44**	4.1 ± 0.20	6.2 ± 0.41
4.	Iodine value (mg KOH/g)	**348.3 ± 0.22**	226.4 ± 0.12	104.5 ± 0.15
5	Saponification value (mg KOH/g)	**214.86 ± 0.25**	235.7 ± 0.17	246.0 ± 0.21
6.	Free fatty acid %	**1.03 ± 0.10**	2.01 ±0.2	3.5 ± 0.10

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

CRITICAL ANALYSIS: BUSH DOCTRINE- WAR ON TERROR

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Introduction

On 20th September, 2001, while addressing the joint session of congress in United States of America, President George W. Bush used the phrase "war on terror" for the first time. He was addressing after the incident of September 11 when New York and Washington have been attacked by Al- Qaeda, a religious- extremist organization led by Osama Bin Laden. The times were unprecedented, never in history had United States been attacked in its heartland[1]; never threat came so closer; and never had United State's power been challenged since the end of Cold War.[2]

Four planes were simultaneously hijacked on 9/11/2001, number of casualties in a terrorist act was unprecedented, and the act attack did not even employed any kind of weapons of mass destruction, it made clear what kind of brutal tactics some religious fundamentalist will go to target the 'non believers'.

On 20th September, 2001, President Bush addressed joint session of US congress, and the citizens of the country, he said "The Taliban must act, and act immediately. They will hand over the terrorists, or they will share their fate.... Every nation, in every region, now has a decision to make, either you are with us, or you are with the terrorists."[3]

[1] Geographical location is one of the primary reason, United States is surrounded by vast oceans from both the sides, this acts as natural protector from actors committing acts of aggression towards it.
[2] After end of cold war and disintegration of Soviet Union, United States is sole surviving superpower. United States now have a greater share of world power than any state since the beginning of the state system.

Next few months saw radicalization of President Bush administration's policy on terrorism. On 29th of January, 2002, during the president's Union Address. He said "Thousands of dangerous killers, schooled in the methods of murder, often supported by outlaw regimes, are now spread throughout the world like ticking time bombs, set to go off without warning. ... In a single instant, we realized that this will be a decisive decade in the history of liberty"[4]

These very words represent the course of action Bush administration was about to take in dealing with non state actors and the states which harbor them. In the first series of action, Afghanistan was invaded and Taliban regime (under Taliban, Afghanistan had become safe havens for Al- Qaeda and its training camps) and in 2003, Iraq was invaded, defying United Nations mandate on the issue.[5]

According to the President Bush - "The attacks of September the 11th showed our country that vast oceans no longer protect us from danger. Before that tragic date, we had only hints of al Qaeda's plans and designs. Today in Iraq, we see a threat whose outlines are far more clearly defined, and whose consequences could be far more deadly."[6]

Terror, Terrorism, Terrorists

Under the pretext of September 11, 2001, US declared a global war on terrorism, which was commonly known as "war on terror", sympathies

[3] President Declares "Freedom at War with Fear" <http://georgewbush whitehouse.archives.gov/news/releases/2001/09/20010920-8.html>. Accessed on: 11 Feb. 2015

[4] George W. Bush Statements on Social Security. <http://www.ssa.gov/history/gwbushstmts2.html>. Accessed on Web. 11 Feb. 2015.

[5] on the pretext that Saddam Hussein, the dictatorial ruler of Iraq, was planning to launch attack on United states, for which he was developing Weapons of Mass Destruction and possessed chemical weapons. These allegations were proved wrong after US forces entered Iraq and no WMD

[6] President Declares "Freedom at War with Fear" <http://georgewbush-whitehouse.archives.gov/news/releases/2001/09/20010920-8.html>. Accessed on: 11 Feb. 2015.

for libration armies or militia were abandoned and their acts were simply termed as acts of terrorism, which were no longer acceptable in any scenario. The distinction between terror, terrorism and terrorist were eliminated. "Our war on terror begins with al-Qaida, but it does not end there. It will not end until every terrorist group of global reach has been found, stopped, and defeated" said President Bush.[7]

After 9/11, attitude towards terrorism was widely reflected in the President Bush administration. Secretary of the State, Colin L. Powell, had similar view and these were quite frequently reflected in address to media by administration. Colin Powell, in May 2002, had this to say about the 'war on terror': "In this global campaign against terrorism, no country has the luxury of remaining on the sidelines. There are no sidelines. Terrorists respect no limits, geographic or moral. The frontlines are everywhere and the stakes are high. Terrorism not only kills people. It also threatens democratic institutions, undermines economies, and destabilizes regions"[8]. For the entire administration terror, terrorism and terrorist had become inseparable concepts. [9]

Charles Tilly in his article, *Terror, Terrorism, Terrorist*, argues that 'war on terrorism' resulted into United States equating Human Rights violation as act of terror. By this definition of terror, human right violation by States was suppose to fall in the category of terror, these act of suppression results into formation of arm groups which commits acts of terror. This categorization resulted into equating governments which committed human right violation with the governments which sponsor or promote transnational terror. According to Charles Tilly,

[7] President Declares "Freedom at War with Fear" <http://georgewbush-whitehouse.archives.gov/news/releases/2001/09/20010920-8.html>. Accessed on: 11 Feb. 2015.
[8] As quoted in Charles Tilly, 'Terror, Terrorism, Terrorists', Theories of Terrorism: A Symposium, Sociological Theory, Vol. 22, No. 1, (Mar., 2004), pp. 5-13
[9] Charles Tilly, 'Terror, Terrorism, Terrorists', Theories of Terrorism: A Symposium, Sociological Theory, Vol. 22, No. 1, (Mar., 2004), pp. 5-13

this argument undermines State's use of coercive power which may at times result into human right violation.

According to Bureau of Democracy, Human Rights, and Labor, "Country Reports on Human Rights Practices for 2001: A world still reeling and reacting to the events of last September. Central mission remains the same to give voice to those who have been denied the freedoms and rights provided for in the Universal Declaration on Human Rights. Only through the promotion and protection of human rights and fundamental freedoms can the international community be secure from the scourge of terrorism.[10]

According to Charles Tilly, not all kind of acts of violence constitute as the act of terrorism and terrorism is an act, a tool used to highlight attention of third party (in this case international community), 'properly understood, terror is a strategy, not creed.' The roots of word terror lies in French revolution, it was first used to describe tactics of 'intimation' employed by party in power against their domestic enemies. "In addition to whatever harm it inflicts directly, it sends signals-signals that the target is vulnerable, that the perpetrators exist, and that the perpetrators have the capacity to strike again. The signals typically reach three different audiences: the targets themselves, potential allies of the perpetrators, and third parties that might cooperate with one or the other."[11]

Arab- West conflict

The justification given by various terrorist groups and organizations, including Al- Qaeda, for terrorist attacks against United States and its

[10] As quoted in Charles Tilly, 'Terror, Terrorism, Terrorists', Theories of Terrorism: A Symposium, Sociological Theory, Vol. 22, No. 1, (Mar., 2004), pp. 5-13
[11] Charles Tilly, 'Terror, Terrorist, Terrorism', Sociological Theory, Vol. 22, No. 1, Theories of Terrorism: A Symposium (Mar., 2004), pp. 5-13

allies is its close ties with Israel and military bases in the holy land of Arabia. United States and its bases are seen as the support of persecution against the Muslims community at large.

"*Declaration of the World Islamic Front for Jihad against the Jews and the Crusaders*" undersigned by Osama Bin Laden, was published in Al-Quds al-Arabi, 23rd, February, 1998, an Arabic newspaper published in London, it appealed every Muslim to fight Jihad against the US, for it supports and persecute Muslims and their interest. There were three underline argument in the text, first one talks about how US has occupied land in holiest place of Islam and uses its bases there to persecute Muslims in neighbouring countries. The second argument was about the repressive sanctions on Iraq, which are responsible for bad conditions and humiliation of Muslims. Thirdly, US not only have economical and a religious reason to occupy land in Arabia but also it is a strategy based to divert attention from conflict between Israel and Palestine and Israel's persecution of Muslims.[12]

The text calls upon Muslims to launch Jihad on US and its interest, and term it as their rightful duty.

"To kill Americans and their allies, both civil and military, is an individual duty of every Muslim who is able, in any country where this is possible, until the Aqsa Mosque [in Jerusalem] and the Haram Mosque [in Mecca] are freed from their grip and until their armies, shattered and broken-winged, depart from all the lands of Islam, incapable."[13]

According to Bernard Lewis, US greatly misunderstood the letters call to all Muslims to launch attack against Americans and their interests

[12] Bernard Lewis, 'License to Kill: Usama Bin Ladin's Declaration of Jihad', Foreign Affairs, Vol. 77, No. 6 (Nov. - Dec., 1998), pp. 14-19

[13] As quoted in Bernard Lewis, 'License to Kill: Usama Bin Ladin's Declaration of Jihad', Foreign Affairs, Vol. 77, No. 6 (Nov. - Dec., 1998), pp. 14-19

world over, since such calls are not obligatory and it depends upon the individuals to interpret Jihad according to his or her on time and context.

With the above pretext in mind it can be argued that both the attackers of 9/11 and the Bush administration were deeply affected by ethnocentrism in their understanding of the people who harm their interest. Both depicted themselves to be virtuous, and rightful in their approaches and the 'enemy' is described as corrupt, untrustworthy, inhumane etc. Both were blinded by their own understanding, which is very narrow in its approach, it divides world into two categories, 'us' and 'them'. [14]

Bush Doctrine

The end of twentieth century witnessed the defeat of totalitarian regimes and emergence of neo liberalism as the dominant theory not only governing state in international sphere but also on the question of 'how to maintain order' in society. Post 9/11, President Bush and his administration made it their policy to promote modern liberal values to counter rise threat of global terrorism, to make universal: freedom, democracy and free enterprise. It was consider that spread of such values will make world a better place.

[14] Cindy D. Kam and Donald R. Kinder, 'Terror and Ethnocentrism: Foundations of American Support for the War on Terrorism', The Journal of Politics, Vol. 69, No. 2 (May, 2007), pp. 320-338. Explore this particular relationship between 'us' and 'them' in the context of terrorism is highlighted by Cindy D. Kam and Donald R. KinderReviewed: "Ethnocentrism is a deep human habit, an altogether commonplace inclination to divide the world into ingroups and outgroups, the former characterized by virtuosity and talent, the latter by corruption and mediocrity. Support for the war on terrorism, under- taken against a strange and shadowy enemy, should come disproportionately, we propose, from Americans possessed of an ethnocentric turn of mind."

Hence, denouncing terror or violence in international domain is no longer enough, citizen of the states must have economic and political rights, that United States would not negotiate with countries that sympathies or harbor terrorist, nor will it ignore Human Right violations by totalitarian regimes. This is a sharp contrast from the earlier policies, which did supported spread of liberal values but not on the cost of US own interest, its support to authoritarian regimes in Algeria, Egypt, Saudi Arabia, and Pakistan is a example of such mindset.

Six months after the attack President Bush in an address to nation propounded: "When the terrorists are disrupted and scattered and discredited, we will see then that the old and serious disputes can be settled within the bounds of reason, and goodwill, and mutual security. I see a peaceful world beyond the war on terror, and with courage and unity, we are building that world together."[15] He presented himself as a protector and defender of liberal forces and repeatedly spoke of creating a 'new world order' where free elections and free market would be characteristic of every society and he asked people of United States and leaders worldwide to support his efforts. "history has given us a unique opportunity to defend freedom. And we're going to seize the moment, and do it."

Conclusion

The fateful day of September 11, 2001, have changed world dramatically, world has seen two wars since then, one in Iraq and one in Afghanistan.

The event led a radical shift in US policy towards 'terrorism', no longer a group could hide itself or gain sympathy by legitimizing its act as a means of liberation. The distinction between 'terror', 'terrorism' and

[15] Remarks at ceremony marking the 6-month anniversary of the September 11 attack: "President Bush Thanks the World Coalition for Anti-Terrorism Efforts". . http://2001-2009.state.gov/coalition/cr/rm/2002/8729.htm Accessed on Web. 11 Feb. 2015

'terrorist' was eliminated and the act was not just seen as an act of aggression against US, but, was highlighted as a pressing threat against the freedom and democratic values of a liberal society. According to Bush administration United States was at war, and the fateful day of September 11 was described as "day of fire", Bush said "We will make no distinction between the terrorists who committed these acts and those who harbor them. ... None of us will ever forget this day."

The threats and dangers which United States faces cannot be eliminated by force alone, terrorist are not fanatics, valuing nothing. It is the dissatisfaction and grievances whose root causes must be address to put an end to this viscous cycle of violence.

"We understand history has called us into action, and we are not going to miss that opportunity to make the world more peaceful and more free" said President Bush after six months of attack on twin towers, but changing world needs to required much more humane way and not the kind of policies which isolated it. A long lasting peace was always a dream since US under Bush administration and implemented democracy in just words and not in action.

In 2013 the President Barack Obama declared that 'war on terror' is over. Only the usage of the phrase has been discontinued but influences of the ideology could still be seen on the Obama administration. Neither world at large or Middle East or Afghanistan has become peaceful nor does it appear that a long lasting peace could come without drastic changes in strategies to deal with terrorism. Bush administration's policy to blur lines between terror, terrorism and terrorist resulted into United States finding itself on the side of regimes with worst human rights volition records. It lead to fueling of anti- US sentiments in Middle East and radicalization and polarization of the society. This created fertile ground for religious extremism to lay the seeds of hatred towards perceived outsiders based on religious, ethnic or cultural identity which at present time is germinating into worst

terror attacks and organization. Groups like Islamic State in Middle East, Boko Haram in Africa today are guided by fractured and misguided Ethnocentrism ideology as displayed by Bush administration. While Islamic State has emerged because of failed intervention in Iraq and inability to contain situation in Syria, Boko Haram is using the radicalized and polarized environment for resurgence. The increasing popularity of such groups can be seen as ripple effects of Bush administration policy which lead to the homogenization of terror, terrorist and terrorism. Any attempt to pacify the situation and limit the influence of extremist groups have to move beyond addressing the problem on the surface ie., using force and have to look at the roots of the discontent of the masses. Until this change in approach takes place the situation will keep aggravating and the vicious circle will never end.

POLLUTION: INNER TO OUTER

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I.1INTRODUCTION

If 'Big Bang', the most acceptable scientific theory regarding the creation of universe, is accepted then we must draw the conclusion that vanish into the 'Black Hole' of the entire universe is the final state which will take a billion of years. All of us know that our solar system is 4.6 billion years old and Sun is the one and only one source of energy. Due to the continuous fusion reaction the light and a tremendous hit is generated within the Sun surface and as well as in the center from which we get the energy in the form of light. It has also been reported by the scientists that the entire source of energy i.e. Sun is not also ever effulgence, it must be extinguished in the form of Red Giant Star after 3000 of years and as a consequence entire solar system will be malformed. This consequence is unavoidable. But when our loving planet Earth is going to be finished due to the anthropogenic sins (here I have failed to think any other alternative word) it is very hard to shut our eyes. In other words we may say that inner pollution is the cause of outer pollution. Among these result of anthropogenic sins or inner pollution, "Green House Effect" is the severe.

I.2 GREEN HOUSE EFFECT IS THE SEVERE

It is severe because it is beyond of any kind of legal or moral law as the effect of this problem is not confined into a particular space. It may be the case that a nation of this planet take the decision to avoid any kind of modern amenities and be happy within themselves with the natural resources as they have got from the nature by default. As it is clearly

recorded, that in our planet there are many communities who have been living happily within their natural resources avoiding all kinds of modern facilities. But "Green House Effect" does not permit it. It is very much surprising that some people have been suffering a lots although they are not themselves are the cause of their suffering or in other words we may say that they have been suffered due to the fulfillment of unlimited greed or desires i.e. inner pollution of others. For this reason **Bikenibeu Paeniu, Prime Minister, Tuvalu, a South Pacific nation** in his presentation on EPLD, Brisbane, 29 June 2006 appealed to the whole world that

"I am not a scientist nor is an expert on Climate Change but I am a citizen of the world, a long serving political leader of my nation whom, among many other leaders in their own respective rights, was bestowed the holy responsibility to fight the cause of climate change to bring justice to the planet earth that is constantly being damaged as a result of human greed."

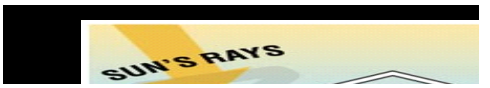
I.3 POSSIBLE WAYS TO OVERCOME THE PROBLEMS

To face the problem, five Major Earth Summit Conventions 1972: Stockholm, 1987: Montreal, 1992: Rio de Janeiro, 1997: Kyoto, 2002: Johannesburg and 2009: Copenhagen has been organized but the crisis remains the same. This paper will be an approach to solve the problem from a different point of view which may be named as **CLEARING INNER POLLUTION** where it has been clearly stated how to give the honour of a man by other man by **becoming a man** and to overcome our unlimited greed.

II.1 GREEN HOUSE EFFECT

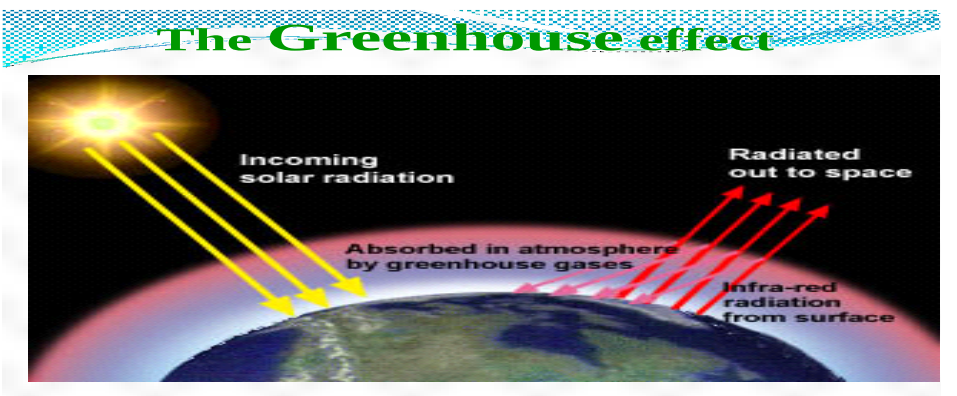
Let us peep into the fact what do we mean by "Green House Effect".

A natural greenhouse



The above picture shows a natural green house. This house is made of glasses and there are plants inside the glass house. The plants grow rapidly inside the glass house because the temperature of the glass house is very high due to green house effect as the sun rays enters into the glass house in the form of light wave but goes back into the form of heat waves, in the mean time the temperature of the glass house increase due to the presence of:

Carbon Dioxide (CO_2), **Methane (CH_4)** ,**Nitrous oxide (N_2O)** and **CFC**



So, in general we may say that "Green House Effect" is the natural greenhouse effect in a global scale is similar to the action of a greenhouse and atmospheric greenhouse gases thus act like the glass panels of a greenhouse.

II.2 SCIENTISTS CONCERNED ABOUT GREEN HOUSE EFFECT

Jean Baptiste - Joseph Fourier, a Frenchman in 1824 was the first scientist to propose that the gases in the atmosphere could retard "heat" radiation (infrared) from escaping to space and thereby warm the surface.

John Tyndall in England in 1863 actually measured the absorption of IR radiation by CO_2 and water vapour and showed that these atmospheric gases could significantly raise the earth's surface temperature.

Svante August Arrhenius, a Swedish scientist who received Nobel Prize in Chemistry, first time quantitatively estimated the greenhouse effect on the average surface temperature of a doubling CO_2 in 1896.

In 1899 an American geologist Thomas C. Chamberlin built on the insights provided by Arrhenius to "Frame a working hypothesis of the cause of glacial epochs on an atmospheric basis."

In 1975, Syukuro Manabe and Richard Wetherald first time to produced a three dimensional climate model to study the greenhouse effect.

In recent years, Energy Balance (EB), Radioactive-Convection (RC) and General-Circulation Models (GCMs) have been developed to simulate conditions of global warming.

II.3 GREEN HOUSE EFFECT WAS BENIFICIAL

What is important in this regard is: "Green House Effect" is beneficial because without the natural "Greenhouse Effect" the earth's average temperature would be -18^0C, instead of the current average of 15^0C, and life as known today would not have been possible. Thus,

Greenhouse gases keep the earth's average temperature in a more hospitable 15^0C for life forms.

II.4 GREEN HOUSE GASES AND THEIR SOURCES

But at present the percentage of Green house has been rising so high day by day that what was once upon a time life giving elements for us become life taking by increasing the global warming. The average global temperature rises three times than the normal global temperature. The following chart represents the increase of the green house gases.

Carbon Dioxide (CO_2)

Source: Fossil fuel burning, deforestation

Anthropogenic increase**: 30%**

Average atmospheric residence time: **500 years**

Methane (CH_4)

Source: Rice cultivation, cattle & sheep ranching, decay from landfills, mining

Anthropogenic increase: **145%**

Average atmospheric residence time: **7-10 years**

Nitrous oxide (N_2O)

Source: Industry and agriculture (fertilizers)

Anthropogenic increase: **15%**

Average atmospheric residence time: **140-190 years**

CFC

Chlorofluorocarbons are released from refrigerators and air conditioners**.**

Anthropogenic increase: **25%**

Average atmospheric residence time: **90 years**

II.5 CONSEQUENCES OF GREEN HOUSE EFFECT

From the above mentioned chart anthropogenic increase play the main role for "Green House Effect" and its consequent leads us to global warming. The other consequences are:

II.5.1 DESTRUCTION OF ECO SYSTEM

Changing climatic conditions and dramatic increases in carbon dioxide will put our ecosystems to the test, threatening supplies of fresh water, clean air, fuel and energy resources, food, medicine and other matters we depend upon not just for our lifestyles but for our survival.

II.5.2 LOSS OF BIODIVERSITY

Species loss and endangerment is rising along with global temperatures. As many as 30 percent of plant and animal species alive today risk extinction by 2050 if average temperatures rise more than 2 to 11.5 degrees F (1.1 to 6.5 degrees C) [sources: EPA, Scientific American].

II.5.3 CORAL BLEACHING

Coral, as a decomposer, helps to maintain the sea water pollution. But as they are now bleached the pollution level of sea water also fails to keep the aquatic biodiversity.

II.5.4 SHRINKING GLACIERS

We don't need special equipment to see that glaciers around the world are shrinking. Tundra once covered with thick permafrost is melting with rising surface temperatures and is now coated with plant life.

II.5.5 RISING SEA LEVEL

Hotter temperatures mean ice—glaciers, sea ice and polar ice sheets—is melting, increasing the amount of water in the world's seas and oceans. By the 2080s, many millions more people than today are projected to experience floods every year due to sea level rise. The numbers affected will be largest in the densely populated and low-lying mega deltas of Asia and Africa while small islands are especially vulnerable (*very high confidence)*.There will be serious risks for coastal protection in South East Asia (Bangladesh and Vietnam), small islands in the Caribbean, the Pacific and Indian Ocean (e.g. Lakshadweep, Maldives), and large coastal cities, such as Tokyo, New York, Mumbai , London etc.

II.5.6 DISEASES

The health status of millions of people is projected to be affected through increases in malnutrition; increased deaths, diseases and injury due to extreme weather events; increased burden of diarrheal diseases; increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone in urban areas related to climate change; and the altered spatial distribution of some infectious diseases.

II.5.7 DROUGHT

While some parts of the world may find themselves deluged by increasing storms and rising waters, other areas may find themselves suffering from drought. As the climate warms, experts estimate drought conditions may increase by at least 66 %.

II.5.8 STORMS AND FLOODS

Experts use climate models to project the impact rising global temperatures will have on precipitation. However, no modeling is needed to see that severe storms are happening more frequently: In

just 30 years the occurrence of the strongest hurricanes—categories 4 and 5—has nearly doubled.

II.5.9 HEAT WAVES

The deadly heat wave that swept across Europe in 2003, killing an estimated 35,000 people, could be the harbinger of an intense heat trend that scientists began tracking in the early 1900s. Heat waves like that experienced in 2003 in Europe, when 35,000 people died and agricultural losses reached $15 billion will be commonplace by the middle of the century.

II.5.10 ECONOMIC CONSEQUENCES

The costs associated with climate change rise along with the temperatures. Severe storms and floods combined with agricultural losses cause billions of dollars in damages, and money is needed to treat and control the spread of disease. For example, during the record-breaking hurricane year of 2005, Louisiana saw a 15% drop in income during the months following the storms, while property damage was estimated at $135 billion.

II.5.11 CONFLICTS AND WAR

Declining amounts of quality food, water and land may be leading to an increase in global security threats, conflict and war.

From the above mentioned discussion it is clear that the problem is so serious that the following

II.6 MAJOR EARTH SUMMIT CONVENSION AND THEIR RESULT

1972: Stockholm

1987: Montreal

1992: Rio de Janeiro

1997: Kyoto

2002: Johannesburg

2009: Copenhagen

Among the above mentioned Major Earth Summit Conventions 1997: Kyoto is very important because the treaty named as The Kyoto Protocol which is an international environmental treaty under the United Nations Framework Convention on Climate Change (UNFCCC) that established legally binding guidelines for the reduction of four greenhouse gasses (CO2, CH_4, N_2O, $SF_{6)}$ and the gas groups of hydrofluorocarbons and perfluorocarbons. But the US rejected the 1997 Kyoto protocol. Former president George Bush argued that the 5% reduction required by Kyoto would "wreck [the American] economy" and made no demands on (at the time) emerging economies like China & India. But in 2002 at Johannesburg, the concept of partnerships between governments, business and civil society was given a large boost by the Summit and the Plan of Implementation. Over 220 partnerships (with $235 million in resources) were identified in advance of the Summit and around 60 partnerships were announced during the Summit by a variety of countries. In 2005 the deal that was the outcome of the Copenhagen Climate Summit has no significance.

Although the above mentioned **Major Earth Summit Conventions** are organized the problem remains increasing and it is surprising that among the top priorities given in 2009 at Copenhagen **Green House Effect is the last**.

III.1ROOT OF THE CAUSE IS INNER POLLUTION I.E. UNLIMITED GREED

It is quite natural to raise the question that the serious crisis likes **Green House Effect** which should have been given the top most priority is at the bottom? Although, scientists from each and every

branches, economists, geologists, Geographers have been trying to solve the problem.

The main fact is that we have totally forgotten about the final destination of our life. For this reason, we the so called learned men do not want to awake from the dogmatic slumber because it has been unfortunately held that there is a direct relationship between what is called development and what is called **Green House Effect.** The term 'development' is very much important. It may mean merely the availability of all kind of facilities for the sake of human comfort. In fact, as human comfort has no limit, as most all of us run towards our unlimited desire. We may regard them as the followers of Cārvākas or the Epicureans of Greece. We should not throw away the opportunity to enjoying this life, in the futile hope of here after. "Rather a pigeon today than become a peacock tomorrow." "A sure shell (Courie) is better than a doubt full golden coin." "Who is that fool who would entrust the money in hand to the custody of others?"The aim of most of us, therefore, is to attain the maximum amount of pleasure in this life, avoiding pain as far as possible. A good life is a life of maximum enjoyment. In this respect, our dogmatic slumber would never be broken.

III.2 OUR DESTINATION IS TO BE A MAN

But the actual meaning of the term 'development' lies into development of our character to be **a man** where a man can enjoy the peace and is not suffered from any inner pollutions. Getting **peace** is not identical with the fulfillment of maximum enjoyment. It may look absurd, that in the age of 2014, the question: how to be **a man?** has not been lost its significant. Let us allow to begin with a famous utterance of our śāstrakāras where it has been mentioned that our *dharma* is the main key of becoming **a man**.

Āhāra-nidrā-bhaya-maiythunanca sāmānyametat paśubhirnarānāṃ |

Dharma hi teṣāṃ adhiko viśeṣo dharmrṇo hināḥ paśubhiḥ samānaḥ ||

The intention of the speaker in the above verse is to emphasize the truth that a man cannot be distinguished from animals in respect to any of these four properties of *āhāra* (taking food), *nidrā* (having a sound sleep) *bhaya* (being afraid of something or someone) *maiythuna* (sexual gratification for the preservation of race); for these are common to both animals and men. What differentiates a man from animals is really the possession of dharma—the special *(viśeṣa) and* additional (*adhika*) feature in man—without which a man is but equal to an animal.

III.2.1 ONLY REASON CANNOT MAKE A MAN

Someone may say that reason makes the difference between an animal and a man. But if this is true, then there would be no sign of:

i) terrorist activities in the world

ii) buttering one's own bread at the cost of millions

iii) taking bribe

iv) doing harm to anybody

v) acting as unaware of environmental crisis for present pleasure

More often than not we look upon an inhuman treatment as *pāśvik atyācār, an* oppression comparable with beasts. But it is believed that if animals could protest, they would surely have joined issue with us. The animals take resort to violent means only out of fear, anger or hunger. But we people commit sin even in a cold-blooded manner.

III.2.2 WHAT IS DHARMA?

Now the important point is what is *dharma*? As the etymology suggests (dhṛ + man), *dharma* is that property in the presence of which man becomes a man and in the absence of which man is not a man i.e. cannot be called a man. When, for example, a man quarrels

with another and uses abusive language, we say that he is behaving like a dog. A man may be educated, but if he fails to behave sympathetically with his fellow beings and deprives them their duties, we say that he is *amānuṣ* i.e. not possessing the qualities of man. A man is thus not born, but made. It is not truly his physical appearance that characterizes him properly what he is. It is rather his achievement, his attainment that makes him a man proper.

III.2.3 WHAT IS DHARMA? ACCORDING TO RAMAKRISHNA AND SWAMIJI

That is why Swami Vivekananda exclaims: "Man-making is my mission."For 'man-making' Swamiji emphasizes the role of 'character-building'. When you build up your character, you not only become a man yourself but also become able to make another man. That is why Swamiji's clarion calls: 'Be and make'. Sri Ramkrishna, the spiritual designer and moulder of Swamiji Vivekananda, used to say: *mon mukh ek karai dharma.*That is to say, to do one think another is not a *dharma. Dharma* on the contrary, consists in a harmony or unity between what one says and what one does. To the insightful vision of Sri Ramkrishna: A man is one who is conscious of his own standard, his own ideal—*mān samparke hunsh mānuṣ.*

III.2.4 WHAT IS DHARMA? ACCORDING TO OUR *ŚĀSTRAS*

Let us now turn to the teaching of *śāstras* which a man sets before himself in order to become a man proper—his *dharmas*. To the vision of our truth-seers the following five properties at least need to be cultivated in order that one attains *dharma*. These are:

Ahiṁsā satyaṁ asteyaṁ ṣaucaṃ saṁyameva ca|

Etat sāmāsikaṃ proktaṁ dharmasya lakṣanaṃ||

Ahiṁsā means absence of doing harm to anybody always and everywhere. *Mā hiṃsāt sarva bhûtāni.* It is not merely enough that we

desist from hurting anybody physically. It is also necessary that we do not even think of doing any harm to anybody mentally as well. Not to commit violence at any time or anybody either physically or mentally is the negative aspect of a*hiṁsā.* Positively, a*hiṁsā* stands for love, kindness, fellow-feeling and the like. To respect another human being, to have reverence for all is a*hiṁsā.*

Satya stand for agreement or parity between words and deeds. Even if the words correspond to reality and meaning but the intention speaker is otherwise, it is to be taken as *mithyā* or false wood. Thus the expression *'Asvatthama hata iti gajaḥ',* though true factually, cannot be taken to be true, as the intention of the speaker being otherwise. Sri Ramakrishna used to say that to be uniform in mind and speech is *dharma* and this *dharma* is *satya.* Mahatma Ghandhi also used to say: Truth is God, God is Truth. The seers and sages also salute truth by saying, '*Satyaṁ paraṃ dhimahi'.* In the *Mundaka śruti* also we find, '*Satyamave jayate nānṛtaṃ'*. I the Upanisads it is exclaimed: *Satyaṁ jñānaṃ anantaṁ Brahman*. All these point to the fact that taking resort to *satya* is essential. That is why the first lesson, imparted to a disciple by a teacher in *Acāryapadeśa*, is *satyaṃ vada*—speaks the truth.

Next come ***asteya*** or non-stealing. In Yoga philosophy it is stated that attachment to articles belonging to others, in mind, speech and deed is the essence of *asteya*. In his commentary Praśtapāda also points out that asteya does not merely mean refraining outwardly from stealing. It consists also in resolving internally the disapproval of all acts of misappropriation as immoral. Our truth-seer *sastrakaras* go to the length of suggesting that nor repaying one's debt or fulfilling one's obligations is also stealing. They point out that a man is born with five kinds if debts *(ṛṇa)*, viz, *bhûta ṛṇa (*debts to subhuman beings), *ṇṛṇa* (debts to society), *pitṛ-matṛ ṛṇa* (debts to our parent), *ṛṣi ṛṇa* (debts to seers and sages from whom we have inherited our culture) and *deva*

ṛṇa (debts to Gods). Only by acknowledging our indebtedness to them and serving them in right earnest can we try to repay at least partially.

Śauca which is placed under *niyama* stands for purity both of body and mind. External purity of body can be had through bathing etc. Internal purification of mind can be obtained only through good thoughts, thoughts of well-beings to others. This is why so much importance is attached to *sadhu sanga* in our scriptures. When one attains *bāhya śauca* one become averse not only to one's own body but also to other bodies, especially those of women resulting in the absence of desire for mating. *Āntara śauca* leads one to the intrinsic pleasure and bliss of mind resulting in the conquest of sense organs, mastery over them and concentration of mind.

By ***saṁyama*** is usually meant to keep in control the power of different sense organs, especially the *janendriya*—the sex organs. In **Manusaṃhitā** this is known as *indriyanigraha.* One who has mastered the art of controlling one's passion like *kāma* (last), *krodha* (anger), *lobha* (greed) etc. is to be regarded as one who has attained *saṁyama.* This is why the students in the olden days were sent to the house of a preceptor to practice *bramhacarya*. When one gets firmly rooted in *saṁyama* one attains the ultimate goal of life, i.e., *ātmasākṣātkāra*. Reality gets revealed to him and he becomes *mukta* being one with God.

So, it becomes perhaps clear by now that *dharma* which is to be achieved by all man in order to be considered as men proper after cleaning the inner pollution. Unless we become **a man,** it is impossible to control our greed i.e. it is impossible to get rid of such serious environmental crisis like **'Green House Effect.'**

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

DECLINE OF TANK IRRIGATION INSTITUTIONS AND RAINFALL IN ANDHRA PRADESH - A CASE OF SRIKAKULAM DISTRICT

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1. Introduction

Small water reservoirs behind earthen dams are called "irrigation tanks" in India. Tanks are providing surface irrigation, recharging ground water and serving water needs of rural households and livestock. Tank irrigation is an old established practice in most of the semi-arid tropical parts of India, where the monsoon rains disperse erratically during a few months of the year and irrigation tanks serve to store and regulate the flow of water for agriculture use. Irrigation is a key input for agriculture. Increased use of high yielding varieties of seeds, multiple cropping, use of chemical fertilizers and mechanization has increased the demand for irrigation water.

Tank irrigation is one of the oldest and significant sources of irrigation in India and is particularly in south India (Palanisamy, 1998). Irrigation tanks accounted for more than one third of the area irrigated in the south Indian states on Tamil Nadu, Karnataka and Andhra Pradesh1.The tanks occupy vital role in the irrigation as well as local ecosystem in the semiarid and regions of South India. This tank provides multiple uses like source of drinking water for uncountable rural and urban communities and livestock, fish culture, recharge of ground water, control of floods etc (Gurunathan, 2006). The existing/functioning of tanks have been known to south India for several years old, the historical evidence suggests that tank

construction was sponsored by kings, chiefs and land lords (Uma Shankari, 1991). It is the most important minor irrigation source of irrigation.

This system has a special significance to the marginal and small scale farmers depending on tank irrigation. Tanks in the Indian context inextricably linked to the socio-cultural aspects of rural life and have historically been an indispensable part of the village habitat, sustaining its socio-ecological balance (Sakthivadivel *et al*, 2004). Irrigation in India has had a history extending to millennia. However the main source of tank irrigation has consistently declined since Independence. This decline can be seen equally in the shape of decrease in the relative importance of tanks and other modes of irrigation. At the same time today there is alarm that these valuable and extensive resources are in a state of near collapse, contributing to increased drought vulnerability in some of the poorest districts in the country. This paper examine the importance of tank irrigation in Andhra Pradesh particularly in Srikakulam district and try to find out why tank irrigation failed in the reign and how to improve this precious irrigation system.

2. Tank Irrigation in India:

Every region in the world has evolved water systems well adapted to its social, geographical, geo-morphological and climatic particularities. While the perennial streams of North India have often led to systems based on diverted flows like the kuhls, in South India traditional water systems have been based mainly on tanks, and often an interconnected cascade of tanks in the lower parts of catchments. Over centuries, a sophisticated system of irrigation had evolved around them that had incorporated regulated access and allocations between and within tanks and also provided for their upkeep and improvement. Though they were not free from the social inequalities that existed in the larger system, nevertheless they provided some minimum water assurance for those traditionally entitled to farming land. With the

advent of the British rule and subsequent developments centered on modern and large irrigation systems, tanks were slowly neglected. However, even in the immediate post-independence period tanks still retained their eminence as providers of water for various livelihood purposes. Thus, tanks accounted for 1,151,082 ha. in 1960-61 (39.5per cent of net irrigated area) in Andhra Pradesh and 335,468 ha. in 1960-61 (44.18 per cent of net irrigated area) in Karnataka.

Small water reservoirs behind earthen dams are called "irrigation tanks" in India. Tanks are providing surface irrigation, recharging ground water and serving water needs of rural households and livestock. Tank irrigation is an old established practice in most of the semi-arid tropical parts of India, where the monsoon rains disperse erratically during few months of the year and irrigation tanks serve to store and regulate the flow of water for agriculture use. Tanks are a feature in the cultural landscape of peninsular India. They are irrigating one-third of the total paddy area in the states of Andhra Pradesh, Karnataka and Tamil Nadu. The concentration of tanks is high in these states because of undulating terrain, hard rock geology, red soils and bimodal rainfall distribution. During and before 1950s, Tank irrigation alone accounted for 47 per cent of the total irrigated area. After 1965, this proportion began declining as there has been a spurt increase in the area of canals and wells. In 1993-94, the area irrigated by tanks was 7.8 per cent of the net irrigated area as compared to 45 per cent in 1949-50. The area irrigated by wells and canals continued to increase from 20 per cent to 35.2 per cent and 23.0 per cent to 47.7 per cent of wells and canals, respectively. Through tanks and wells in Andhra Pradesh, Karnataka and Tamil Nadu account for nearly 60 per cent of the tank irrigated area. There are about 1, 27,000 tanks in these states as against 2, 08,000 tanks in the country. Although several reasons like deforestation, centralization of authority, poor catchment treatment, issue of private property, increase

in population, agricultural transformation, unfavorable institutional framework and its capacity to handle the tank, *etc.* are quite evident from the field research and the available literature that the tank systems are on declining trend in terms of performance.

Man-made reservoirs, popularly known as tanks, have formed the backbone of agriculture in the dry regions of India, especially in south India. These regions not only receive relatively small amounts of rain-fall but also suffer from a high degree of annual and seasonal fluctuations. Tanks have been an ingenious way of utilizing rain water. While rain fed cultivation goes on during the monsoon the tanks store water during this period for later use. Tanks are also crucial for recharging ground water in these regions since streams and rivers, remain dry for most part of the year. That these dry regions grow a great variety of crops and support dense populations is a testimony, among other things, to the effectiveness of this traditional technology of water conservation.

Sources of supply to the tanks include, apart from rainwater which falls in the vicinity, rivers, hill streams, check dams across the streams and overflows of tanks situated above. These tanks have often been constructed in such a manner that the overflows from one tank go to supply another tank below and so on, so as to form, a chain system. Constructing check dams across rivers and streams and diverting water to supply the tanks is an important way of ensuring water supply to the tanks on a sustained basis.

Village tanks have been one of the most important water resources on which the rural communities depend for their livelihood. A tank is a village water resource formed by constructing an earthen bund (a man-made embankment) across a shallow valley to impound the rainwater run-off from its catchment area. The stored water is utilized by gravity flow to the lands situated below, primarily for irrigation purpose. As small scale irrigation systems, the tanks are

easily adaptable to the system of decentralized village administration that prevailed during the medieval period and thereafter. The precise shape and size of each tank seem to have been determined by the terrain along with the native wisdom of local villagers.

Even in the 21st century, the tanks, not only in Indian context, but also in South Asian context have very high relevance in practicing Integrated Water Resources Management (IWRM). As per minor irrigation census (1994), there exists 5, 00,000 irrigation tanks in the country of which 1, 50,000 tanks are located in the Deccan Plateau covered by South Indian States. These irrigation tanks are situated in sequential chains (cascades) with the slope mildly dipping towards the Southern coastal plains. As a result, the rainfall run-off flowing from a sub basin and / or watershed is effectively impounded and harnessed for multiple uses with irrigation being the major user. The irrigation sector merits high priority in an agrarian tail-end state like Andhra Pradesh. Emphasis on tanks as a source of irrigation arises from the fact that the state has the largest number of tanks and the largest area under tank irrigation in the country. Further, tank based irrigation systems are the foundation for traditional agro-based livelihoods and directly impact the lives of marginal farmers and wage earners in rain fed areas.

Table-1

Net Area Irrigated under Tanks in States where Tank Irrigation is Predominant 1990-91 and 2011-12

(Area in Lakh hectares)

S. No	State	1990-91		2011-12	
		Net area under tanks	Percentage	Net area under tanks	Percentage
1	Andhra Pradesh	9.68	29.83	5.50	10.81
2	Bihar	1.15	3.54	0.60	3.10
3	Karnataka	2.40	7.40	1.78	9.19
4	Madhya Pradesh	1.57	4.84	2.20	11.36
5	Maharashtra	3.10	9.55	-	0.00
6	Odisha	2.89	8.91	-	0.00
7	Tamilnadu	5.31	16.36	5.28	27.26
8	West Bengal	2.63	8.10	-	0.00
9	All India	32.45	100.00	19.37	100.00

Source: Statistical Abstract, , published by bureau Economics and statistics, Government of Andhra Pradesh., Note: Figures in brackets indicate percentages in All India Net Area Irrigated.

From the above Table it can be noticed the importance of tank irrigation in Andhra Pradesh compared to States where tank irrigation is predominant. In the year 1990-91, the net area irrigated under tanks in Andhra Pradesh was 9.68 lakh hectares accounting for 29.83 per cent of the area irrigated under tanks at all India level. Next in the order are Tamilnadu (16.36 per cent), Maharashtra (9.55 per cent), Odisha (8.91 per cent), West Bengal (8.10 per cent), Karnataka (7.40 per cent), Madhya Pradesh (4.84 per cent), and Bihar (3.54 per cent).

In the year 2011-12, the net area irrigated tanks in Andhra Pradesh was 5.50 lakh hectares accounting for 10.81 per cent of the area irrigated under tanks at all India level. Next in the order are

Tamilnadu (27.26 per cent), Karnataka (9.19 per cent), Madhya Pradesh (11.36 per cent), and Bihar (3.10 per cent). Thus the importance of tanks as source of irrigation is on declining trend in all the states. Among the states considered Andhra Pradesh is still having considerable area tank irrigation.

3. Growth of Irrigated Area in Andhra Pradesh:

The growth of irrigation in Andhra Pradesh is analyzed by considering the broad indicators viz, NIA and GIA. Among the South Indian states, AP has the largest number of tanks. According to the State Government data, there are about 77472 tanks with a command area of about 17.5 lakh hectares of farm lands, which includes area irrigated by tanks with less than 40 ha. command coming under the jurisdiction of Gram Panchayats. The tanks with more than 40 ha. (100 acres) administered by the Minor Irrigation Department are a little above 11000 in number with a command of about 11.55 lakh hectares. The region wise distributions of these tanks are presented in the following Table 2

Table-2

Region Wise distribution of Tanks in Andhra Pradesh and their Command Area

S. NO.	Region	Number of tanks	Per cent	Command (in ha) Area	Per cent
1	Coastal AP	4670	41.4	48308	41.8
2	Rayalaseema	1544	13.7	15893	13.8
3	Telangana	5063	44.9	5131	44.4
4	Total	11277	100.0	115512	100.0

Source: Statistical Abstract, Published by Bureau Economics and Statistics, Government of Andhra Pradesh.

From the above Table it can be noticed that the higher proportion of tanks are registered in the Telangana region and it is

followed by coastal Andhra Pradesh with little difference. But in case of Rayalaseema region the numbers of tanks are very low.

4. Rainfall and Tank Irrigation in Andhra Pradesh:

As many tanks are mostly rain fed, the tank irrigation basically depends on rainfall. Data on rainfall and tank irrigation is analyzed together. In Andhra Pradesh most of the rainfall occurs in south-west monsoon. Around 80 per cent of the rainfall is received during the month of June to October. Data on monthly rainfall for the months June to October, i.e., the initial period for growth of crops, are presented for the period 1990-91 to 2011-12. It may be noted that period July to August is critical for transplantation and September to October for the growth of the crop and yields. Table 3 gives data relating to rainfall for the State of Andhra Pradesh.

Table-3
Rainfall Pattern in Andhra Pradesh during 1990-91 to 2011-12

Year	Rainfall							Deviations of Actual from Normal			
	Jun	July	August	September	October	Total 2-5	Total 2-6	June to Sept (2-5)	Per cent	June to Oct (2-6)	Per cent
1990-91	141	113	259	134	203	647	850	23	3.69	88	11.55
1991-92	209	178	132	171	112	690	802	66	10.58	40	5.25
1992-93	89	149	203	112	96	553	649	-71	-11.38	-113	-14.83
1993-94	66	182	119	143	163	510	673	-114	-18.27	-89	-11.68
1994-95	62	190	166	67	218	485	703	-139	-22.28	-59	-7.74
1995-96	96	216	193	122	269	627	896	3	0.48	134	17.59
1996-97	176	170	228	164	201	738	939	114	18.27	177	23.23
1997-98	59	136	111	214	91	520	611	-104	-16.67	-151	-19.82
1998-99	104	194	225	232	213	755	968	131	20.99	206	27.03
1999-00	97	152	155	130	105	534	639	-90	-14.42	-123	-16.14
2000-01	185	157	338	79	62	759	821	135	21.63	59	7.74
2001-02	112	94	170	157	208	533	741	-91	-14.58	-21	-2.76
2002-03	103	67	183	64	134	417	551	-207	-33.17	-211	-27.69
2003-04	85	226	176	111	175	598	773	-26	-4.17	11	1.44
2004-05	81	228	144	192	214	644	858	20	3.21	96	12.60
2005-06	77	230	111	272	253	690	943	66	10.58	181	23.75
2006-07	103	109	210	205	100	627	727	3	0.48	-35	-4.59
2007-08	216	113	182	237	129	748	877	124	19.87	115	15.09
2008-09	87	154	263	137	66	641	707	17	2.72	-55	-7.22
2009-10	65	86	151	153	79	455	534	-169	-27.08	-228	-29.92
2010-11	113	278	232	187	136	810	946	186	29.81	184	24.15
2011-12	68	196	194	82	67	540	607	-84	-13.46	-155	-20.34
Normal	108	189	184	143	138	624	762	0	0.00	0	0.00

Source**:** Season and Crop Reports, Bureau of Economics and Statistics, Government of Andhra Pradesh

Table-4

Relationship between Rainfall and Area Irrigated under Tanks in Andhra Pradesh for the Years, 1990-91 to 2011-12

Year	per cent Deviation of Rainfall from Normal June to September	Index of Tank irrigation
1990-91	3.69	100.00
1991-92	10.58	97.95
1992-93	-11.38	75.27
1993-94	-18.27	65.36
1994-95	-22.28	71.50
1995-96	0.48	77.14
1996-97	18.27	87.19
1997-98	-16.67	58.14
1998-99	20.99	83.74
1999-00	-14.42	67.31
2000-01	21.63	75.10
2001-02	-14.58	58.64
2002-03	-33.17	43.98
2003-04	-4.17	50.58
2004-05	3.21	49.30
2005-06	10.58	68.36
2006-07	0.48	62.22
2007-08	19.87	60.44
2008-09	2.72	66.93
2009-10	-27.08	34.28
2010-11	29.81	67.17
2011-12	-13.46	56.82

Source: Table 3.11 and 3.9

From the above Table-4 presented data relating to the relationship between rainfall and area irrigated under tanks by taking percentage deviation of rainfall from normal June to September. There is an unfouvarable deviation in rain fall in the years 1994-95, 2002-03 and 2009-10 with minus 22.28 per cent, minus 33.17 per cent and minus 27.08 per cent for respective years. There some fouvarable conditions in deviations especially in 1996-97, 1998-99, 200-01, 2007-08

and 2010-11 with 18.27, 20.99, 21.63, 19.87 and 29.81 percentages for the corresponding years. This kind of fluctuations effects area irrigated under tanks. It observed from the table the year 2009-10 reports least index of tank irrigation with 34.28 per cent followed by 2002-03 with 43.98 per cent, 2004-05 with 49.30 per cent. And 1990-91 has base year of index 1991-92 reports highest index of tank irrigation with 97.95 per cent followed by 1996-97 with 87.19 per cent.

5. Tank Irrigation in Different Districts:

The proportion of area irrigated under tanks for each of all districts of Andhra Pradesh, for five years 2007-08,2008-09,2009-10,2010-11and 2011-12 are presented in Table-5 The Table clearly shows the preponderance of tank irrigation in Srikakulam district. The area irrigated under tanks as a percentage of total irrigated area is around 32.51 per cent in the district, while for the state as a whole it accounts for only around 9.31 per cent. Considering Costal Andhra alone, the preponderance of tank irrigation in this district appears much higher. In fact this feature distinguishes North Costal Andhra comprising Srikakulam and Visakhapatnam districts from the districts of South Costal Andhra Pradesh in which Nellore with a significant proportion of area under tank irrigation, is an exception.

Table-5

Percentage of Tank Irrigated Area to total Irrigated area for all the Districts of Andhra Pradesh for the years 2007-08 to 2011-12

Name of the district	2007-08	2008-09	2009-10	2010-11	2011-12
Srikakulam	32.51	32.50	26.97	31.21	29.91
Vizianagaram	44.68	47.69	39.39	44.31	45.15
Visakhapatnam	20.71	19.61	13.70	20.59	21.15
East Godavari	7.14	6.43	3.47	6.45	5.49
West Godavari	3.63	3.49	0.33	2.87	3.04

Krishna	5.08	5.32	1.84	6.45	7.75
Guntur	0.91	0.95	1.08	1.05	1.05
Praksham	13.20	9.08	6.65	8.82	5.05
Nellore	24.98	23.63	21.29	22.12	21.11
Chittoor	12.24	11.73	9.12	8.33	8.57
Cuddapah	8.37	3.76	2.26	3.97	1.98
Anathapur	2.84	5.08	2.37	4.67	0.52
Kurnool	5.60	3.50	3.95	4.69	2.77
Mahaboobnagr	3.01	1.23	2.03	4.57	1.01
Rangareddy	2.34	2.36	3.16	4.90	2.24
Medak	1.63	6.55	0.63	4.19	2.73
Nizambad	2.16	2.22	1.54	2.46	3.05
Adilabad	10.95	32.47	5.66	12.64	14.32
Karimnagar	4.70	4.88	0.65	5.70	4.56
Warangal	13.27	16.33	3.38	16.52	12.54
Khammam	17.29	19.23	6.90	18.39	17.83
Nalgonda	3.87	4.04	3.48	3.54	3.99
Andhra Pradesh	9.31	9.61	5.76	9.09	8.10

Source: Government of Andhra Pradesh Statistical Abstract for the relevant years

6. Rainfall and Tank Irrigation in Srikakulam:

As many tanks are mostly rain fed, the tank irrigation basically depends on rainfall. Data on rainfall and tank irrigation is analyzed together. In Srikakulam most of the rainfall occurs in south-west monsoon. Around 80 per cent of the rainfall is received during the month of June to October. Data on monthly rainfall for the months June to October, i.e., the initial period for growth of crops, are presented for the period 1990-91 to 2011-12. It may be noted that period July to August is critical for transplantation and September to October for the growth of the crop and yields. Table 3.19 gives data relating to rainfall for the Srikakulam district.

Table-6
Rainfall Pattern in Srikakulam District during 1990-91 to 2011-12

Year	Rainfall							Deviations of Actual from Normal			
	Jun	July	August	September	October	Total 2-5	Total 2-6	June to Sept (2-5)	Per cent	June to Oct (2-6)	Per cent
1990-91	144	96	228	129	293	597	890	-108	-15.32	2	0.23
1991-92	203	284	124	262	134	873	1007	168	23.83	119	13.40
1992-93	73	216	234	190	195	713	908	8	1.13	20	2.25
1993-94	123	178	125	192	158	618	776	-87	-12.34	-112	-12.61
1994-95	51	205	171	191	165	618	783	-87	-12.34	-105	-11.82
1995-96	55	280	291	199	356	825	1181	120	17.02	293	33.00
1996-97	225	91	161	128	145	605	750	-100	-14.18	-138	-15.54
1997-98	70	194	189	246	55	699	754	-6	-0.85	-134	-15.09
1998-99	132	234	154	230	280	750	1030	45	6.38	142	15.99
1999-00	264	81	123	160	182	628	810	-77	-10.92	-78	-8.78
2000-01	208	133	310	90	81	741	822	36	5.11	-66	-7.43
2001-02	126	121	234	127	201	608	809	-97	-13.76	-79	-8.90
2002-03	167	147	160	83	142	557	699	-148	-20.99	-189	-21.28
2003-04	37	220	222	117	538	596	1134	-109	-15.46	246	27.70
2004-05	55	178	172.5	267	403	673	1076	-33	-4.61	188	21.11
2005-06	73	136	123	417	268	749	1017	44	6.24	129	14.53
2006-07	190	274	406	185	61	1055	1116	350	49.65	228	25.68
2007-08	369	97	162	333	140	961	1101	256	36.31	213	23.99
2008-09	83	222	222	236	21	763	784	58	8.23	-104	-11.71
2009-10	101	214	148	135	96	598	694	-107	-15.18	-194	-21.85
2010-11	142	239	262	206	281	849	1130	144	20.43	242	27.25
2011-12	132	156	253	188	31	729	760	24	3.40	-128	-14.41
Normal	135	189	185	196	183	705	888	0	0	0	0.00

Source**:** Season and Crop Reports, Bureau of Economics and Statistics, Government of Andhra Pradesh

These refer to figures of the average rainfall of all the rainfall stations in the district. Data on irrigated area refer to actual irrigated area under all the tanks in the district.

Table-7

Relationship between Rainfall and Area Irrigated under Tanks in Srikakulam District for the Years, 1990-91 to 2011-12

Year	per cent Deviation of Rainfall from Normal June to September	Index of Tank irrigation
1990-91	-15.32	100.00
1991-92	23.83	95.51
1992-93	1.13	100.15
1993-94	-12.34	90.30
1994-95	-12.34	98.11
1995-96	17.02	106.00
1996-97	-14.18	81.60
1997-98	-0.85	94.80
1998-99	6.38	93.89
1999-00	-10.92	94.38
2000-01	5.11	104.26
2001-02	-13.76	74.77
2002-03	-20.99	56.66
2003-04	-15.46	80.79
2004-05	-4.61	85.07
2005-06	6.24	59.45
2006-07	49.65	87.66
2007-08	36.31	91.88
2008-09	8.23	89.44
2009-10	-15.18	66.71
2010-11	20.43	89.03
2011-12	3.40	85.58

Source: Table 3.19 and 3.17

From the above Table-7 presents data relating to the relationship between rainfall and area irrigated under tanks by taking

percentage deviation of rainfall from normal June to September. It is clear from the Table the percentage of deviations has been seriously fluctuated in the total period of the study. There is an unfouvarable deviation in rain fall in the years 1994-95, 2002-03 and 2009-10 with minus 12.34 per cent, minus 20.99 per cent and minus 15.18 per cent for respective years. There some fouvarable conditions in deviations especially in 1995-96, 2006-07, 2007-08 and 2010-11 with 17.02, 49.65, 36.31, and 20.43 percentages for the corresponding years. This kind of fluctuations effects area irrigated under tanks. It observed from the Table the year 2002-03 reports least index of tank irrigation with 56.66 followed by 2005-06 with 59.45, 2009-10 with 66.71 respectively.

7. Regression of Irrigation under Tanks and Rainfall:

The relationship between area under tanks and rainfall is also examined by estimating the equation of the type $Y=a+bx$ where Y=Area under tanks and X=Rainfall. The regression results indicated that the co-efficient of rainfall is positive and statistically significant. This implies that the area under tanks is heavily dependent on rainfall.

As seen earlier, the period 1990-91 to 2011-12 witnessed a decline in tank irrigation and increase in well irrigation. To examine the relationship between these two. The Regression results indicated that, the co-efficient of the area under tanks has a negative sign, though not statistically significant, substantiating our earlier finding that the growth in well irrigation can be largely due to decline in tank irrigation.

Table-8

Regression Results

S. No	Function Pitted	Constant	Regression Coefficient	R^2
Andhra Pradesh				
1	Y=a+bx (where, Y=Area under Tank Irrigation, X= Rainfall)	151038.3	545.7684* (3.002031)	0.31
2	Y=a+bx (where, Y=Area under Wells, X= Area under Tanks)	2672268.8	-1.21817303* (-2.8759)	0.29
Srikakulam				
1	Y=a+bx (where, Y=Area under Tank Irrigation, X= Rainfall)	52482.78	13.38434 (1.249489)	0.07
2	Y=a+bx (where, Y=Area under Wells, X= Area under Tanks)	5932.029	0.115371 (1.297238)	0.07

NOTE: Figures in brackets are't' values.

* Significant at 1 per cent level.

The study of raw data and the Regression results clearly established the decline in tank irrigation in the State and district during the period 1990-91 to 2011-12. Further, the area irrigated by tanks is very much dependent upon the amount of rainfall which may point out that the fact that fluctuation in rainfall responsible for the decline in tank irrigation. There may be other factors too which might

have contributed to the decline in the tank irrigation. There is thus a need for an in-depth study of these factors and the present study is an attempt in this direction.

Tanks and their Functions:

The tank system has four different functions in irrigated agriculture: soil and water conservation, flood control, drought mitigation and protection of environment of surrounding area. Likewise, development of tank irrigation has to undergo the four phases, namely, water acquisition or harvesting, storage, disposal of surplus water, distribution and management of water in the command area by an institution. The tank complex comprises the catchment area, the feeder channel, tank bund; water spread area, sluice outlets, command area, field distributaries (water courses) and surplus weir.

While the South and East Indian tanks are known for their antiquity and are created essentially as a source for providing supplementary irrigation during monsoon season, innumerable small water holding structures called ponds have been in existence in many North Indian States and some were constructed even after Independence for multiple uses including irrigated agriculture. Although many of these ponds are primarily meant for inland fresh water aquaculture, they have also been used for multiple purposes like irrigated agriculture, livestock and other domestic uses. Tank irrigation has thus a rich heritage on account of long historical antecedents in various regions of India. Over centuries, tanks and ponds constituted an important supplementary source of water to the distressed poor.

Tanks and Societal Needs:

Tank is a centre of socio economic activities of a village catering to the multifarious needs of the village community. The tank is not simply an irrigation system appended to big reservoirs. It has multiple uses and serves diverse needs of people, animals and plants. Apart from

the above, the tanks contribute to the recharge of ground water, microclimate and the environment to keep the surrounding area green and cool. This environment attracts the migratory birds from far and near. The advantage of tank irrigation is its proximity to the command area, so that the water requirement of the crop can be assessed and supplied from the tank, which is the core issue of water management. Most of the small tanks serve one single village and its hamlets, enabling the de-centralized management to be effective.irrigation and in local ecosystem in the semi-arid and arid regions of Andhra Pradesh, 1/3rd of gross cultivated are under it owned mostly by rural poor in the study found that tank irrigation is located widespread in South India.

8. Tank Irrigation Conditions in Andhra Pradesh:

Historically, tank irrigation in Andhra Pradesh has played a vital role in the development of its agricultural economy on a larger front and livelihoods of diverse communities on the whole. There are 77,452 small and big irrigation tanks dotted over the state irrigating over a million ha. in the most drought prone and semi arid regions of the state. These structures that are common in the Deccan plateau have survived over centuries, providing water for irrigation and domestic uses. Breaking down of local institutions responsible for managing the tanks, has resulted in state of disrepair and sub-optimal production from these tanks. Consequent loss of agriculture production has affected the small and marginal farmers adversely in rain fed areas; the area under agriculture is almost constant despite creating new potential in terms of command and massive watershed treatment program in last decade. This requires a detailed analysis of source wise irrigation. The area under irrigation from tanks is drastically reduced. The percentage of area dependent in Andhra Pradesh on tanks for irrigation has reduced to less than half in 45 years - from 39per cent in 1955 to 16 percent in 2010 (GoAP, 2010).

Tanks are considered the prime source for the development of agriculture which indirectly helps the wells to get recharge it s supply. Before the independence the tank system is one of the major components of minor irrigation sources in many of the India states. Tanks have many positive attributes such as

· Less capital intensive to build and maintain

· Provide ecological benefits

· Recharging ground water

· Control the floods

· Provided livelihood options (farming, fishing, forestry, dug hearing)

The surface water sources have been exploited to this potential and there is very little scope for further development of major and medium schemes. The State's agricultural production mainly depends on the north east monsoon. None of the rivers in the state is perennial and rarely half of the cropped area in the state continues to be rain fed. Quality in terms of assured, adequate and timely supply of water is crucial for increasing the productivity of land for ensuring food security. Water is the basic input for crop production. Intensive and extensive cultivation of land mainly depend on the availability of water. Important sources of irrigation in Andhra Pradesh are Wells, Canals, and Tanks In Andhra Pradesh, the area irrigated by tanks is very much dependent upon the amount of rainfall which may be subjected to fluctuations in rainfall may be responsible for the decline in tank irrigation. There may be other factors too which might have contributed to the decline in the tank irrigation. There is a need for an in depth study of these factors and the present study is an attempt in this direction. The general problems of many of the selected tanks can be indicated as follows: Accumulation of silt in the tank bed area and

loss of the depth of the tank bed. The Silting of sluices of feeder channels, Weed growth in the tank bed area and in feeder channels. Encroachments of tank bed area and feeder channels, damages to sluices and surplus weirs, loss of the height of the tank bunds and damages to tank bunds.

In order to strengthen the irrigation in the state Government of A.P Proposed (APCBTMP).During its first phase, the proposed Andhra Pradesh Community-Based Tank Management Project (APCBTMP) aims to rehabilitate around 3,000 tank systems in eleven districts of the state. With its focus on Participatory Irrigation Management (PIM), the project will work to strengthen community-based institutions involved in tank management, and improve tank-based livelihoods. In recent years, Government and NGOs alike, in the states of Karnataka, Orissa, Maharashtra, Tamil Nadu, and Andhra Pradesh, have undertaken water resource management projects in a big way. These include projects on tank restoration, watershed development and groundwater management. In broad terms the importance of minor irrigation in the state indicate that about 14 lakh hectares have been irrigated by minor sources in the state for 2005-2011.In Telangana and Costal Andhra Regions, more than 5lakh hectares are irrigated by minor irrigation sources during this period.

,, The importance of minor irrigation can also be seen from the fact that minor irrigation works cover an important segment of the area irrigated. The percentage of area irrigated by minor sources in total Net Irrigated Area (NIA) for different districts, the state as a whole about 50 per cent age of the NIA was under minor irrigation sources.

9. Decline of Tank System in Andhra Pradesh:

There has been a steady decline in the area irrigated by tanks in the last four decades in spite of a marginal increase in the number of

tanks. The situation in the drought prone areas was alarming. The reasons cited were siltation, weed infestation, closure of feeder channels between chains of tanks, encroachment into tanks and cultivation in tank beds, etc. However, above all, the major problem was inadequate or even total absence in many cases, maintenance, which has its roots in policy directions. The notion that small tanks were unremunerative and their maintenance is unnecessary burden on the state got strengthened in the post-independence period. In the earlier years of Independence the thrust was on large scale multi-purpose river valley projects. The minor irrigation sector got neglected. The funds for maintenance of traditional structures were minimal and at times totally absent. The tanks were left to their fate, encroachment became rampant, community participation and responsibility became things of the past.

11. Causes of Decline of Tank Irrigation

After the independence the significant source of tank irrigation drastically decreased due to several socio-economic and institutional factors, the most factors has been changes in land ownership pattern and changes in caste and class configuration (Sivasubramaniyan: 1997, Janakarajan : 1993, 2003, Sakthivadivel : 2004). The minor irrigation was decreased after independence due to importance given to canal systems and over exploitation of ground water (Sivasubramaniyan, 1998). The decline of tank irrigation due to particularly massive diffusion of private wells and pumps has spread to tank command area (Balasubramaniayan, 2003). Emergence of wells is influenced by many factors such as the advent of green revolution technology, the farmers were switched over to well irrigation due to its quality irrigation which provides more yield and more crop. Due to this change farmers are able to cultivate multiple crops in a year. So the cropping pattern was changed meanwhile the traditional irrigation system such as tanks got disintegrated. Materialization of wells in the tank ayacut has led to the

decline of interest in the tank management among farmers who own wells at the same time well is a private resource whereas a tank is a common property, moreover well irrigation is more stable and reliable than tank irrigation (The Hindu Business Line, March 2002).

The IWMI–Tata Programme pointed out identifies the characteristics of high performing local managed tank institutions. The most important reasons of breakdown of tank irrigation are due to disappearance of village institutions that were managing the tanks (Asian Development Bank, 2006). Encroachment on the tank foreshore area, deforestation in the catchments area, poor operating condition of the upper sluices, defective tank structures, weak farmers organization also lead to decline of tank performance. The problems due to poor maintenance, encroachment, lack of money etc.

10. Management of Tanks

Tanks are classified into two categories i.e., system and non-system. The system tanks receive water from major streams or reservoir in addition to the run-off from their own catchments. Non-system tanks depend on rainfall and are not connected to a river system. Originally most tanks were non-system tanks. Currently, for the administrative purpose tanks are classified into Panchayat Union (PU) and Public Works Department (PWD). Panchayat tanks have a command area less than 40 ha, and the control is with the village communities. PWD having a command area of more than 40 ha and all the system tanks are maintained by PWD.

12. Concluding remarks and Policy suggestions

The important source of tank irrigation has been constantly decline due to other mode of irrigation, shortage of rainfall, lost of farmer interest, financial problem etc., and the traditional water management of tank irrigation largely disappeared due to modern technologies. Now the tank irrigation system is critical condition.

Because farmers are more concerned about Ground water. Without surface water the ground water used for only limited period. The other factors of decline of tank irrigation are conflict among villagers, encroachment, siltation, poor maintenance etc. Except suitable finance, institutional arrangements, improve of user participation are evolved the present condition will continue.

Growth of irrigation is stagnant in Srikakulam district over a period of time. Tanks are predominant source of irrigation. These are mainly rain-fed. The ayacut under tank irrigation in the district is very limited. Due to this in the district the extent of intensity of irrigation is very low. As far as cropping pattern under tank irrigation in the district is concerned, rice is the predominant crop under both tanks and canals. In the selected district, a higher proportion of paddy is grown in Kharif season. Because of the predominance of rain fed tanks in the district, adverse trends in rainfall is leading to decline in both the area under cultivation as well as crop yield in the study area. As a whole due to scarcity of water the cultivators under tank irrigation are facing frequent problems relating to loss of different crops.

Suggestions and Policy Implications:

In the light of the conclusions drawn based on the in-depth study, the following measures are suggested for proper upkeep of tanks.

- ✓ Encroachment of tank bed area needs to be stopped by effective execution of the existing laws and Government Orders (GOs). For instance, the recent effort of the Central Government for renovation and restoration of the tanks has not been implemented successfully, the reasons being obvious. Therefore, government at all levels needs to take serious steps in this direction. With the help of local farmers, village level officers,

Grama (village) Sabha, village records, the encroachers need to be identified.

- ✓ Sincere, concrete legal action against encroachers needs to be initiated with appropriate amendments to the existing legal frame work.
- ✓ Tank sluices and surplus weirs have to be repaired on time bound basis. Government along with people's participation can attend to these works. Funds can be pooled from the farmers and matching grant need to be given by government.
- ✓ Desilting of tank bed and sluices regularly in the summer season will help in restoring tank bed to its original level, thereby increasing water holding capacity of tank.
- ✓ Extensive weed growth in the tank bed area affects the storage capacity. Periodical clearance of weed will increase the storage capacity of the tank. Clearance of weed and silt in time will prevent not only weed growth in tank bed area but also facilitates free flow of water in the feeder channel benefiting the farmers in general and the tail –end users in particular.
- ✓ Farmer's involvement in the maintenance of tanks and the structures as well as their participation in tank improvement is very essential. It is important that farmers should be encouraged both in the maintenance and improvement programmes.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

RUSSIA AND GERMANY IN THE CONTEMPORARY WORLD

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Introduction

Generally an unfriendly feeling emerge when considering the relations of Russia and Germany during the time of World War. The division of Germany into East Germany and West Germany, and control of East Germany by USSR and West Germany by USA during the time of Cold War turned Germany as the centre of conflict between the two super powers. But the in-depth analysis of Russia-Germany relation provides an idea that from historical period, various treaties and agreements have been signed between them. The unfriendly feelings were the product of the circumstances during the time of Fist World War and Second World War. This topic clearly elaborates the relations of Russia and Germany in the contemporary periods.

The disintegration of Soviet Union and the integration of East Germany and West Germany into a single nation assigned a new chapter to world history. Russia emerged as a democratic country from a communist country and Germany became a western federal democratic country. Russia tried itself as an emerging power and Germany tried for acquiring more active role in international sphere.

Different bilateral agreements have been signed between Russia and Germany which strengthened their bilateral relations. Inter-governmental Consultations have been annually organized since 1998. The bilateral governmental consultation process opened by Chancellor Gerhard Schroder is an important milestone in the emerging

relationship between Russia and Germany. The relations between Russia and Germany became systematic after 2000, when Russian President Vladimir Putin came to power. Another important milestone in the bilateral relations between Russia and Germany is the Petersburg dialogue organized since 2001 between the heads of states and civil society of two countries. This "Petersburg Dialogue" is termed as second pillar of official relationship between Russia and Germany. In this dialogue, Germany has been proposing to develop Russia's civil society institutions. The first Russian-German Youth conference entitled "relating the future" is an important episode conducted along with Petersburg Dialogue.

Russia and Germany had been cooperating with each other for achieving their previous position as Russia tried to achieve the position which it enjoyed before its disintegration and Germany tried to achieve its sovereignty. Germany encouraged Russia to be a member of G-7 and Russia also expects help from Germany to reconstruct its economy.

In the contemporary world both cooperates each other for the solution of different complicated international issues like Iraq issue, Iran's Nuclear Issues, Combating Terrorism and removal of Weapon of Mass destruction. Further they want restructuring or reform of United Nations Security Council and wants it's functioning in a democratic manner. Both Russia and Germany oppose the unipolar world lead by USA and both justify the evolution of a multipolar world.

Russian-German Effort on Combating Terrorism

In the modern world, **terrorism** is emerging as a most disastrous problem which has been killing innocent people day by day. In the contemporary period, Russia and Germany are facing both home-grown terrorism and international terrorism. So they want the eradication of this problem from their respective countries as well as from the world.

In case of combating terrorism Russia and Germany joined with USA in its war against terrorism, but both opposed the US attack on Iraq on the suspension of possession of weapon of mass destruction. This marks the attempt of Russia and Germany for establishing a multipolar world. By joining with different regional and international organizations like SCO, CSTO, BRIC, G-4, RIC, United Nations Organisation both respect the creation of a multipolar world.

Both have provided their support to USA in the fight against **terrorism** or to the war against terrorism. Russia has cooperated with USA, the UN and SCO in the counter terror activities. Germany has been cooperating with the UN for removal of terrorism and removal of weapons of mass destruction.

In addition to this, they are cooperating for the eradication of nuclear **terrorism** from the world. As active members of G-8, they have been contributing for a peaceful world free from terrorism. Both Russia and Germany have participated in the G-8 members in combating nuclear terrorism. They have supported the UN Security Council counter-terrorism committee. Russia and Germany have cooperated with world community for the stabilization of unstable situation in Afghanistan. They signed Agreement on the Transit of Military Equipment and Personnel through the Territory of Russia to Afghanistan.

Russia Germany and Iraq issue

In the case of Iraq issue, Russia and Germany strictly opposed the US war attempt on Iraq**.** Furthermore**,** Russia and Germany along with France decided that they will not provide peacekeeping troops or further funds for Iraq**.** According to Russia, Germany and France, international law did not justify the war in Iraq**.** Russia and Germany wanted a peaceful solution of this issue. Russia and Germany along with France formed common alliance against US-led war in Iraq at the

beginning of 2003. They issued a joint declaration calling for strengthening United Nations weapons inspections in Iraq, aimed at peacefully disarming that country. According to Russia and Germany, the Iraq issue should be handled within the framework of the United Nations. That is why; Moscow and Berlin along with Paris formed an "Anti-War Coalition" and opposed the USA on the issue of attack on Iraq.

View of Russia and Germany on Iran's Nuclear Issue

The Iran's Nuclear Issue has emerged as a controversial issue leading to threat to peace and security of the word. Both want for the peaceful solution of Iran's nuclear issue by becoming active members of P-5 +1 meetings.

Russia always thinks for the peaceful solution of Iran's nuclear issue. Russia and Germany have been taking part in P5+1 members meeting and discussing for the peaceful solution of Iran's nuclear Issue. Both Russia and Germany wants that Iran should obey the rules and regulations of United Nations Security Council and the International Atomic Energy Agency and act within the purview of NPT. Though the right to peaceful uses of nuclear energy is the right of Iran, production of such a huge amount of uranium by Iran is making suspicion among the international community about its nuclear programme.

Initially, Russia opposed sanctions against Iran, but felt impatience with Iran's repeated refusal to halt enriching uranium. Germany favours more harsh sanctions against Iran because of its not halting the nuclear programme. In 2010, Russia joined with Germany and France in supporting sanctions against Iran if it fails to cooperate with leading international bodies regarding its nuclear programme.

Effort of Russia and Germany for eradication of Weapon of Mass Destruction

Germany is supporting Russia in destroying or converting its chemical weapons and production facilities to the best of its ability by providing their expertise and extensive funding. Russia and Germany launched Russo-German projects, meant to eliminate nuclear and chemical weapons. Since 2002, the bilateral cooperation was rapidly expanding into the field of combating new threats like proliferation of weapons of mass destruction. Along with members of G-8 at the June 2002 summit in Kananaskis, German Chancellor, Gerhard Schroeder and President of Russian Federation, Vladimir Putin initiated the "Global Partnership against the Spread of Weapons and Materials of Mass Destruction". On 9 October 2003, an agreement was signed by Federal Chancellor Gerhard Schroeder and Russian President Vladimir Putin between the German Federal Ministry of Economics and Labour (BMWA) and the Ministry for Atomic Energy of the Russian Federation. The agreement is meant for supporting the elimination of the nuclear weapons which the Russian Federation has pledged to reduce through the dismantlement of decommissioned nuclear submarines from Russia's Northern Fleet.

Germany together with Russia started to implement major projects like building the Russian chemical weapons destruction facility in Kambarka. Russia and Germany have vast experience of cooperation in the field of disarmament. The two countries have been cooperating on developing facilities for the destruction of chemical weapons in Gorny (Saratov region). Since 1993 they have been working to improve the physical protection of nuclear facilities.

Expectation of Russia and Germany for Multipolar world

While formulating regional organizations and obeying the central role of the UN for solution of all international problems, both opposed the attack of the US on Iraq in 2003 and attempted for the solution of Iran's nuclear issue peacefully without use of force. All this reflects a clear-cut stand of Russia and Germany for a democratic international system and multipolar world.

Opposition to Iraq war by Russia, Germany and France implies an idea of multipolarity which opposes the unilateral approach of USA. The eradication of terrorism and global partnership against spread of weapons and materials of mass destruction require global and multilateral approach in which both Russia and Germany are active partners.

Russia and Germany have borne equal responsibility for creating a world order vested with equality, multipolarity and cooperation. In the case of attack on Iraq the multilateral approach of Russia, Germany and France is visible against America's unilateral approach. On February 10, 2003 Russia, Germany and France published a statement of "alternative to war" on Iraq. By issuing a joint statement in February 2003, and by developing concerted actions in the United Nations Security Council, Russia and Germany along with France opposed the Bush administration for its attack on Iraq. This attitude of Russia and Germany appeared to be a step towards establishing a new multipolar world order. Their approach to stop Iraq war turned out to be failure, but their approach for establishing a multipolar world became noticeable in international politics.

Russia, Germany and reform of United Nation Security Council (UNSC)

Both the nations support the reform of United Nation Security Council in a democratic manner. Russia supports for Germany's permanent membership in UNSC. On the issue concerning veto power of the UN permanent members, Russia and Germany reflects the same view. Russia is of the opinion that there should not be any limitation to veto but it supports the extension of the veto power to the new permanent members. Germany also represents that veto power should be given to all the new permanent members. All these moves and common approach of Russia and Germany are obviously meant for a stable world.

Russia supports the permanent membership of Germany in the United Nations Security Council. The status of countries and scenario of the world is changing continuously. The reconstruction of UN Security Council is the need of time. The status of Germany has been changing. Now it is one of largest contributor of funds to the United Nations. The status of Germany is changed form an enemy country after the World War Second to an industrialized and improved country in the present period. So the permanent seat to Germany in the UNSC is justified. Russia's positive consent for Germany's permanent membership is appreciable.

Economic Cooperation between Russia and Germany

Russia and Germany depends on each other for their economic and trade relations. Their economic relation is growing through various institutional mechanisms. They are Russian-German Foreign Trade Chamber, Commodity Forum between Russia and Germany, and so on. Russian export to Germany consists of oil, oil products, natural gas, iron and steel, and so on. German export to Russia constitutes

manufactured goods, equipments, cars, electronics and chemical equipments, mechanical engineering, automobiles and parts, chemicals, electrical equipment, and so on. They have established a stable bilateral economic cooperation.

Overall, Russia's export to Germany and Russia's import from Germany are increasing. But the year 2009 marked a significant decrease in the export and import. Russia mainly exports energy related goods to Germany and Germany provides help to Russia for the development of its energy infrastructure. Due to global economic crisis, there was reduction in the export and import; but there was no suspension in the major projects and from 2010 again there was increase in the volume of export and import.

Germany is also playing a greater role in the modernization process of Russian economy. A German company, Seimens is contracted to modernize 22 Russian railway switching yards by 2026 and also to install wind turbines in Russia. Germany is an important partner in the construction of Skolkovo high tech hub in Russia.

Germany helps Russia for the development of small and medium size industries because small and medium size companies in Russia remains in an underdeveloped stage. Germany also worked for the production of standard quality of goods. "EurasiaRailLogistics" is a joint venture between the German Railroad Corp. (DB) and the Russian Railways (RZD).

Strengthening Energy cooperation between Russia and Germany

In case of Energy cooperation companies of Russia and Germany signed contracts, Memorandums of Understanding and agreements. Various deals and agreements are signed between Gazprom and BASF, and between E.On Ruhrgas and Wintershall (fully owned by BASF).

Further, Russian-German Energy Agency (Rudea) works for energy efficiency projects for Russia.

The Nord Stream Gas pipeline is supplying energy to Europe and this project is environment friendly. Gazprom, E.On Ruhrgas and BASF/Wintershall are involved in the construction of Nord Stream gas pipeline. The Nord Stream pipelines is built and operated by a company named Nord Stream AG. The resource base of Nord Stream gas pipeline are Yuzhno-Russkoye field, Shtokman gas field, gas deposits of Yamal peninsula and Obsko-Tazovsky guba, and the Russian Unified Gas System. The total construction cost of Nord Stream gas pipelines project is 7.4 billion euros.

Above all, Nord Stream gas pipeline is helpful to satisfy the energy need of Germany in particular and energy need of Europe in general. This is an offshore project and constructed under the Baltic Sea without disturbing towns, cities, roads, railways, canals, and landforms. It is constructed after getting approval from Environmental Impact Assessment, and only one compressor station is required to operate this pipeline. Natural gas produces low CO_2 and so the gas of Nord Stream is environment friendly. In the period of nuclear phase out, this will become the major source of energy to Germany.

Conclusion

In the twenty first century several international events and problems have come up and the reactions of Russia and Germany and their approach for the solution of these problems would gradually contribute for the security of the Europe as well as security of the world. They are trying for the peaceful solution of different problems in international sphere.

When analysing the approach of Russia and Germany towards eradication of terrorism, solution of Iran's nuclear issue, Iraq issue,

establishment of multipolar world, attempts to eradicate weapons of mass destruction, and reform of United Nations Security Council for its democratization, a picture emerged that both cooperates for the establishment of secure, nuclear weapon free world, and work for democratic UN and democratic world system.

While discussing the overall relations between Russia and Germany, the picture which comes to the mind is that the relation between the states is not permanent, but dynamic. This changes according to need of time and circumstances. The enemy feeling, which existed between Russia and Germany during the First and Second World War is eradicated now. Some uneasy feelings also emerged during the last phase of rule of President Yeltsin. From 2000 onwards their relations became systematic and regular and they took nearly similar positions and approaches towards solution of various international problems and tried for their solution in a peaceful and cooperative manner. Common problems are solved by common efforts. International problems are solved by the effort of international community. Peaceful solution of a problem is possible through deliberation, negotiation, and discussion, which is best option than violent or military ones.

Russia-Germany cooperation is important to find solution to various international issues which have emerged since 2000, such as Iraq war, Iran's nuclear issue, reform of United Nations Security Council, terrorism, and weapons of mass destruction (WMD). Russia and Germany have cooperated with each other for the solution of international problems peacefully. They have established stronger political, economic and energy relations in the contemporary world.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

GIRISH KARNAD'S HAYAVADANA: AN INSATIABLE YEARNING FOR PERFECTION

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Our wants, fears, pleasures and pains are involved in our contract with the things of the out side world.[1]

The play *Hayavadana* is one of the most balanced and subtle plays written by Girish Karnad. Through this play he raises fundamental questions like, existence versus social category, which of them dictate the lives of the people and determine their identity.

Karnad exposed modern man's futile quest for perfection from the traditional story *Hayavadana*, the characters in the play represent modern man's carving for perfection.

Hayavadana was originally written in Kannada and later translated into English by Karnad himself like his previous play *Tughlaq*. With reference to writing the play, Karnad says, "I must express my thanks to the Homi Bhabha Fellowships Council for the Fellowship which enabled me to write the play"[2]. The plot of *Hayavadana* is derived from *Kathasarit Sagara*, an ancient collection of stories in Sanskrit. Karnad has also drawn heavily on Thomas Mann's reworking of the tale in *The Transposed Heads.*

Originally Girish Karnad wanted to make a film when he read Thomas Mann's story. But his friend B.V. Karanth advised him to write play. Karnad points out,

> It was when I was focusing on the question of folk- forms and the use of masks and their relationships to theatre music, that my play Hayavadana suddenly began to take shape in my head.[3]

Girish Karnad's English translation of *Hayavadana* was first published by Rajinder Paul in his Journal *Enact. Hayavadana* was first staged in English by the madras players at the Museum Theatre, Madras on 7th December, 1972. It was presented with the Kamala Devi Award of Bharatiya Natak Sangh for the best play of 1971 and Sangeet Natak Academy Award for play writing in 1972 for his play *Hayavadana.*

The play begins with the Bhagavata's invocation to Lord Ganesh who is the destroyer of obstacles. Hayavadana the eponymous character is introduced dramatically. Hayavadana is a man with the head of a house. *Haya* means horse and *vadana* means face. When Bhagavata starts introducing the play Actor-1 comes on the stage shouting with fear. When Bhagavata asks him not to panic and tell him the reason for his screaming. Actor-1 says, he is obstructed from urinating on the main road by a horse. This reminds us of houyhnhnms[4], in Swift's *Gulliver's Travels,* who are endowed with more commonsense than human beings. Actor-1 says that it is a horse with a human body, but Bhagavata does not believe this. Then Hayavadana comes on to the stage and Bhagavata thinks that his horse head is only a mask and tries to pull it off assisted by Actor-1, and later they discover that it has been there from birth. Bhagavata says he has been born like that because, he might have had committed a sin in his previous birth.

Hayavadana says that his mother is a princess of Karanataka, who fell in love with a white stallion. She was married off to white stallion and she had lived with him for fifteen years. This stallion was in fact a celestial being, cursed by God Kubera to be born a horse for some act of misbehavior. After fifteen years of human love he got deliverance from the curse and become a celestial being. He asked the princess to accompany him to his heavenly abode, which she refused and wanted him to become a horse again. Then he cursed her to become a mare and left for his heavenly abode. The Princess become a mare

and ran away happily. Only Hayavadana, the child of their marriage was left behind. Thus Hayavadana was born with a horse head. He wanted to become a complete man and so he visited many temples.

So he accepts his fate calmly and takes active interest in the social life of the nation like politics, nationalism and socialism.

The main plot starts with Bhagavata's narration of the story of Devadatta, Padmini and Kapila. He starts the story about two friends in the city of Dharamapura. Devadatta is the only son of a revered Brahmin, named Vidyasagar, being comely in appearance and fair in color. He is a man with erudition and he humbled the greatest Pundits of the world with his poetry and wit. That is why he becomes the apple of every eye in Dharmapura. The other protagonist is Kapila, the only son of the ironsmith Lohita who is dark and plain in appearance but peerless in physical skills.

In the eyes of society Devadatta is a Brahmin, an embodiment of light, learning, Satvaguna and wisdom. On the other hand Kapila is a symbol of physical strength, an epitome of tamas and without light and direction. Interestingly, during the progress of the play, Kapila exhibits noble qualities like forgiveness and forbearance and Devadatta exhibits possessiveness and intolerance.

Devadatta, who gives preference to the intellectual pursuits and ignores physical strength, is praised by all in the society. As in the words of Steiner:

> This man decides in adolescence that the highest achievement accomplishable is the development of intellect. He rejects all physical pursuits in favor of learning. He reads studies, talks and head-trips around the clock and begins to feel that his body and his emotions are encumbrances in these intellectual pursuits.[5]

On the other hand Kapila is a great athlete, who depends of his physical strength and ignores intellectual pursuits.

Devadatta and Kapila again are two extremes oh society. Devadatta belongs to the higher order and Kapila belongs to the lower order. Apparently as both show traces and influences of the other. In a way it is also questions the complex organization of nature versus limited categories of society. Devadatta and Kapila are close and good friends. In a way they are complementary to each other, Shubhangi S. Raykar comments that,

> Devadatta and Kapila's friendship obviously evolves out of their fascination for the aspect which each one of them lacks. They are thus complementary to each other.[6]

One find day Devadatta falls in love with Padmini for the sixteenth time and Kapila observes Devadatta pining for Padmini and acts as his messenger, goes to Pavana veedhi and searches for Padmini's house. He finds it at last and approaches Padmini. Padmini teases Kapila with her words and witty conversation. Finally Kapila conveys the love of Devadatta for Padmini.

Bhagavata reports the marriage of Devadatta and Padmini and adds that all are like Rama, Sita and Lakshmana. Kapila often comes to the house of Devadatta for the sake of Padmini. He starts loving Padmini and she too begins to look amourously towards Kapila. Devadatta slowly comes to know of the situation, and is very unhappy about it. They plan a trip to Ujjain along with Kapila. Devadatta tries to get it cancelled because he does not approve of this trip. On the other hand Padmini is waiting for Kapila.

Kapila arrives at the Devadatta's house with a bullock cart for the trip to Ujjain. He comes to know that the trip is cancelled due to the ill-health of Padmini. He feels very dejected and is unable to restrain his obsession for Padmini.

At last Padmini says that her health is alright and her ache is cured by ginger paste and asks them to start on the journey. On their way to Ujjain they stop to rest in the forest. Padmini praises the smooth driving of Kapila even on the rough road and belittles the driving of Devadatta during the days of their marriage. She asks Kapila, regarding the glorious tree which is covered with flowers. Kapila says that it is called the fortunate Lady's flower symbolizing married women and forthwith, he climbs the tree to pluck the flower without even being requested by her.

Devadatta observes all these developments, feels dejected and unhappily comment that, in no way did he want to place any blame on her. It is his attractive physique, which he was himself ignorant and innocent of all these years. No woman could restrain herself from a person like Kapila. Even though Padmini was a married woman, she too had failed to resist herself from Kapila's attractive personality.

Kapila give those flowers to Padmini and described the flowers poetically, and Padmini appreciates him. Kapila says that nearby there is the river Bhargavi. The poet Vyasa had a hermitage on its banks and, there is a temple of Rudra also there and beyond that hill there is a temple of Kali. This reminds Devadatta of his promise which he had made to Rudra and Kali. Padmini and Kapila want to visit the temple of Rudra, but Devadatta say he wants to visit the temple of Kali first and he sends Kapila and Padmini to the temple of Rudra.

Later he reaches the Kali temple. Unable to bear the love between Padmini and Kapila, he wants to commit suicide, so he addresses Kali and dies. Devadatta addresses goddess Kali with titles like, Bhavani, Bhairavi, Kali, Durga, Mahamaya and Mother of all nature. Kali fulfilled his obsession by giving Padmini to him as his wife. He admits that he had forgotten his promise to kali and seeks her forgiveness and eventually he decapitates himself.

Kapila and Padmini return from the temple of Rudra, and they finds that Devadatta is missing. Kapila goes in search of Devadatta and reaches the Kali temple, where he is confounded to find the dead body of Devadatta. Kapila too want to commit suicide. Kapila says that he cannot breathe without Devadatta, referring to him as his brother, father and friend. Kapila expresses anger at being spurned by Devadatta in this world and feels that Devadatta should accept him as a brother at least in his coming birth since he would follow his path forever. Finally he cuts his head and dies.

Padmini, after some time, goes in search of Kapila and reaches the Kali temple. There she finds the dead bodies of both Devadatta and Kapila and with a terrified scream.

Goddess Kali is moved by Padmini's honesty and saves Padmini, when she is trying to kill herself. Padmini asks Kali as to, why she has had not saved Devadatta and Kapila from suicide. Goddess kali reveals the true disposition of Devadatta and Kapila that Devadatta had once promised his head to Rudra and his arms to Kali. Kapila and Padmini had gone to the Rudra temple that is the reason why Devadatta had come to the Kali temple and had offered his head at Kali's feet. He said that he was dying for friendship and failed to refer to his earlier vow to mother Kali. If Kapila had not opted for suicide, then he would be accused of killing Davadatta in order to possess Padmini.

The Goddess Kali asks Padmini to put back their heads to their body and press them with the sword. Padmini in her excitement, confuses the heads, Devadatta's head goes to Kapila and vice versa.

Padmini looks happily when Kapila and Devadatta come back to life with transposed heads; they also feel for their new bodies.

Here the real problem brews, who is the husband of Padmini. Norman Gross, a theatre critic commented when Padmini had confused

the heads with the wrong bodies. The play then poses the dilemma: which of the two is the real Husband[7].

Kapila and Devadatta squabble over the issue. Kapila claims that Padmini belongs to him. They argue over this enigma. The denouement divulges that they kill each other for the sake of Padmini. Finally Padmini commits sati on the pyre of Devadatta and Kapila. The actions of Padmini denote her inner urge for perfection, which is impossible in nature. By nature a human being is imperfect, but if any one tries to be breach the limitations imposed by nature man will be doomed to fail, as the play unfolds, we observe this hypothesis.

Padmini, who attempts to transcend the limits clamped by nature, offers a clue to the enigma of human disposition. In a way, her personality implies that nature creates all these forms and any tampering with it, leads to alienation, tragedy and suffering. V.B. Vinod in his paper on *Hayavadana* comments that,

Hayavadana as a theme is a play of ideas. It is absurd in a Beckettian sense and fractured in a Freudian sense. [8]

The play *Hayavadana* is concerned with the identity crises of Padmini in the main plot and of *Hayavadana* in the sub-plot, while *Hayavadana* attains completeness due to being an animal. It is not possible for Padmini, she being a human being, since the completeness or fulfillment is possible either at the animal level or at the divine level. Though Lord Ganesha in the beginning has been described as an incomplete being, he is a fusion of the divine, animal and man. Through Devadatta and Kapila both are good friends, Devadatta's is a cultural hegemony, that is why he used to sit on a chair, and Kapila would squat on the floor, since they each belonged to different strata of the higher and lower community of society.

Girish Karnad in this play questions human identity which is unfolded in the fulfillment of human personality. He raises profound

questions like society versus individual and human nature versus social controls. Characters are symbolic in nature and bring into play the artificial characterization of body versus mind and how it is fragmented by society as a kind of division of labour. This classification develops problems, as there cannot be a body without a mind and vice versa.

In an ironical reversal Padmini comes back to Kapila who is residing in the forest. Here it is forest versus society, forest stands for instinct and society for reason.

The story of *Hayavadana* is a subtle comment on the fate of the characters, while Haya is happy as a horse, the three human beings Devadatta, Padmini and Kapila represent the three gunas – *Satva, Rajas and Tamas* the basic characteristic of the Indian way of life. These three being desiring an extraordinary life, come to a tragic end.

The existential problem in human beings is aptly depicted by the choice, they make and the consequences they face: the problem of choice is given to human nature but it carries the moral responsibility of bearing the consequences of choice. The choice is against the conditions imposed by nature which leads to distortion and the final tragedy as shown in the lives of Kapila and Devadatta.

The transformation of *Hayavadana* into a horse is an ironical reversal as *Hayavadana* had wished to be complete, to be one piece, is fulfilled by his becoming a horse, whereas, he wished to become a man. One can understand that if he happened to be a human, he would still be incomplete like Kapila or Devadatta; but by becoming a horse and losing human traits it made him an integrated being, which shows the illusion of striving for perfection. Girish Karnad commented that *Hayavadana* depicts, "a world of inarticulate and non- human beings who create a typology of functional character"[9].

A close examination of Karnad's presentation of supernatural beings especially that of Kali in *Hayavadana* points to the playwright's

aesthetic leanings. He stresses the fact that there are no smooth and practical solutions to human problems. Mother Kali grants a boon to human beings, when they pray sincerely, but ultimately the problem remains unsolved as revealed in the case of Padmini and also that of *Hayavadana.* They (supernatural elements) cannot help human being unless the latter help themselves by accepting the limitations imposed by Nature.

Padmini is the key as well as the source of conflict in the play and the play in a way closes with her committed Sati. Was it for Devadatta or Kapila or because her life had reached the point of absurdity without any hope in life. Another interesting thing is that she does not have the sacrificing trait of motherhood, but goes satiating her own urge for life. She desires to possess the person who is strong in flesh and sprit, which is humanly impossible.

The urge to be in higher status is doomed to failure, while at the lower form it is easily achieved. The writer implies that any form of human or animal must have internal harmony and compatibility rather than fragmentation. It is almost a limitation of human nature that the exception of development of one aspect is at the cost of the other. Any person who requires balance cannot but be mediocre, which was realized by Padmini when her desire for the fabulous mind of Devadatta and fabulous body of Kapila ends in failure. Should a woman hunt after?

> Many for many virtues excellent
> None but for some
> And yet all difference? [10]

Karnad says that not being happy with oneself is a mark of human existence and if unhappiness is the unalterable law of life, it is good for the human being and he suggests that one should accept an unhappy life positively instead of creating greater sorrow.

Karnad has plainly suggested that reconciliation with one's self and one's environment is the best course of action for the incomplete and insatiable human being. Fundamentally a human being is incomplete and imperfect when he searches and strives to attain the unattainable ideal of completeness or perfection which usually end either in tragedy or in comedy. The urge for completion is a human interest but incompleteness is the human condition.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

FROM THE DARK ROOM TO LIBERTY: A COMPARATIVE STUDY OF R.K. NARAYAN'S "THE DARK ROOM" NOVEL AND VOLGA'S TELUGU NOVEL "SWETCHA"

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Feminist writings in India:

Feminism mainly started in Europe, as a campaign for the rights of women, including social, political, and economic equality with men. Between 17th-19th centuries, these campaigners fought for women's right to own property, to have access to higher education, and to vote. Latter, the campaign spread to the other parts of the world. In 20th century, the campaign's emphasis shifted to the goals of equal social, economic and employment opportunities for women.

In India, some writers in the pre-independence era tried to touch the problems of women in their works of literature. But in these works, feminism was handled under restricted circumstances only. With the advancement of time, however, feminism has been accepted in India, setting aside the patriarchal pre-domination to certain extent. The feminist writers include not only female writers, but also male writers who are sympathizers of women.

R.K. Narayan - "The Dark Room":

R.K. Narayan (1907-2001) is well known for his fiction, especially his novels, which represent the microcosmic India of his

times. His novels serve as socio-historical chronicles of both Pre- and Post- Independent India. His stories are mainly set in the fictional town of Malgudi. His characters are realistic portrayals from life. It is interesting to see his books from the feministic perspective as no one seriously agrees with this statement and Narayan himself did never claim so. Particularly one novel of Narayan "The Dark Room" shows the writer on the side of women.

"The Dark Room" is the story of Savitri, a middle class housewife, whose husband is an employee in an insurance company. Her husband, Ramani is a dominant, excessively critical and self-centered person. They have three children. The first scene sees him criticising everything that his wife serves him on the table. He curses the cook and freely taunts his wife. At work, he enters into an affair with a woman called Shanta Bai.

Unable to bear the humiliation and neglect, Savitri confronts her husband who dismisses her objections. Desolate at being taken so entirely for granted she raises her voice and then is determined to leave the house. She wants to take the kids along, but Ramani stops her harshly. "Don't touch them or talk to them. Go yourself, if you want. They are my children," he shouts.

Depressed in heart, Savitri wanders alone in the street and even plunges herself into the river. But overcome by fear, she shouts out for help. A blacksmith by day and burglar by night saves her. He brings along his wife, Ponni who tries to befriend Savitri. She offers her shelter and food. But Savitri refuses to eat anything not earned by her. She is disgusted at being at the mercy of the men in her life – father, brother, husband. She doesn't want to take any one's charity. She starts working at a temple as a cleaner. But in a day she realises the impracticality of her choice and returns home. Ramani is relieved to find her back, less for her sake, and more to keep up social pretenses.

Narayan quite clearly feels a deep anguish at the wife being treated shabbily and leaves no opportunity to portray the ugliness and selfishness of the husband's character. Narayan's sympathies are with Savitri though he resists from making a grand feminist statement. She leaves the house for valid reasons, but reconciles and comes back. Narayan was a realist and understood the limitations of people in their context and worlds. Narayan is effective in his portrayal of Ramani, a vain, sarcastic, self-serving man. Also, the part where Savitri leaves and encounters a different world is poignant.

Olga's Telugu Novel – Swetcha:

The Telugu novel 'Swetcha' was written by P. Lalitha Kumari, who is well-known by her pen name 'Olga', and published in 1987. This novel appears like a manifesto of Feminist writers in Andhra Pradesh. Unlike R.K. Narayan, Olga wrote this novel with a specific purpose of propagating the philosophy of feminism through literature.

The protagonist in the novel 'Aruna' writes her final M.A. exams. Because of her middle class family, she grows under control, right from her childhood. After she attains age, her father and brother start setting limitations to her freedom. For this, to some extent, her maternal aunt Kanakamma is also responsible. She lost her husband at very young age and came to her younger brother's house with some wealth. As she could not enjoy her marital life properly she always expresses her jealous and sadistic nature by wielding command over her sister-in-law and niece Aruna. Because of the love for her wealth, nobody dares talking against her. Particularly, she tries to suppress Aruna always. She thinks of getting Aruna married at the age of 15 years as was done in Aruna's elder sister's case. She always makes fuss over the issue of Aruna's marriage. Aruna opposes this suppression and limitations right from her childhood in her heart.

In such a family, if Aruna could pursue her studies up to Post Graduation, it was only due to the inability of her father in finding money for her marriage. Otherwise, he would have married her off long back and reduced his burden.

Aruna thinks of marrying her classmate Prakasam whom she loves and wants to join in a job for financial freedom. Immediately after getting a job, she marries Prakasam. Though Aruna is not willing to beget children immediately, Prakasam makes her oblige with his adamant nature and male chauvinism. Right from the beginning, Prakasam did not like Aruna doing job, and taking financial decisions herself. Though Aruna balances both the family and office affairs effectively, Prakasam always troubles her with his words. His anger over her increases when he finds Aruna participating in strike in her college for full salary, working for a progressive magazine 'Abhyudaya', moving among people for the magazine, interviewing the prostitute women at Mehendi area, etc. His opinion is that his wife should limit herself for the household responsibilities only. He asks her not to involve in the problems of the society. Finally he threatens her by asking her to choose between family and social service.

Aruna slowly understands that all the women around her also suffer from similar problems. She could not bear the fact that her colleague Kesava Rao, who appears like a progressive person and talks about social reforms, also confines his wife to the kitchen at home. Once she understands the nature of bondages, she also understands the form of 'liberty'. Finally she decides to come out of the bondages of the family. Leaving her family, she thinks of helping the society and fellow needy women to the extent possible.

Comparison between the two Novels: Though they belong to different times and genres, "The Dark Room" and "Swetcha" novels reflect some common problems faced by women. They are:

1. Family and Gender Roles:

The main focus of the two writers is the slow erosion of a woman's individual identity within a family. Both of them attacked on the myth of the 'ideal' family by showing how the family is a space where gender roles are often decided by the men of the house. In Narayan's novel, the protagonist is symbolically named 'Savitri' after one of the most revered models of Indian womanhood. She does all that is expected of her, and serves the family with utmost diligence. Despite this, she has no role to play in decision-making. The cook is unhappy but she cannot feed him. The child is ill but she cannot tell him to stay at home. Similar situation is faced by Aruna in Swetcha novel. She does not have a right on issues like when she wants to be a mother, etc. In these two novels, the criticism of the family system focuses on the following:

- The woman does not choose her roles – the roles are given to her, as mother, wife, etc.
- The absence of any role for women in decision-making.
- The complete erasure of her identity and personality due to the pressure of the roles assigned to her.

In the scene where Savitri leaves the house she says:

"…I don't possess anything in this world. What possession can a woman call her own except her body? Everything else that she has is her father's her husband's or her son's…."

What Savitri is saying is that her entire identity comes from somebody else- her husband, father or son. She owns nothing, even her identity is not her own. Interestingly, though Aruna in Swetcha novel is a Post Graduate and an employee, she too faces the similar problem of identity as a daughter before marriage and as a wife after marriage.

'The Dark Room' and 'Swetcha' novels show how gender roles are instilled in the children from a very early age. The father in Narayan's novel seeks to allot behavior, recreation and attitude to the children so that they fit the gender roles for adult life. Thus boys will not play with dolls becomes a kind of rule. Similarly, in Swetcha novel, Aruna experiences a different treatment compared to her brother in making her choices related to studies, etc. and faces criticism from her father and aunt. This is a form of 'socialization' where boys and girls are fitted, trained to fill certain gendered roles, even if they are unwilling to do so.

Society's pre-determined roles for girls and boys are played out within the family. The social roles for gender are first developed as forms of behaviour within the family. The family, in other words, reproduces the gender roles.

These two novels make a strong criticism of this condition where:

- The family is seen as a fundamental unit for individual identity;
- The family functions in such a way that the man can choose his identity but the woman is not given this choice;
- The family indoctrinates the children in gender roles so that they fit into such roles for the society;

2. Individualism and the woman:

In both the novels 'The Dark Room' and 'Swetcha' the issue of woman's individualism is dealt with strongly.

In a fiery speech Savitri, tells Ramani:

> "I am a human being... You men will never grant us that. For you we are playthings when you feel like hugging and slaves at other times."

In the novel Swetcha also, Aruna tells her friend about her husband Prakasam that '…he loves her if she behaves according to his wishes, otherwise, he becomes serious…". In another situation, she doubts whether her husband loves her as an individual or just because she is beautiful and intelligent. Thus, these situations are comments on individualism – for human to respect another as a human. They are pointing two things:

- The reduction of women to commodities.
- The absence of an individual identity except as somebody's property, slave or thing.

Savitri comes to enjoy her identity when she starts working in the temple on her own and earns her food. She feels a great thrill when she lights the oven and cooks a little rice for herself. She says: "This is my own rice, my very own, and I am not obliged to anyone for this. This is nobody's charity to me."

There is an interesting play of space that Narayan engages in, which reflects his theme of individualism. Whenever Savitri is upset and humiliated she retires to the 'dark room' in her house. Interestingly when she goes to live in the temple, she again gets a 'dark room'. The 'dark room' is therefore the only space where Savitri is truly conscious of herself. In her house it becomes the space where she is truly her individual self. It shuts her off from her tyrannical husband, her dependent family and her pre-determined gender roles.

Aruna in Swetcha novel tries to assert her individuality right from the beginning. Interestingly, her individuality is not just for her sake, but for the sake of society, because she wants to work for the welfare of poor girls and unfortunate prostitutes of Mehendi area.

In addition to the above mentioned common points, 'Swetcha' novel focuses on several problems that today's woman face, the way their

lives are being reined by the men around her, be it in her family or her work space.

- It deals with the issues like:
    - restricting the freedom of girl child;
    - husband dictating terms to wife and opposing her;
    - woman lacking freedom to decide when to have children;
    - rape in married life; and
    - laws that decide that children stay with their father when husband and wife are divorced;
- It also supports the idea of freedom to the adults, to have live-in relationship without entering matrimony, by creating the character of 'Uma', Aruna's friend.
- In Olga's own words, "This novel questions the system which always tries to hold back women in families, politics or movements and suggests that matters which commonly occur in middle class families need to be recognized as social issues and treated as such."

The major difference between the two protagonists 'Savitri' and 'Aruna' is that while Savitri leaves the house, but returns home after few days, after experiencing brief span of individuality. Aruna, right from the beginning fights for her individuality and leaves the house, almost with a clear determination of not returning to the marital life, as she wishes to serve the fellow women in the society. Aruna's character keeps on evolving throughout the story and attains her desired goal, her individuality, and her freedom.

In the words of Olga:

"This liberty is not something given by others. Not achieved from anybody. Liberty is recognizing the important things necessary for our

needs and identity. It is liberty for us from ourselves. It is liberty from the thoughts, opinions and customs that have been habituated for us right from our birth. It is the liberty from the beliefs that have been ingrained in us."

Conclusion:

As seen from the two novels, it is understood that the earlier Indian writers reflected the idea of women's rights and liberty indirectly, without branding themselves as feminist writers. Whereas after 70's women writers, who are activists themselves involved in creating feminist literature to popularize the philosophy of feminism and bring awareness about the equal rights for women – socially, politically and economically. They further focused on the individualism and sexuality issues of women in their works. Literature is said to be a vehicle for social transformation. The feminist literature also can be said to have achieved its target of bringing change in the society to considerable extent.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

MORPHOLOGICAL GROWTH AND CENTRAL BUSINESS DISTRICT OF HINDUPUR MUNICIPALITY, ANANTHAPURAMU DISTRICT, ANDHRA PRADESH, INDIA, USING REMOTE SENSING AND GIS TECHNIQUES

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INTRODUCTION

Urban morphology refers to physical arrangement of structure of a town, its pattern of streets, building blocks, individual buildings, their different functions, densities and layouts (Knowles and Wareing, 1976). The spacious structure of the city is the product of competitive interaction between its people, market facilities, transportation, communication agencies, and type of functions. It tends to follow definite pattern modified by geographic and local cultural conditions. Demographic growth stimulates structural changes through multiplier effects and attracts immigrants. The increasing rapid rate of growth of urban population and uneven nature of its growth have played an important role in altering the nature, structure, morphology and pattern of urban centers. Singh (1965) has described city structure consist of land activities and infrastructure in which the city exerts influence on socio-economic structure and helps formation of land use patterns and he focused on functional grounds of the city on the basis of its morphology. He carried out study on Bangalore city. During the pre-industrial society there was structural unconformity and slowly in the post industrial society there is a slow transportation for development of urban structure. According to Prakash Rao (1983) the

structure, pattern of the urban sprawl and population density is influencing the morphology of an urban area. The internal structure of the city is complex and it is essential to study the basic dimensions of variations with in a city.

Ujgir Singh (1971) explained the morphology of towns based on layout, open spaces and types of houses Prabhu (1979) evaluated the inter structure of different urban centers. Kulkarni (1979) made a study pertaining to pattern and density of houses in Central Business District areas of Nasik city. Anirudha Sharma (1985) discussed on impact of urban morphology and growth patterns of selected Indian cities. Abrol (1986) studied the urban morphology of Katra town of Jammu & Kasmir. Kammar (1995) has studied the morphology of industrial town Dandli. The spacio and temporal growth of cities is possible through Remote Sensing and Geographic information system techniques (Sudhira *et al*., 2003). Lakshmanan (2009) stated that the Science and Technology of Remote sensing play a crucial role in studying & monitoring morphological changes in the urban areas. Illangovan (2009) described that Remote sensing techniques has a wider application in urban studies particularly in land use and land cover classifications Anji Reddy (2006) described that the GIS is a decision support computer based system which has wider application in urban studies. Ramchandra *et al*., (2007) has described that land use and land cover studies could be carried out through image processing in which satellite imagery is subjected to image restoration, image enhancement and image transformation. Pathan *et al.,* (1989) has mapped the urban land use of Bombay metropolitan region using Remote sensing data. Pathan *et al*., (1991a) has studied the urban land use of Calcutta metropolitan development authority area using Remote sensing techniques. Similarly Pathan *et al*., (1991b) has studied the urban land use of Ahmadabad urban development authority area using Remote sensing data. The role of remote sensing and GIS in urban land

use planning of Ahmadabad city and its surrounding environs has been described by Pathan (2002). Ramachandra and Jagadish (2007) have concluded that Remote Sensing and GIS techniques are highly useful on urban sprawl studies. Nanda Tina (2005) has studied the urban sprawl and occupational change of Raipur city. Madhavilatha *et al*., (2001) have studied the urban sprawl of Hyderabad city.

Awol Akmal Yusif (2010) studied the urban sprawl and urban growth of Addis Ababa city of Ethiopia through Remote sensing and GIS data. Mallikarjun S.Kurani (2007) has made an attempt to bring out the urban growth and its impact on environment of Belgum city.

STUDY AREA

Hindupur Municipality is located at 13^0 15^0 N latitude and 77^0 30' E longitude at an attitude of about 624 meters above mean sea level on the broad guage section of Southern Railway connecting, Bangalore and Hyderabad cities. The Municipality spreads an area of about 3,816 hectares with a population of about 1, 51, 677 in 2011. Out of this 76,370 are males, 75,307 are females. The people in Hindupur Municipality comprise Hindus of about 67% Muslims of about 29%, Christians and others of about 4%. Out of the total population schedule caste and schedule tribe people constitute 11,923 and 1,089 respectively. The other category population is about 1,12,062. There are about 30 wards in the Hindupur Municipality. There are about 53 slums with a population of about 72,025. People in slums constituting 47.5% of the total population of the Municipality as per the 2011 census.

OBJECTIVES

The main objectives of the study are

1. To study the morphological growth of the Hindupur Municipality from 1921 to 2010

2. To delineate the Central Business District of the Hindupur Municipality and
3. To describe the structure of Central Business District of the Hindupur Municipality

METHODOLOGY

The morphological growth of the Hindupur Municipality has been brought from the study of historical records and decadal growth in terms of morphology of the Hindupur Municipality. The relative increase is brought out in area from 1921 to 2010 through the study of remote sensing data. The central business district has been delineated by carrying out primary data collection and field study of the core zone of the Hindupur Municipality. The structure of the CBD is also mapped through primary data collection and field survey in the core zone of the Hindupur Municipality.

RESULTS AND DISCUSSION

HISTORICAL GROWTH OF HINDUPUR MUNICIPALITY

The town was formed part of Vijaya Nagara empire during 14th century. It was under the influence of Kuthubshahis in 1589 A.D, Moghals in 1687 A.D and Nawabs of Kadapa. The town was occupied by Palegar of Bellary in 1753 A.D. The place was under the position of Hyder Ali in 1775 A.D. and was under the control of Tippu Sultan in 1792 A.D. The British occupied the Hindupur territories in 1800 A.D. and was in the jurisdiction of Ananthapuramu district. Sir Thomas Manro was selected the First Collector of the Ananthapuramu District. To the advent of country's independence on 15th August, 1947 the National Government took over the India's administration from British. In 1953 the states were reconstituted on linguistic base and Hindupur became the part of Ananthapuramu district of Andhra Pradesh in November, 1956 The Hindupur received its name from a

Maratha chieftain Morari Rao. It is widely believed by scholars and historians that the name itself was taken from that the Chieftains's father Hindoji Rao. Hindupur town was called after his name. The town has an average literacy rate of 62%. Telugu, Kanada are widely spoken. This town is located at about ten kilometers north of Karnataka state. Hindupur is a major health center and attracts patient from Gorantla, Penukonda, Pavagada and Madhugiri, Hindupur is known for famous goods like silk sarees, Jaggery, Tamarind, red dry chillies etc., Majority of the people in Hindupur are engaged in trading and selling activity of silk, jaggery, tamarind and red dry chilies. Huge trucks, iron works and automotive body construction industries exists in Hindupur. Hindupur is a good trade and commerce center. It is known for its jewellery business also and many gold merchants can be found along the main bazaar of the Hindupur town. The growth of town during the Vijaya Nagara period, Kuthubshahis, Moghals, Nawabs, Nizams, Hydar Ali, Tippu Sultan and British period was not recorded. However in 1920 the Hindupur Municipality was confined to a contiguous development in the old town area with an area of about 60 hectares. In 1901 the total area of Hindupur Municipality was 12 hectares, out of which 6 hectares was residential, 1 hectare was under commercial, 1 hectare was under public and semi public offices, 2 hectares was under Transport and Communications, 1 hectare was under water body and 1 hectare was under agriculture and vacant land.

In 1911 Hindupur grow into an area of about 27 hectares. Out of this area 15 hectares was under residential, 1 hectare commercial, 2 hectares was under public & semi public, 3 hectare was under transport and communication, 1 hectare was under water body, 5 hectares was under agriculture and vacant land. In 1920 Hindupur is constituted as grade – III municipality and the election to the first council was held in 1920. The area of Hindupur Municipality was 60 hectares in 1921. Out of the total area 35 hectares was under residential area, 2 hectares was

under commercial, 1 hectare each was under industries, recreational and water bodies, 5 hectares was under public and semi public offices, 10 hectares was under transport and communications and 5 hectares was under Agricultural and vacant land. In 1931 the area of Hindupur Municipality was 112 hectares. The growth was almost linear on either side of the major state highway. The total area under residential was 70 hectares in 1931, commercial 5 hectares, Industrial 3 hectares, recreational 3 hectares, public and semi public 3 hectares, Transport and Communications 15 hectares, water bodies 2 hectares, Agriculture and vacant land 4 hectares. During 1941 the Hindupur Municipality was with an area of about 123 hectares. There is an increase in all categories of land use in Hindupur Municipality from 1931 to 1941. During 1951 Hindupur Municipality was an area of about 178 hectares and Hindupur was upgraded to grade – II municipality in 1952. The Eastern & Western villages were added to Hindupur Municipality in 1951. Over all there was an increase in the land use categories from 1941 to 1951. During 1956 the new office building for Hindupur Municipality foundation was laid. In 1958 and 1959 the protected water supply was first supplied to Hindupur Municipality. In 1961 the Hindupur Municipality was expanded to 364 hectares and by 1971 the municipality was expanded to 834 hectares with residential area of about 254 hectares, commercial of about 25 hectares, 10 hectares of about Industrial area, 10 hectares of about recreational area, 30 hectares of public and semi public offices, 80 hectares of transport and communications, 50 hectares of water bodies, 375 hectares of Agricultural and vacant land. There was no change in area from 1971 to 81. It was remained as 834 hectares. The Hindupur has been upgraded as Grade-I municipality in 1970. It was upgraded as special grade municipality by 1989 with the merger of 6 panchayats like Mothukupalli, Sadlapalli, Kollakunta, Melapuram, Muddireddipalli and Singireddipalli. Hindupur was expanded to 3,816 hectares in 1989. The merger of 6 panchayat has made the major tanks in northeast,

southwest direction to be part of Hindupur Municipality. The total area of water bodies was expanded to 320 hectares. The total residential area in 1991 was 534 hectares. There was no change in the municipal limits from 1991 to 2010. It remained to be 3,816 hectares. The change is found only in expansion of residential area from 534 hectare in 1991 to 1,195 hectares in 2010. Similarly the growth was found in commercial, industrial, recreational, public and semi public and transport and communications. The water bodies remained as 320 hectares during 1991 and 2010. However the agriculture and vacant land which was 2,652 hectares has reduced to 1,751 hectares due to expansion of residential, commercial, industrial, recreational, public and semi public and transport and communications areas. About 5 stages in the morphological growth of Hindupur Municipality were noticed. In stage 1 it was 27 hectares and in stage 2 it was 112 hectares. In stage 3 the Hindupur municipality was 178 hectares. In stage 4, 1981 the Hindupur Municipality was 834 hectares, and in stage 5, 1991 it was 3816 hectares. Morphologically there was a growth of 12 hectares in 1901 to 3816 hectares in 1991. The growth in Hindupur Municipality from 1901 to 1991 was about 318 times. In other words the Hindupur Municipality has aerially expanded from 12 hectares to 3816 hectares. The urban sprawal of Hindupur Municipality is towards north – south direction in stage 1,2 and 3 (Fig 1). During the 1st stage the growth was concentrated to ward numbers 6,7,8,10,11,15 and 16 in the central zone. In the 2nd stage the expansion of the town was towards southern and western side. The growth was expanded to ward numbers 12,13,14 part of 15 and 16. In the 3rd stage the growth of Hindupur Municipality was towards north of ward number 6 and 16. The growth was found in 1, 2, 3 and part of 4 and 17. During the 4th stage the growth of Hindupur Municipality was expanded towards eastern and western side of the core wards. It is expanded to ward number 4, part of ward numbers 5, 21, 23 and 24. In the 5th stage the 6 panchayats located in southern and northern side of the Hindupur Municipality was included.

The density of residential area was density concentrated in ward numbers 1,2,3,6,7,8, 9,10,11 and 20.Later the growth has taken place towards eastern side consisting of D.B.Colony, Sreekanthapuram, Prasantha Ramaiah Colony, Laxmipuram, Naneppa Nagar, Rahamathpur and Model Colony.

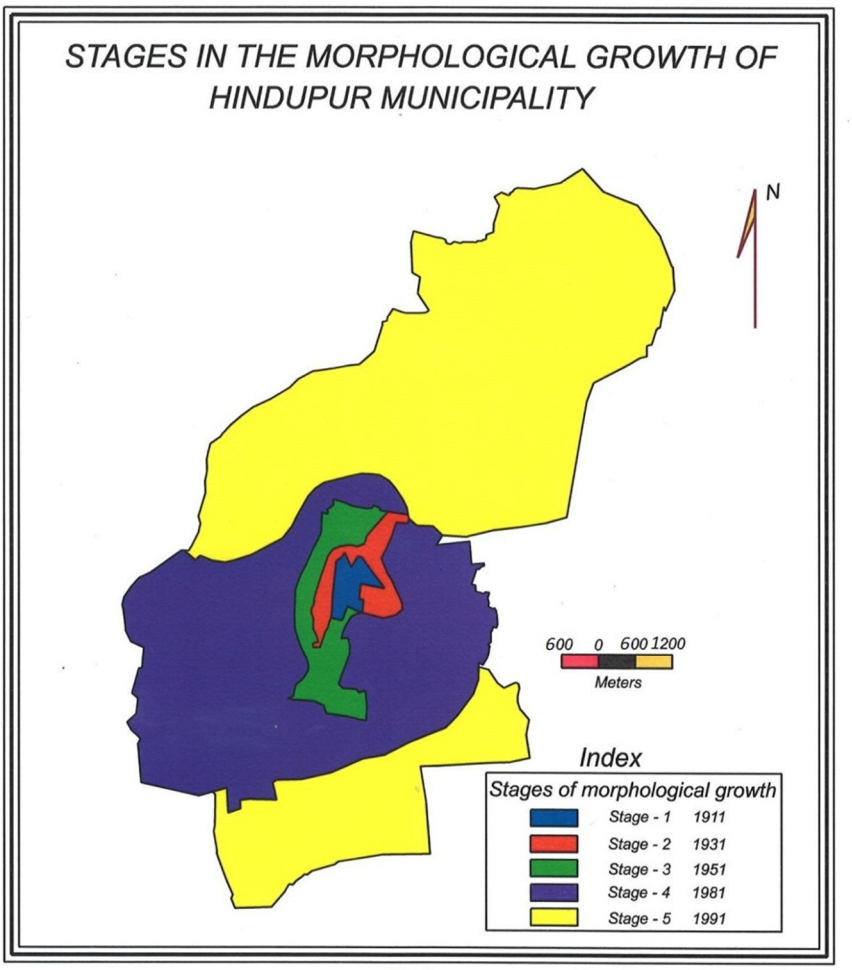

Fig 1

During the same period the R.T.C. Colony, Shanti Nagar, Thyagaraja Nagar, Balaji Nagar, Satyasai Nagar, Gandhi Nagar and Chowdeswari Colony was developed. The recent growths are Aravind Nagar, Shivabalayogi Nagar, Subhash Nagar, Lakshminagar, Prasanthi Nagar, Housing Board Colony, Teachers colony and N.T.R. Colony. The vacant and Agricultural land of about 1751 hectares covering 45.88% of the total municipal area is found in the western side, south eastern side, Northern side and North western side. The growth is concentrated along arterial roads leading to Ananthapuramu, Bangalore, Parigi and Lepakshi roads.

CENTRAL BUSINESS DISTRICT AREA

Central Business District area is the core center of the town/city where commercial activity is intensive with high concentration wholesale, retail and service activities. It is the heart of the city. The land values and rental values are very high. The Central Business District area is the focus of maximum industrial and automobile traffic. Here one finds the greater concentration of offices and wholesale and retail stores. According to Harris and Ullman (1985) the Central Business District in the focus of commercial, social and civic life with departmental stores, smart shops, office buildings, clubs, banks, hotels, theatres, museum and organization head quarters. The first principle is the population per unit area, the 2nd principle is the land use per unit area and the 3rd principle is the total building height index. They developed Central Business index which is a combination of Central Business high index and Central Business intensity index. They were able to delimit the Central Business District's of 9 American cities. In the present study the delimitation of Central Business area of Hindupur Municipality is based on general land use, population distribution, land values, rental values and Central Business intensity index. For calculating Central Business index the municipal area is divided into blocks. For this purpose the major roads passing through

the Central Business area are taken as boundaries to the blocks. The total area under Central Business District is calculated and its proportion to the total area to the relevant block is obtained and plotted against the block. If the block with more than 50% of the commercial, business use it is considered to be under Central Business use. The delimiting boundary drawn enclosing all blocks under Central Business use is considered to be Central Business District area of the Hindupur Municipality. The total area of under Central Business use in estimated to be 36 hectares (Fig. 2) which accounts to be 0.94% of the total area of the Hindupur Municipality. Central Business District is linear in shape. The Central Business District area is concentrated along main bazaar, old bus stand, new bus stand road, Bangalore Road, Lepakshi Road and Parigi road.

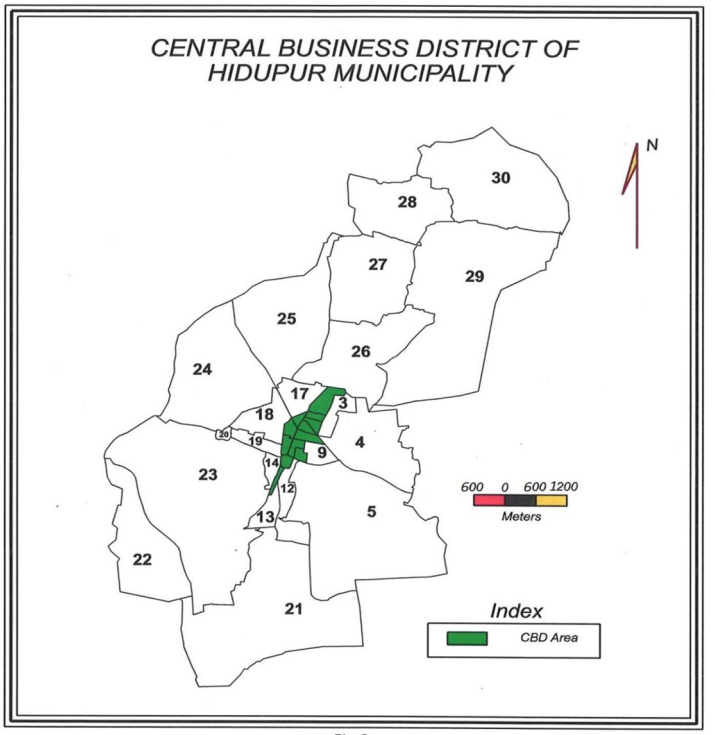

Fig 2

The area covers parts of ward Nos.1,2,3,6,7,8, 9, 10,11,15 and 16. Unlike in developed countries where central commercial activities are found with great intensity of severe land use, offices, retail stores, commercial activities, all buildings, high land values and rental values. In India the Central Business area is attached with commercial and residential activities. On either side of the major roads it is found that the front part of the main houses is used for commercial activity and the second half of the building is used for residential purposes. As we see in the metropolitan areas there are no separate malls in the Central Business area. The structure of the Central Business area is farmed of clothe shops, Foot wear shops, Medical stores, cycle shops, stationary shops, bakery shops, provisional shops, fruit shops clock shops, photo studio, banks theatres, furniture shops, utensil shops, cool drink shops, electrical shops, jewellery shops, printing press, petrol bunks, spectical shops vegetable market and motton and fish market. The lodges are found along the new R.T.C.road and Lepakshi road. The main bazaar starting from Gandhi chowk to chinna market area is the main commercial activity with high intensity and combination of the above said shops. The number of jewellery shops is high in the main bazaar. Only one shopping complex is found in the Nanjundeswara building of the main bazaar. The vegetable and fruit market is located in this main bazaar. The concentration of automobile shops is around Balaji circle which is located on the Lepakshi road. There are about 5 hectares in and around the Central Business District area. There are about 5 major banks in the Central Business District area. The rental values vary from Rs.10,000/- to 50,000/- depending upon the area of the shops. The commercial land values of the Central Business District area varies from 7 lakhs to 15 lakhs per cent. Due to concentration of shopping complexes along the main bazaar there is an increase in the problem of parking place for 2 wheelers and 4 wheelers. The vegetable market located on the main bazaar accelerated the parking problem. The structure of Central Business area is changing in shape and for

depending on the commercial demand. Many of the old buildings are destroy for construction of new shopping complex. Unfortunately the roads are very narrow in the Central Business District area of the Hindupur Municipality. Morphologically the roads have to be widened and parking facilities have to be provided in the Central Business District area. Field studies reveal that there are about 2,500 rented shops and houses in the Central Business District area. Out of this 625 are own shops and 1,875 are rented shops. The retail shops and services are concentrated along the main roads and the whole sale shops are concentrated near vegetable market and Nanjundeswara Building. The increasing land values and rental values is giving scope to convert the residential building to commercial units slowly.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

ENHANCED SECURITY PROVIDED TO BANK LOCKER SYSTEM

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Introduction:

Customers keep their valuable items and money in bank locker, It is very important for every bank that it should provide high security to Locker system .In this paper by using RFID Face Recognition we will provide more security than other systems. In this busy, competitive world security is of primary concern and human cannot find ways to provide security to his confidential properties manually.

Figure 1: Bank Locker

How does it work?

Just as you trust a bank with your money in the savings accounts or fixed deposits, safe deposit lockers offer the best option to safeguard your valuables, including jewellery, cash and important documents. Lockers must be allocated by Banks on a first come, first serve basis. If none are available, the bank branch needs to maintain a waiting list and provide the applicant with a waitlist number. It must also inform the customer when the locker is available.

What is a Bank Locker?

Banks offer locker facility to the customers for keeping their valuables in a Locker Cabinet. Banks are having number of lockers of various sizes.

- Every locker has two key holes, one for the lessee's key and another Master Key used by the Bank for the whole cabinet. Lessee's key is given to the locker holder where as Master Key is there with bank. The function of the master key is just enabling the lessee key to be functioning. The locker can only be opened if both the Banker (lesser) and the Customer (lessee) are present. After enabling the lessee's key the Banker moves outside the strong room and the customer under covered privacy can operate, remove or keep the valuables. At a time only one customer can be present in the strong room for privacy purpose. Once the customer locks the locker and wants to reopen it he/she will have to call the bank officer for enabling act because locker is only be operated when both keys are present.
- Banks are under obligation to provide cleanliness in the strong room with a facility of enough lighting and stool.
- Nowadays, almost all the locker cabinets have third key hole and it provides facility to lessee for another lock. Previously the cabinets

had provisions to cover the two key holes by a lid on which lessee can put manual optional lock. But there are some practical problems like some customers inadvertently or in a haste put up the manual lock on someone other's locker creating difficulties for the banks. So the use of manual locks has been stopped and customers can put up their own lock with levers put inside the locker, which will rule out the following remote possibilities.

Lessee – General Awareness:

The locker being offered to the lessee is either a fresh locker or a surrendered locker. If it is fresh locker then the locker key which is to be allotted to the lessee by the lesser will be embedded in a sealed cover and the lessee can ask the bank to break open the seal in his/her presence. If the locker is a surrendered locker then it is the duty of bank to change the locks as used locker is not always safe due to following reasons.

Drawbacks:

How used locker can be risky – rarest of the rare possibilities: (Assumptions)

An existing lessee surrenders the locker key while surrendering the locker facility to the bank. He/She may be having another locker in the same bank. He/She may prepares a duplicate key for the locker surrendered and also checks that it operates while operating his/her locker in the past visits. Original key is surrendered and duplicate key is available with him/her. He/she visit the locker room to operate his/her another locker in which he/she is joint hirer and during operation he/she win over the custodian of the lockers who leaves the master key in the key hole of the locker being operated. The lessee using the master key and duplicate key of the locker already surrendered operate that surrendered locker, remove contents and lock the locker again and move over after operating their 2nd locker after

handing over the master key to the custodian. The theft will come into notice only when the new lessee, to whom the surrendered locker was issued, visits the bank. **That is why customer need to check the locker (at the time of locker allotment by the bank) if it is a brand new locker or surrendered locker with changed locks as per guidelines to the Banks.**

Drawbacks of using key as a security for accessing locker:-

Using key as a security for accessing locker has number of drawbacks like

1. The key can be lost and the locker holder suffer the different headache of getting new key as well as he can't use the locker in mean time.

2. The key can be stolen or duplicate key can be easily made and unauthorized person can access the locker.

Security and maintenance of locker system in banks has always been a matter of concern for managements. In one month the customers are allowed to access their locker for given attempt of times. That is maintained by keeping manual register and taking sign of each and every customer in that. The bank officers have to look in the matter for every time and also at the same time the officer has to do the other task since the full time officer is not appointed for this. Customers have to wait if concern officer is busy in his important work; as soon as officer becomes free he will provide the service to customer. Initially he will register the name of customer in register and take sign of customer in register then he will go in locker room to open the locker by inserting master key and then customer can open the locker by inserting his key. The major drawbacks of such manual lock systems are lack of security and the waiting time of the customers. This is a time consuming job and for each and every time concern officer has to go in to the locker

room. Much human time is going to waste in this manual system. This can be overcome by any automatic locker system.

For personal identification, currently passwords, Personal Identification Numbers (4-digit PIN numbers) or identification cards are used. However, cards can be stolen, and passwords and numbers can be guessed or forgotten. To solve these problems, biometric authentication technology is attracting attention. Biometric authentication identifies people by their unique biological information. The present situation to operate a bank locker is with locks which are having keys. By this we can't say that we are going to provide good security to our lockers. To provide perfect security and to make our work easier, we are taking the help of two different technologies named RFID and Face Recognition.

RFID technique is fast, it requires no contact and line of sight and can perform simultaneous read of multiple objects. Active RFID systems work best on large items and tracked over long distances. RFID readers can communicate with active RFID tags across 20 to 100 meters. Biometrics can be defined as recognizing and identifying a person based on physiological or behavioural characteristics. In biometric authentication, an account holder's face images are registered in a database and then compared with others who may try to access that account to see if the attempt is legitimate [1].

Thereby, security is guaranteed and the customers waiting time is drastically reduced.

RFID Introduction:

RFID is short for Radio Frequency Identification. Generally a RFID system consists of 2 parts: A Reader, and one or more Transponders, also known as Tags. RFID systems evolved from barcode labels as a means to automatically identify and track products and people.

Components of RFID:

A typical RFID system is made up of three components: Tags (RFID ID Cards), Readers and the host computer.

Tag (RFID ID Cards): An RFID tag is comprised of a microchip containing identifying information and an antenna that transmits this data wirelessly to a reader. At its most basic, the chip will contain a serialized identifier, or license plate number, that uniquely identifies that item, similar to the way many bar codes are used today. Tags come in a variety of types, with a variety of capabilities. Key variables include: **"Read-only"** versus **"read-write"**[10].

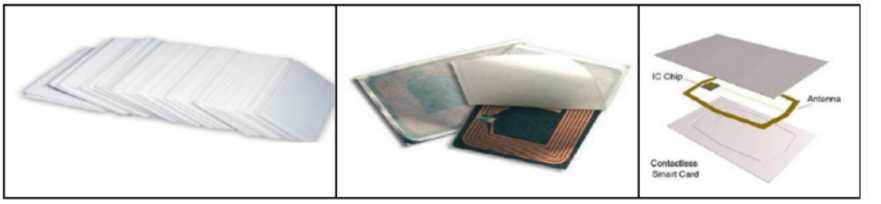

Figure 2: RFID Tags

Reader: An RFID reader is a device that is used to read RFID tag data. The reader has an antenna that emits radio waves; the tag responds by sending back data stored in it to Reader.

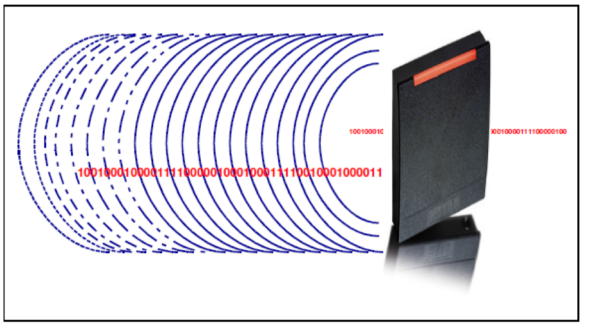

Figure 3: RFID Reader

Host Computer: It reads/writes data from / to the tags through the reader. It stores evaluates obtained data and links the transceiver to applications.

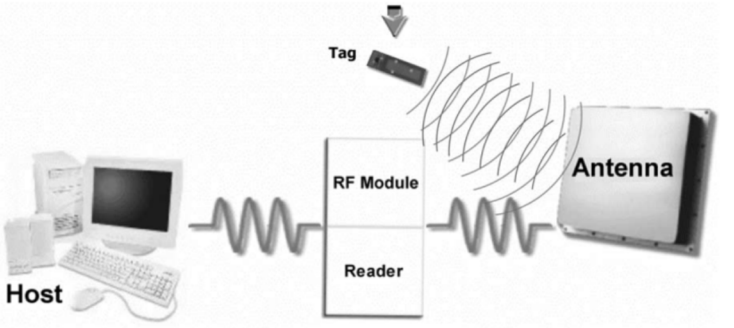

Figure 4: Host Computer

Shown below is a typical RFID system. In every RFID system the transponder Tags contain information. Shown is a RFID transceiver that communicates with a Tag. There are two types of tags: Active Tags and Passive Tags. When the Tag enters the generated RF field it is able to draw enough power from the field to access its internal memory and transmit its stored information. When the transponder Tag draws power in this way the resultant interaction of the RF fields causes the voltage at the transceiver antenna to drop in value. This effect is utilized by the Tag to communicate its information to the reader. The Tag is able to control the amount of power drawn from the field and by doing so it can modulate the voltage sensed at the transceiver according to the bit pattern it wishes to transmit [10].

Biometric Introduction:

Biometrics are automated methods of recognizing a person based on a physiological or behavioral characteristic. Using this technique the features measured are face, fingerprints, hand geometry, handwriting, iris, retinal, vein, and voice. Biometric technologies are becoming the foundation of an extensive array of highly secure identification and

personal verification solutions. As the level of security breaches and transaction fraud increases, the need for highly secure identification and personal verification technologies is becoming apparent.

A biometric system is essentially a pattern recognition system that operates by acquiring biometric data from an individual, extracting a feature set from the acquired data, and comparing this feature set against the template set in the database. Depending on the requirement, a biometric system may operate either in verification mode or identification mode:

In the verification mode, the system validates a person's identity by comparing the captured biometric data with her own biometric template(s) stored in system database. In such a system, an individual who desires to be recognized claims an identity, usually via a PIN (Personal Identification Number), a user name, RFID, a smart card, etc., and the system conducts a one-to-one comparison to determine whether the claim is true or not (e.g., "Does this biometric data matches?"). Identity verification is typically used for positive recognition, where the aim is to prevent multiple people from using the same identity [2].

In the identification mode, the system recognizes an individual by matching the acquired templates of user with all the user's templates in the database. Therefore, the system conducts a one-to-many comparison to establish an individual's identity (or fails if the subject is not enrolled in the system database) without the subject having to claim an identity (e.g., "Whose biometric data is this?"). Identification is a critical component in negative recognition applications where the system establishes whether the person is who she (implicitly or explicitly) denies to be. The purpose of negative recognition is to prevent a single person from using multiple identities [2].

Face Recognition:

Face detection and recognition schemes are a complementary scheme, each one is a complement to the other. Meanwhile, each one can work individually depending on regular system. However, Face detection technology is a computer technology that is based on learning algorithms to allocate human faces in digital images

Face recognition is a non-intrusive method, and facial images are probably the most common biometric characteristic used by humans to make a personal recognition. The applications of facial recognition range from a static, controlled "mug-shot" verification to a dynamic, uncontrolled face identification in a cluttered background (e.g., airport). The most popular approaches to face recognition are based on either (i) the location and shape of facial attributes, such as the eyes, eyebrows, nose, lips, and chin and their spatial relationships, or (ii) the overall (global) analysis of the face image that represents a face as a weighted combination of a number of canonical faces. While the verification performance of the face recognition systems that are commercially available is reasonable [6], they impose a number of restrictions on how the facial images are obtained, sometimes requiring a fixed and simple background or special illumination. These systems also have difficulty in recognizing a face from images captured from two drastically different views and under different illumination conditions. It is questionable whether the face itself, without any contextual information, is a sufficient basis for recognizing a person from a large number of identities with an extremely high level of confidence [4]. In order that a facial recognition system works well in practice, it should automatically (i) detect whether a face is present in the acquired image; (ii) locate the face if there is one; and (iii) recognize the face from a general viewpoint (i.e., from any pose).

Methodology:

Our Proposed system is to provide an ultimate security to banks & their lockers using RFID and Face Recognition. This system consists of RFID Reader and high quality camera. Each locker holder is having its own RFID Card in form of Identity Card. He/she is supposed to come with this card at the time of locker operation. In front of the locker room gate, there should be one RFID reader mounted which is going to read RFID tag data when locker holder comes in front of it. If it matches to one which is stored in the database, camera on top of the locker room gate is going to capture the image of that person. If it matches then it will allow her/him to enter in the room else buzzer will be on indicating that wrong person tries to enter into the locker room. So this way proposed system eliminates need of human involvement for bank locker operation. When any person comes to the bank for locker opening, bank will issue one RFID card to him/her for identity purpose and bank will take his/her images and store into database for future use. Below is the system flow.

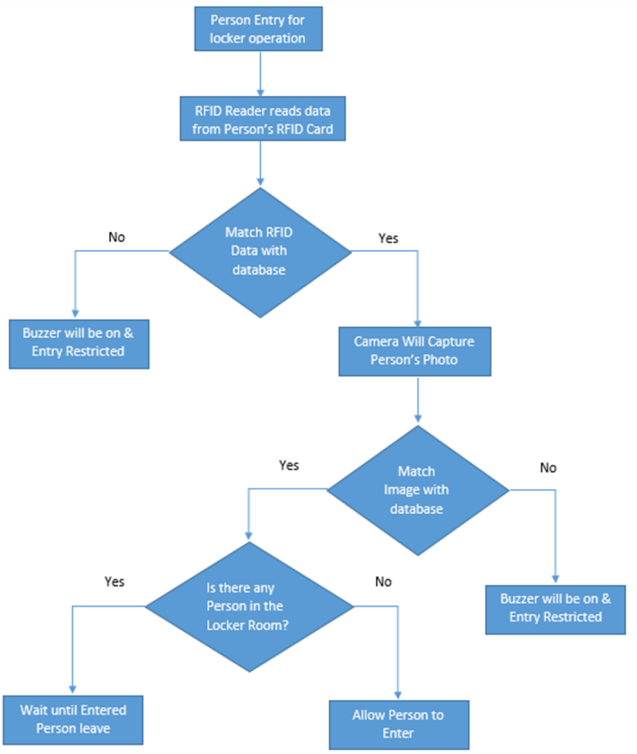

Figure 5: System Flow

The Proposed system is maintaining the records of persons entered into the Locker room. In case if any person is in the locker room and at the same time if anybody tries to enter into the locker room system buzzers the alarm and person has to wait until locker room gets free. Before entering into the locker room system identifies the RFID tag data with the data stored into the database for that person. After then face is recognized at different angles by the face recognition biometrics and face is matched with the stored images in the database for verification purpose. If it matches then only the person is allowed to access their bank locker. If any third party comes with identity card of someone else at that time RFID tag data matches with the database data but the face of the person not matches with the data stored in the database so system refuses to enter into the locker room. So in this way locker

holders need not remember their signature for accessing the locker. And at the same time there is no need to maintain the locker access book. So it will reduce the manual work and increase the security of the system.

Conclusion:

This project is mainly aimed at reducing banker's workload and to provide the security to locker operating system. Time is significantly saved by this RFID based automated bank locker system as there is no need for any authentication by the bank employee. It is more secured system and is cost effective. The system requires identity check using RFID and security is provided using Face Recognition verification technique as well as this system is very simple, efficient, accurate and requires few components.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

COMPARATIVE FINANCIAL ANALYSIS, WITH REFERENCE TO AWASH INTERNATIONAL BANKS.C AND DASHEN BANKS.C

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Background of the Paper

Financial statements provide an insight in the business of any organization. This information's are in the organization, processed in the organization and then to the management which further uses this information for decision making in the organization. The main task associated with this is to consider all the factor affecting and their sources to help the analyst analyze the organization. According to accounting standard the term "financial statement covers balance sheet, income statement or profit and loss accounts, notes and other statements and explanatory materials which are identified as being part of the financial statement" (Erich 20p01)

In fact the financial statements based on accounting policies vary from enterprise to enterprise and must be clear and understandable. As a result the financial statements are to be analysis the strong point and weakness of a business unit and provide scope for understanding the liquidity, solvency, profitability, and operation efficiency of the business concerned (Richard and Mayers 2001). A number of practice and bodies like banks, trade unions, important customers etc have an interest in financial results of the company.

According to Gebhard and Gunther (2000) financial analysis helps to reduce reliance on guesses and thus helps reducing uncertainty. Financial analysis does not lesser the need for judgment rather than establishing a sound and systematic basis for its rational application. Furthermore, financial analysis is done to know the overall position of

the company. The whole economy was hit by inflation and slowdown all over the world. How these affect the financial position of the firm? How readily the company is putting its resources in to action and getting output? This all will be determined easily by knowing the trend of changes in various ratios which can then easily reveal position of the firm. Therefore, understanding and analysis of financial statements of different companies are the way to identify either efficiencies or inefficiencies of the companies especially in the banking industry.

Statement of the problem

There are many problems faced by banks of Ethiopia such as low interest rate, slow growth of loan volume, huge amount of new regulations, poor management, weak internal government of owners and management, increasing complexity of the organizational structure, poor risk assessment in bank operating.

Objective of the project

As the name indicate general objective of this project describe the main aim of the research of this particular study is to evaluate the performance of the company by investigating its financial performance on the bases of financial ratio analysis of the banks and to help the managers understand how information from bank financial statement can be used as a tools to reveal how well their banks were performing..

Methodology

Research methodology is the systematic, theoretical analysis of this method applied to a field of study, or the theoretical analysis of the body of method and principles associated with a branch of knowledge. It typical encompasses concepts such as theoretical models, phases, qualitative and quantitative techniques. Methodology does not set out to provide solutions but offers the theoretical under planning for

understanding which method, set of methods, or so called best practices can be applied to a specific case.

The task of data collection begin after a research problem has been defined. The study of this research is total based the analysis and study of secondary data

The scope of the study

This financial report analysis did not touch and cover all ratios analysis which would have had positive impact, if it had been included on the project. It has also been done considering only five years financial statement of both Awash international bank and Dashen bank, (2009 - 2012). Furthermore, it has paid a due attention only these two banks of Ethiopia

A due analysis, interpretation and conclusion are given on the basis of the ratio computed and effort are exerted to avoid or minimize mistakes in analysis and interpretations of the result which would probably lead to hastily generalization and immature recommendation if they happen in any way otherwise moreover, attempts are made to present the analysis and interpretation parts as clearly and understandable as possible so that it can be easily understood by the users.

1. Return on asset

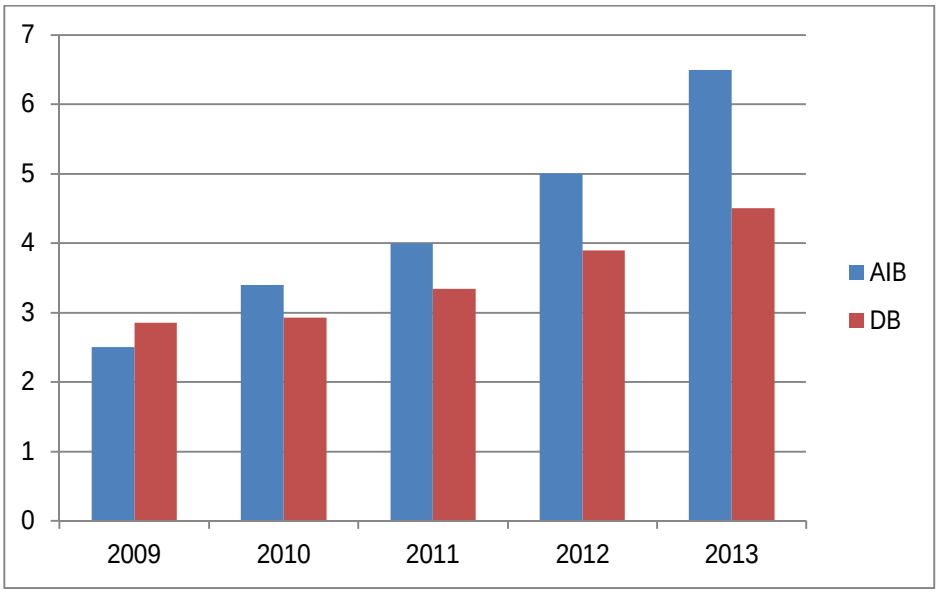
Return on assets: indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings .ROA shows earnings that are generated from invested capital (assets).

$$\textbf{Return on asset} = \frac{\textbf{net income after tax}}{\textbf{Current year total asset + previous total asset/2}} \times 100$$

Table 1: Return on Asset

years	Return on Asset ratio (in %)	
	Awash international Bank	Dashen Bank
2009	2.5	2.9
2010	3.4	2.9
2011	4.0	3.5
2012	5.0	3.9
2013	6.5	4.5

Source ratio computed from appendix



The above diagram illustrates how many Birr of earning results from each Birr of asset the company controls. The return on asset for Awash international Bank has increased consistently: in 2009 it was 25%, in 2010 (34%), and better increments have seen during the years from 2011 to 2013: 4.0%, 50%, 65% respectively. Similarly the return for the

Bank Dashen has shown continuous growth: in 2009 it was (2.9%), in 2010 (2.9%), in 2011 (3.5%), in 2012 (3.9%), in 2013 (4.5%).

Even though both Banks have shown a continuous increment for the last five year in their return on asset Awash international Bank was better than Dashen Bank, because the number of percentage of Awash international bank was greater than the number of percentage of Dashen bank. In other words the management and asset utilization of Awash international bank is more effective and efficient than Dashen bank specially from 2009 onwards.

2. The return on equity (ROE):

measures how much the shareholders earned for their investment in the company. The higher the ratio percentage, the more efficient management is in utilizing its equity base and the better return is to investors. . Many analysts consider ROE the single most important financial ratio applying to stockholders and the best measure of performance by a firm's management.

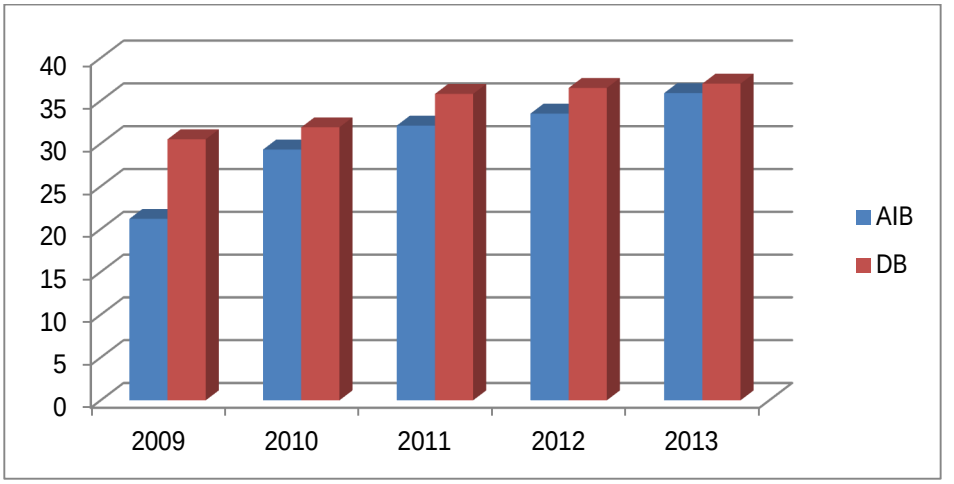
Return on equity = **net income after tax & provision** **100%**

total capital & reserve/ 2

Table 2: Return on Equity

YEAR	Return on Equity ratio (in %)	
	Awash international Bank	Dashen Bank
2009	21.2	30.5
2010	29.3	31.9
2011	32.1	35.8
2012	33.5	36.5
2013	35.9	37

Source ratio computed from appendix



This ratio indicates the company's profit ability by measuring how much profit generated with the money invested by common stock owners. The rise in return on equity for Awash international bank from 2009 to 2010 was higher 21.2%, 29.3% respectively and For the last five successive years Awash international bank has shown a constant increments. On the other hand Dashen bank also indicated an increment trends.

Generally, return on equity used to decide where to buy, hold, or sell shares. When we compared the two banks, Dashen bank was more efficient than Awash international in generating income on new investment. This shows that Dashen bank had better management on both assets and liabilities to create consistent growth because the ratio of Dashen bank was higher for each five years.

3. Profit margin ratio

A measure of how well a company controls its costs. The higher the profit margin is, the better the company is thought to control costs. Investors use the profit margin to compare companies in the same industry and well as between industries to determine which are the most profitable.

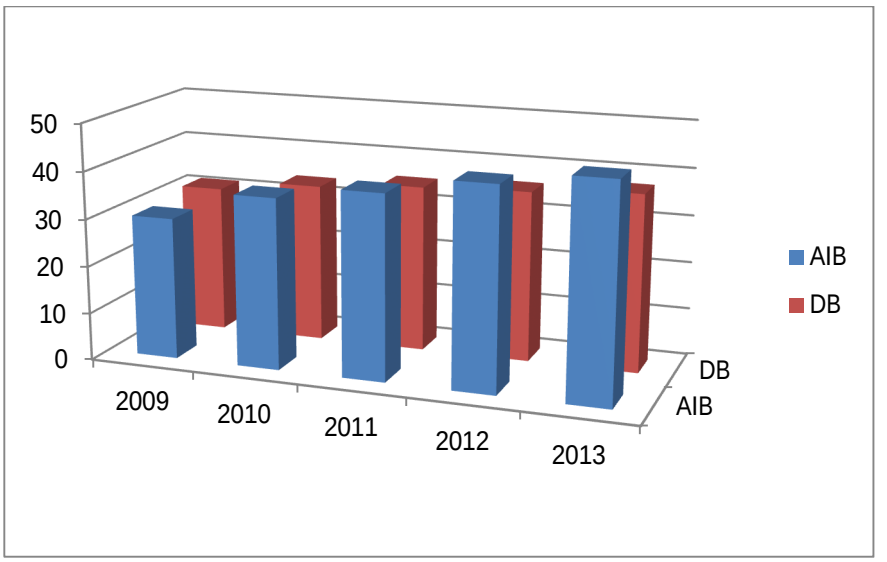
Profit margin ratio = net income after tax & provision/interest income

+ Total non-interest income

Table 3: Profit margin

year	Profit margin ratio (IN %)	
	Awash international Bank	Dashen Bank
2009	29.9	31.3
2010	36.1	33.6
2011	38.9	35.2
2012	42.4	36.0
2013	45.5	37.4

Source Ratio computed from Appendix



As shown by the above diagram it provides clues to the companies pricing policies, cost structure and operation efficiency. When it is compared in 2009 the margin profit ratio for Dashen bank was greater

than Awash international bank 31.1% & 29.9% respectively. But for the next four years (2010 to 2013) Awash international bank had better marginal profit ratio: in 2010 (36.1%), in 2011 (38.9%), in 2012 (42.4%), in 2013 (45.5%), while Dshen bank had in 2010 (33.6%), in 2011 (35.2%), in 2012 (36.0%), and in 2013 (37.4%).

Therefore, it is possible to say Awash international bank had better control over its cost compared to Dashen bank, as its marginal profit ratio was higher. This also indicates that Awash international bank was more effective in converting revenue in to actual profit. At the same time Awash international bank was better in controlling the factor affecting profit margin such as: pricing strategies of its services, type of market and condition of operation.

4. Gross yield on Asset

The yield on an investment before the deduction of taxes and expenses. Gross yield is expressed in percentage terms. It is calculated as the annual return on an investment prior to taxes and expenses divided by the current price of the investment.

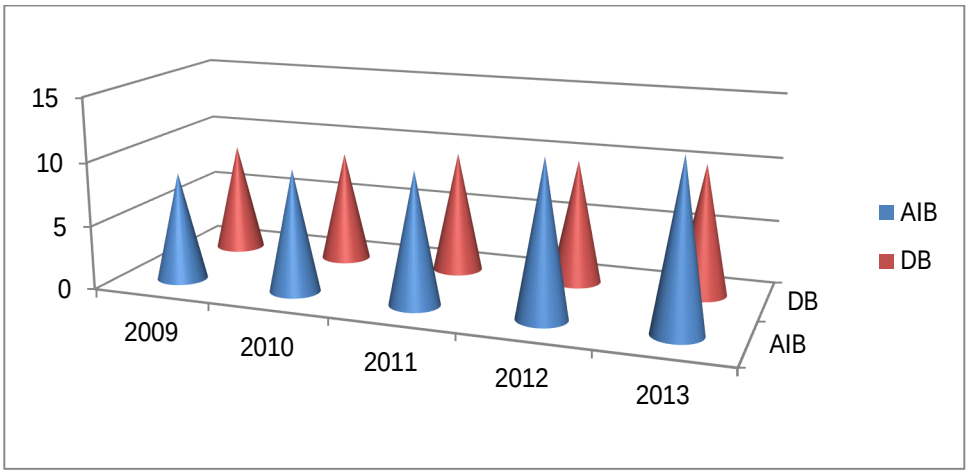
Gross yield on Asset = interest income + non-interest income X 100

Current year + previous year total asset/2

Table 4 Gross Yield on Asset

year	Gross yield on Asset Ratio (in %)	
	Awash international Bank	Dashen Bank
2009	8.5	8.6
2010	9.6	8.73
2011	10.3	9.5
2012	11.1	9.7
2013	12.0	10.2

Source Ratio computed from Appendix



As it is illustrated by the above diagram the gross yield on asset ratio was show slightly a little change for both banks for consecutive years. In 2009 Awash international bank and Dashen bank have almost the same ratio that was 8.5% & 8.6% respectively? From 2010 onwards Awash international bank in its gross yield on asset ratio was slightly greater than Dashen bank.

Generally Awash international bank was somewhat better than Daeshen bank in annual rate of return on investment. This ratio indicates the two competing banks were almost equally efficient with small differences which were insignificant.

5. Non-interest income

Non-interest income is any type of income that is generated from the application of fees, rather than from interest that is applied to the outstanding balance of a financial account. Income of this type is often associated with financial institutions, particularly banks and credit card companies..

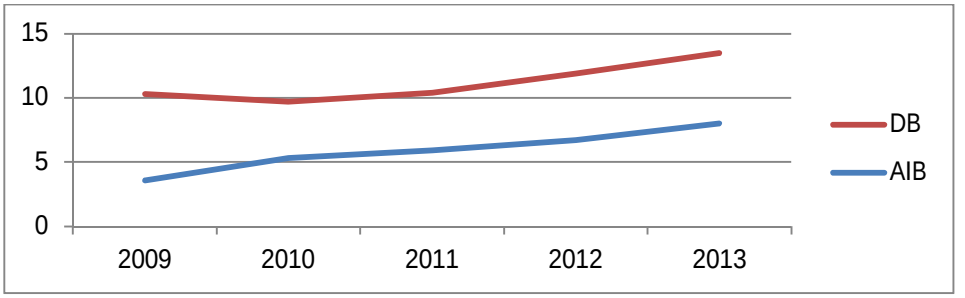
Non-interest income = total non-interest income x 100 %

Current & previous year total asset/ 2

Table 5: Non-interest income ratio

year	Non –interest income ratio (in %)	
	Awash international Bank	Dashen Bank
2009	3.6	6.7
2010	5.3	4.4
2011	5.9	4.5
2012	6.7	5.2
2013	7.2	5.5

Source Ratio computed from Appendix



This ratio indicates the total non-interest income as proportion of operating income. In 2009 Awash international bank has 3.6% and Dashen bank has 6.7% Except in this year the two banks have nearly the same ratios. Even though the ratio for Dashen bank declined form 2009 to 2010, it has shown an increment for the following years (from 2010 to 2013)

We can conclude that these banks generate almost equal non-interest income from deposit and transaction fee, insufficient fees, annual fees, in activity fees and monthly account service charges. The sustainable growth of non-interest income provides a way of generating revenue and ensuring liquidity in the events of increased default rates for both banks. But still the growths in terms of non-interest income for the two companies were very insignificant.

6. Equity multiplier Ratio

The equity multiplier is a measurement of a company's financial leverage. Companies finance the purchase of assets either through equity or debt, so a high equity multiplier indicates that a larger portion of asset financing is being done through debt.

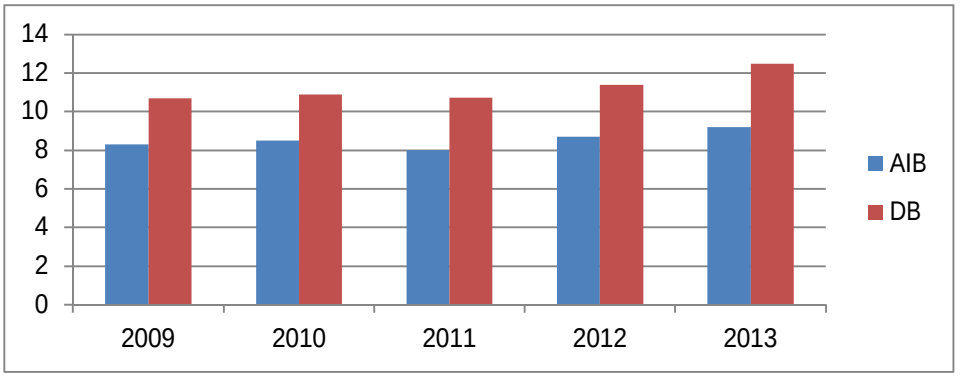
Equity multiplier ratio= current and previous year total asset

Current and previous year capital and reserves

Table 6 Equity multiplier ratio

Source Ratio computed from Appendix

year		Equity multiplier ratio (in %)	
		Awash international Bank	Dashen Bank
2009		8.3	10.7
2010		8.5	10.9
2011		8.0	10.72
2012		8.4	10.8
2013		8.9	11.1



As it is illustrated on the above diagram the financial leverage ratio for both banks has shown growth from 2009 to 2010, at the same time in both companies the ratio has decreased, Awash international bank's ratio had declined from 8.5% (in 2010) to 8.0% (in 2011) and Dashen bank's ratio had declined from 10.9% (in 2010) to 10.72% (in 2011) and for the last two years both companies shown a consistent rise up in their equity multiplier ratio.

So as to strengthen the conclusion reached based on data given, Awash international bank has less financial leverage than Dashen bank for the last five years. These show that the extent of Dashen bank to finance its asset and maintain operation with debt was stronger, on the other hand Awash international bank carries less amount of debt to operate its business and less risky and more favourable as it was compared to Dashen bank.

Conclusions

On the basis of the analysis and interpretation ratios computed, the following conclusion has been given:

- The return on Asset for both Awash international bank and Dashen bank were continuously increasing for the last five years. But Awash international bank had better return than Dashen bank
- Dashen bank was more efficient and effective when it was compared with that of Awash international bank in generating income on new investment. But still both banks need more progress on equity return.
- Both banks were at good position on controlling their overall costs even though Awash international bank was better in controlling the factor affecting profit margin.

- Their Gross yields on Asset ratio for the two competing companies were almost equally efficient with small differences which were insignificant.
- The two banks were generating almost equal non-interest income and the progress was insignificant.
- The Equity multiplier ratio have been decreasing for both companies but it has started to rise for the last two years (2012 and 2013). The extent of Dashen bank to finance its Asset and maintain operation with debt was strong. On the other hand,Awash international bank carries less amount of debt to operate its business and less risky and more favorable as it was compared to Dashen bank.
- Both banks had positive interest margin ratio, the return generated on the investment were greater than the interest expenses incurred. However, the income generated by Awash international bank was more optimal than compared Dashen bank, and the investment strategy paid more interest than its costs and more optimal decision.
- In terms of spread ratio Dashen bank had an inconsistent trend as indicated it was experiencing a declined ratio from 2009 to 2012. But unfortunately it began to rise in 2013, on the other hand Awash international bank have been indicated a rise in the ratio except in 2010.
- The two banks were effective in utilizing their Asset and managing their liabilities. This would have been enabled the banks to generate more profit from their business operation.
- The sales volumes of the services of two companies have been on increasing trends and they have been used human and materials resources efficiently and effectively.

- Both banks earned small amount of interest income in 2010 and 2011. But eventually it has been started slowly to rise for the last two years. However, Dashen bank had better incremental ratio than Awash international bank.The banks were on better position to decrease those expenses related to activities that were not associated with targeting customers to deposit funds in the ban. However, the fall of the percentage of the non-interest expenses were not satisfactory.
- Dashen bank and Awash international had better solvency ability and on good position to pay off their short term debt obligation.

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

ADVANCED HOME ENERGY MANAGEMENT (HEM) SYSTEM FOR DEMAND RESPONSE APPLICATIONS

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I. INTRODUCTION

Energy controlling system using plays a crucial role in realizing residential Demand Response (DR) programs in the smart grid environment. In many part of the world there is a persistent problem is inefficient use of electric power generation and transmission assets. This problem been tackled by demand side management with the introduction of the smart grid, it is now possible to perform demand response at customer premises to get a finer control of the available resources. The objective of Energy Management System is to design and implement efficient Advanced Home Energy Management (HEM) System and evaluate the HEM operation performance, in particular how each load performs when being controlled by the HEM unit. It provides a homeowner the ability to automatically perform smart load controls based on Utility signals, customer's preference and load priority by using MSP430. The HEM's communication time delay to perform load control is analyzed, along with its residual energy consumption**.** An Advanced Home Energy Management (HEM) system can contribute to major reductions of energy.

II. PROJECT OVERVIEW

Over the past several decades, electric power systems have encountered more frequent stress conditions due to ever-increasing electricity demand. Transmission line outages have been a common

cause of system stress conditions, which are likely to occur during critical peak hours. Such events will cause a supply-limit situation where cascading failures and large-area blackouts are possible. Demand response (DR) has been envisioned to deal with such unexpected supply limit events by selectively curtailing system loads, whereby regaining balance between electricity supply and demand [5]. DR also plays an important role in load shifting that can help increase reliability.

Most of the HEM implementations are designed to schedule appliance operation based on price signals [1].There is yet another implementation of a HEM system that can manage power-intensive loads to limit the household peak demand, while taking into account homeowner's load priority and comfort preference. Emphasis is placed on the HEM system setup and electrical measurements of the loads that are controlled by the HEM unit, together with measurements of communication time delays between the HEM unit and load controllers, along with the HEM system's residual power consumption.

III.DESCRIPTION OF THE HEM SYSTEM

The overall system comprises an HEM system that provides monitoring and control functionalities for a homeowner, and load controllers that gather electrical consumption data from selected appliances and perform local control based on command signals from the EB section. A smart meter can be used to provide an interface between a utility and a homeowner in a real-life HEM deployment [5]. HEM system makes a decision to switch ON/OFF selected load based on the utility signal received, as well as homeowner's load priority and preference settings. It is also responsible for collecting electrical consumption data from all load controllers and providing an interface for homeowners to retrieve appliances' status and review their power consumption.

IV. BLOCK DIAGRAM

A.HEM System

The HEM System mainly consists of MSP430G2553 Launch Pad, Voltage Sensing Unit, Current Sensing Unit, LCD display, Relay Driver Circuit, Level Convertor and the Power Supply. The signals from the Electricity Board (EB) section is received by the ZigBee, based on the signals received by the ZigBee the MSP430 performs load control based on the demand limit, priority and comfort level of the home user [8]. The LCD in the HEM System displays the Voltage, Current, Power, Units, Amount. These values are again transmitted to the EB office. The HEM System is shown in Fig. 1.

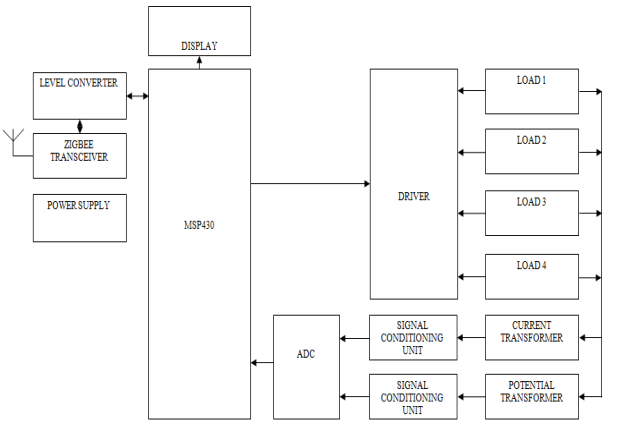


Fig. 1. HEM System

B. EB Section

The EB section consists of a power supply unit with ZigBee which is connected to a Laptop. Commands such as Optimization, Shut down, Pay Bill are given from Laptop which is send serially to ZigBee. The ZigBee in the HEM system receives the commands and performs load control based on the received signal. The Fig. 2. shows the Block Diagram of the EB section.

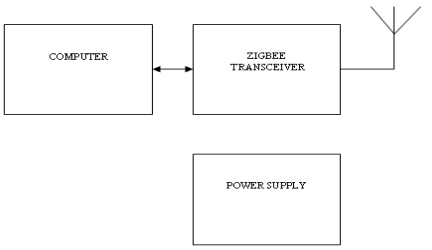


Fig. 2. EB Section

The HEM System with the help of Voltage sensing unit (Signal Conditioning Unit and Potential Transformer) and Current sensing unit (Signal Conditioning Unit and Current Transformer) collects and calculates real-time electrical consumption data, such as voltage, current, power, units and amount from the loads and sends it through ZigBee to display it in VB Form in the Laptop in EB Section.

V. ARCHITECTURE OF THE HEM SYSTEM

A. HEM ALGORITHM

Step 1: Start the program and include the LCD's header file and define the pins for the relay drivers and LCD.

Step 2: Set the relay pins as output pins and initialize the serial communication with baud rate 9600.

Step 3: Initially all the relays pins are set as LOW. Read and calculate the values of voltage and current and display.

Step 4: Check for optimization, if it is equal to 1 print 1 else 0 and calculate the units of consumption.

Step 5: Read the values of units and amount and display. When the value "F" is received the values of voltage, current, power, units and amount are displayed at the EB office's computer.

Step 6: If value **0** is received all the loads are ON.

If value **1** is received all the loads are OFF.

Step 7: If value **2** is received optimization=1 executes Step 10 and Step 11.

Step 8: If value **3** is received optimization=0 and all the loads are ON.

Step 9: If value **4** is received and pay bill status=1 display "PAY BILL" in LCD.

Step 10: If value **5** is received and pay bill status=0 display PAY BILL is OFF.

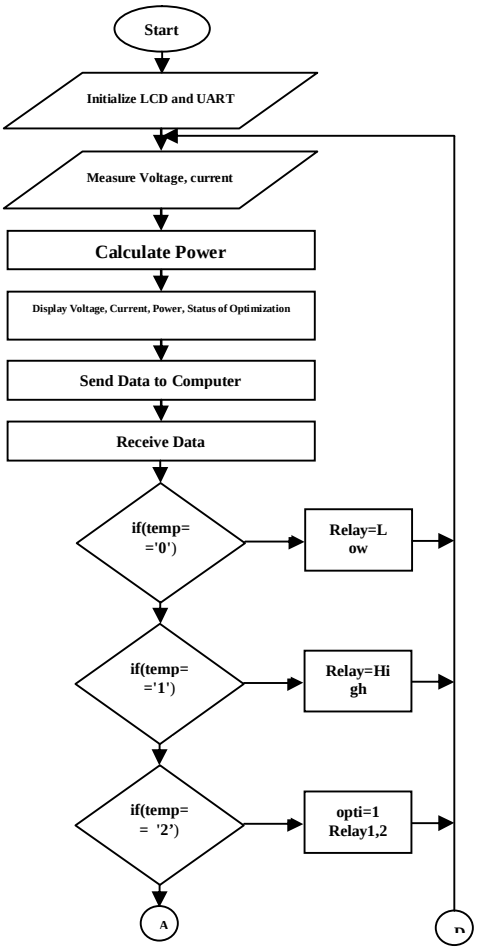
Step 11: If value **6** is received today shut down status=1 and display "TODAY SHUTDOWN" in LCD.

Step 12: If value **7** is received today shut down status=0 and display "TODAY SHUTDOWN" IN LCD" is OFF.

Step 13: If pay bill status=1 and today shut down status=1 display "PAY BILL" and "TODAY SHUTDOWN" in LCD.

Step 14: If pay bill status=1 and today shut down status=0 display "PAY BILL" in LCD and If pay bill status=0 and today shut down status=1 display "TODAY SHUTDOWN" in LCD.

B. FLOWCHART


Start
Initialize LCD and UART
Measure Voltage, current
Calculate Power
Display Voltage, Current, Power, Status of Optimization
Send Data to Computer
Receive Data
if(temp= ='0')
Relay=Low
if(temp= ='1')
Relay=High
if(temp= = '2')
opti=1 Relay1,2
A

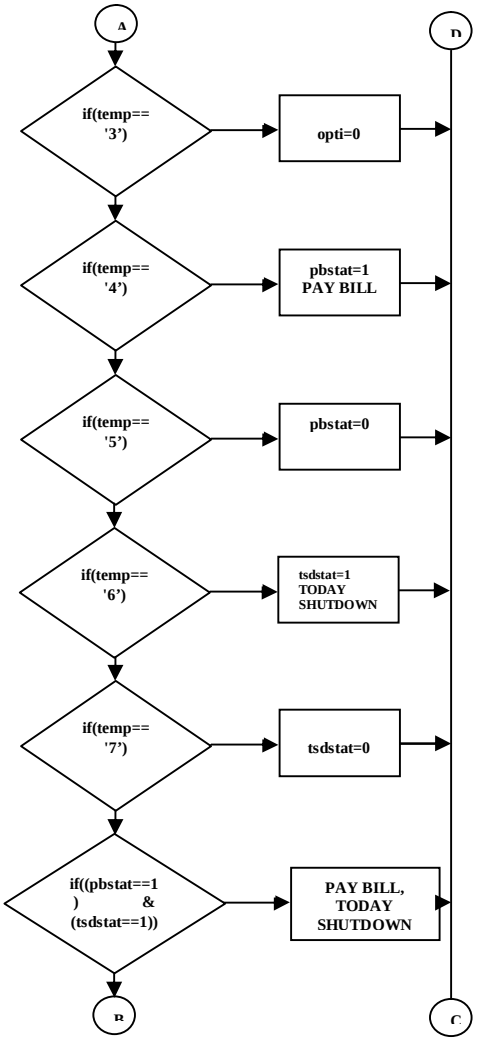
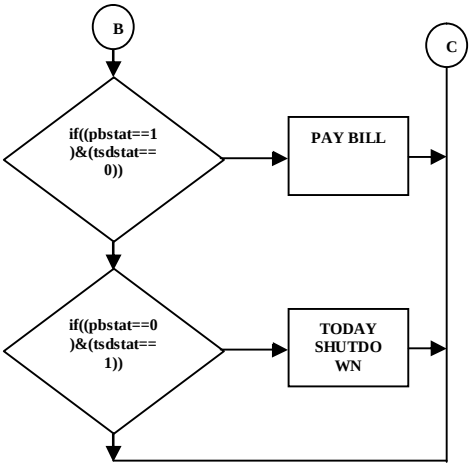


Fig. 3 Flowchart of the HEM System



VI. EXPERIMENTAL RESULTS

The HEM system installation of the project in laboratory environment is conducted and its experimental results under various conditions are practically implemented and the results are verified successfully. In this demonstration, we assume that a utility's DR event signal sent to a home comprises of the 50% of the demand limit. Four identical lamp loads are used in this demonstration.

A.HEM SYSTEM

The HEM system is used for managing end-use appliances. For demonstration four lamp loads are taken as managing the load control. The inputs are given from the Electricity Board (EB) section such as load on, load off, optimization on, optimization off, pay bill status, today shutdown status are send via serial cable to the ZigBee transceiver. The ZigBee transmits the values from 0 to 7 and the transceiver ZigBee at the HEM System receives the value and sends it to MSP430. The MSP430 performs load control based on the command received. The demand limit is set i.e., when the optimization is on 50% of the demand limit is utilized and thereby reducing the power consumption. Fig. 4. shows the HEM System. The HEM System also acts as a Smart Meter thereby displaying the Voltage, Current, Power, Units and Amount

along with the Optimization indicator, Pay Bill Status and Today Shut down Status.

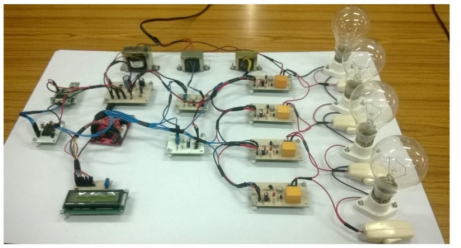


Fig. 4. HEM System

A. EB SECTION

Fig. 5. shows the EB section. The EB section consists of a Laptop and a ZigBee. Load control messages are transmitted via ZigBee to the HEM System. When the values from 0 to 7 are received at the microcontroller and load control takes place. The values of voltage, current, power, units and amount are displayed at the EB VB form. Figure 6.3 shows the VB form of the EB section.

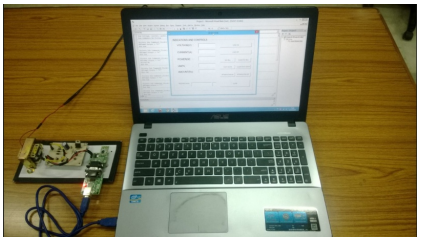


Fig. 5. EB Section

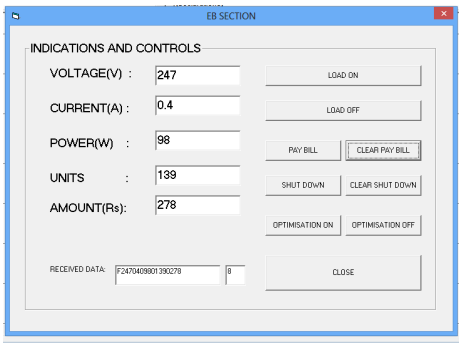


Fig. 6. EB Section

Condition 1:

When the Condition 1 is given in the EB section VB form the value "**0**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are ON. The Fig. 7. shows the output in the HEM system when LOAD ON.

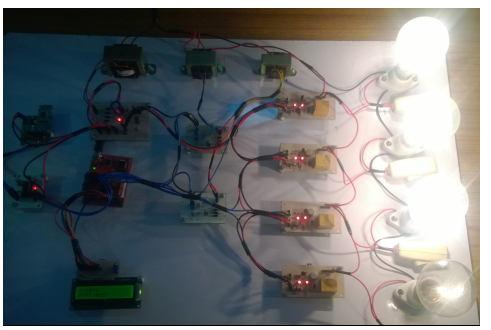


Fig. 7. HEM System when LOAD ON

The Fig. 8. shows the readings displayed in the LCD.The values displayed are Voltage, Current, Power, Optimization condition,Units and Amount.

Condition 2: LOAD OFF

When the Condition 2 is given in the EB section VB form the value "**1**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are OFF.

Condition 3: Load ON & Optimization ON

When the Condition 3 is given in the EB section VB form the value "**2**" is received by the ZigBee and transmitted to the ZigBee at the HEM system the 50% of the demand limit is set if the load exceeds 205 W load1 and load2 are ON. The remaining loads are OFF. The Fig. 8. shows the output in the HEM system when LOAD ON and Optimization ON.

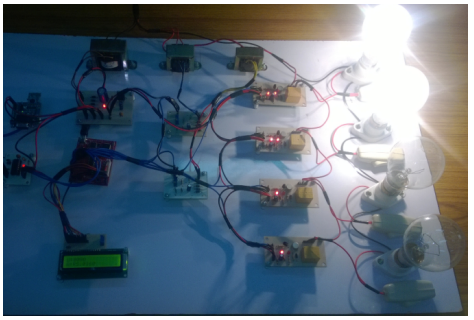


Fig. 8.HEM System when LOAD ON and Optimization ON

Condition 4: Load ON & Optimization OFF

When the Condition 4 is given in the EB section VB form the value "**3**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are ON.

Condition 5: PAY BILL

a) When the Condition 5 is given in the EB section VB form the value "**4**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are ON and PAYBILL is displayed in LCD as shown in Fig. 9.

Fig. 9. LCD displaying PAY BILL status

b) When the Condition CLEAR PAY BILL is given in the EB section VB form the value "**5**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are ON and PAYBILL status is cleared.

Condition 6: SHUTDOWN

a) When the Condition 6 is given in the EB section VB form the value "**6**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are ON and TODAY SHUTDOWN is displayed in LCD as shown in Fig. 10

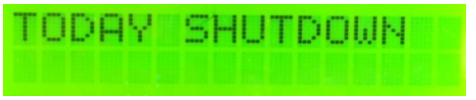


Fig. 10. LCD displaying TODAY SHUTDOWN status

b) When the Condition CLEAR TODAY SHUTDOWN is given in the EB section VB form the value "**7**" is received by the ZigBee and transmitted to the ZigBee at the HEM system and all the loads are ON and PAYBILL status is cleared.

Condition 7: PAY BILL AND SHUTDOWN

When the PAY BILL and TODAY SHUTDOWN is given in the EB section VB form the value "**4**" and "**6**" is received by the ZigBee and

transmitted to the ZigBee at the HEM system and all the loads are ON and PAYBILL as well as SHUTDOWN is displayed in LCD as shown in Fig.11.

Fig. 11. LCD displaying TODAY SHUTDOWN status

The readings are tabulated in Table 1 For example consider the condition **OPTIMISATION ON** is given in the EB section VB form the value "**2**" is received by the ZigBee and transmitted to the ZigBee at the HEM system the 50% of the demand limit is set if the load exceeds 205 W load1 and load2 are ON. The values read in the LCD is Voltage-**247 V**, Current-**0.4 A**, Power-**98 W**, Units consumed- **50**, Amount- **Rs. 100.**

Condition	Value	Voltag (V)	Curren (A)	Powe (W)	Unit	Amoun (Rs.)
LOAD ON	0	247	1.6	395	12	24
LOAD OFF	1	247	0	0	39	78
OPTIMISATION ON	2	247	0.4	98	50	100
OPTIMISATION OFF	3	247	1.6	395	131	262
PAY BILL	4	247	1.6	395	143	286
CLEAR PAY BILL	5	247	1.6	395	155	310
SHUT DOWN	6	247	1.6	395	167	334
CLEAR SHUT DOWN	7	247	1.6	395	179	358

Table 1 Experimental Results

VII. CONCLUSION AND FUTURE WORK

This project is the successful implementation of the Advanced HEM system for Demand Response Applications using MSP430.The Demand Response Applications are assumed as the four lamp loads and

the evaluation of the overall HEM system's residual power consumption. Electrical measurements of the four loads, including voltage, current, power with the Units, Amount and Optimization Status. The Advanced HEM system hardware comprises a Low power microprocessor **MSP430, Current and Voltage Sensing Unit** for measuring the Voltage and the Current consumed, Four **Relay driver circuit** that performs switching ON and OFF of four loads**, Level Converter** for converting TTL to RS232 logic and Vice versa, **ZigBee** as transceiver and a **Power Supply Circuit** to provide power to the entire HEM System. The EB Section with Laptop installed with **Microsoft VB6.0** and a **ZigBee** transceiver with **Power Supply Circuit**.

Experimental results show that the proposed HEM system can monitor and control actual loads. The measured electrical measurements of the loads confirm that the system performed well during the entire experiment. This project will provide an insight into the overall HEM system operation, in particular providing a detailed look at the implementation of an HEM system for automated residential DR applications.

The real-world implementation of the proposed system will benefit electric power distribution companies by helping to avoid distribution transformer overloads with the presence of new power-intensive loads.

FUTURE WORK

An Advanced HEM system can be implemented along with Electronic Clearing Service (ECS). It is a mode by which the funds are automatically debited to our account every month to collect the utility bills. Information can also be send through messages to the home owner by using GSM technology.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

DEPICTION OF WOMEN IN INDIAN CINEMA –A FEMINIST CRITIQUE

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INTRODUCTION:

The historical study of Indian women shows that women have faced rise and fall in their status. During Vedic era women enjoyed high status. Woman was never considered as inferior to man. She had the rights to own the property of her father and her husband. After Vedic period the status of woman was deteriorated. According to Hindu law giver Manu, woman is subject to man. This decline in status of woman is evident in their customs related to marriage, property and role in family system (Rosemeyer, 2000). Indian woman is divided into different groups on the basis of class, caste, urban, rural, education, occupation, and linguistic basis but marginalization is common factor among all such groups.

By and large the media scene in India is that media does not address serious issues about exploitation and unequal treatment to women in different spheres but is keen in reporting sex related incidents by way of sensationalizing news of atrocities on women. Thus instead of highlighting the exploitation of woman they end up becoming one of the reasons in increase of violence as their coverage more often than not tend to glorify the crime against women. It is true that media has brought to light, as never before, certain misdemeanors against women but in a very subtle manner it also perpetuated the stereotyped image of woman as a householder and an inconsequential entity in the traditional value system. Generally, women's problems never figure on the front page of a newspaper unless it is a gruesome murder or a case of rape. Newspapers even on women's page does not usually address

relevant issues for women empowerment but reporting is concerned with beauty tips recipes, fashion syndrome etc.

India is the largest film producing industry in the world and its cinema is becoming increasingly popular in various countries around the globe. Bollywood is a powerful medium that provides useful and entertaining information on history, civilization, variety of cultures, religions, socio-economics and politics in various regional languages. More and more people, irrespective of their ethnicity, watch Bollywood films in many parts of the world.

Media cover women's problems drawing the attention of policymakers to issues requiring immediate attention such as the adverse sex ratio, infant and maternal mortality, crime against women and the effects of poverty on women and their families. But this coverage is very limited with the rest of the space occupied by cinema actresses, models, video jockeys and the rich women and their hobbies. Many of the women's magazines are devoted to fashion, glamour, beauty aids, weight reduction, cookery and how to sharpen 'feminine instincts' to keep men and their in-laws happy. There are comparatively fewer articles on career opportunities, health awareness, entrepreneurship, and legal aid, counseling services, childcare services and financial management.

This portrayal of women in media particularly in cinema has led the National Commission for Women to recommend amendment in the Indecent Representation of Women (Prohibition Act), 1986. The NCW wants to include new technologies like MMS and the electronic media and some which were left outside the ambit of the Act like posters and TV serials which perpetuate stereotypes of women.

Explaining the reason for including soaps in proposed amendment in the Act, National Commission for Women has stated that "women are either being portrayed as Sita (Ramayana) or as

Kaikayee (Ramayana) and there seems to be nothing in between the two extreme characters being shown in Soaps.

Divorces, adultery are highlighted frequently in Soaps where characters break the law without repercussion." Negative images or just portraying reality is not enough. In fact, it can often be harmful. It has been observed that sheer duplication of the dark side of life can often lead to apathy and passivity. This can be avoided by depicting the positive images or success stories of women in whatever sphere they happen.

Recently a popular Indian movie-Slumdog Millionaire has received eight Oscar awards, and thus, scholars and academicians are showing keen interest, and are actively involved in teaching and research on different aspects of Indian cinema particularly Bollywood. During the last two decades there has been spurt in publications on Indian cinema. To support teaching and research, several libraries have developed good collections of printed and microforms resources. In recent years, we have witnessed a huge proliferation of digital and web resources, and information is now accessible on Indian cinema more easily and promptly through the Internet.

Bollywood is the largest movie producing industry in the world. In recent years, there has been growing interest and awareness of Indian cinema, and as such many universities, colleges and other educational institutions have developed and introduced several courses

Indian cinema and culture is a vital aspect of South Asian programs, and we have witnessed that there has been growing interest in the scholarly study of Bollywood and Indian cinema among South Asian Diasporas. In recent years movies produced in India have received international attention. Most recently, there have been successful efforts in the co-productions of Hindi as well as English movies by Hollywood and Bollywood producers and directors.

Many Indian actors are working in Hollywood films and similarly a number of American and British actors are also appearing in Bollywood movies. The majority of Indian films are now produced with English subtitles, and thus many people around the globe love to watch and get acquainted with Indian history, culture and society through the movies. Faculty, students and scholars have developed keen interest in the study and research on different aspects of cinema. So far no bibliographical source with international coverage has been compiled on Indian cinema and thus many patrons have suggested in producing a guide to help their research. When completed, this resource guide will greatly support research programs in South Asian studies, and will serve as an exhaustive and most up to- date bibliographical reference on Indian cinema. This publication will assist graduate and under-graduate students as well as faculty and other researchers in locating information on various aspects of films produced in and about India.

Recently, Bollywood media has celebrated the 100 years it's existing. Of course, the fact that "Bollywood" media is becoming increasingly more visible all over the world made me want to probe the matter on a deeper level. In these years what has been dominating in Hindi media can be described in one word as patriarchal. Who count is what the heroine provokes and rather what she represents. She is the one or rather than love of fear she inspire in the hero or, else the concern He feels for her, who makes him act the way he does in herself the women has not the importance (Quoted by Mulvey , film& feminism , Jasbir Jain & Sudharaj).

Woman character always depicted in stereotype patriarchal system or in the male gaze portrayal. Where in patriarchal stereotype portrayal depicted women as a powerless, desire less submissive women. In male gaze portrayal, women depicted as male sexual desire things and against the culture and moral value of the Indian society. In particular, I felt the need to look at the construction of women

characters, because it is this construction that perpetuates Indian society and creates a following. I also intend to investigate whether the way in which women characters are constructed has changed over a period of time.

SIGNIFICANCE OF STUDY:

Media is considered to the fourth estate of democracy and being a part of media, movies are undertaken as an important tool for changing the people's views. Women need to ensure that media reflects images that develop positive and constructive role of women in society in order to change the damaging stereotypes. Keeping this in view the current study will analyze the patterns, values and ideologies which Star Plus soap operas are focusing in presenting their female characters.

STATEMENT OF PROBLEMS:

Media is an important tool for change. Being inexpensive and easy to access, cable television has spread rapidly in India. Therefore, this study seeks to examine the portrayal of women (feministic Critiques) in television serials. The portrayal of woman's character has been even poor. During the four decades 1970-2012 in the beginning woman portrayed mostly in two famous forms as a prostitute and good catering wife (for instance Pakeezah, Umraojan Bazaar), according to Mishra (2006),study, If we further look for a film about Muslim Women empowerment , self actualization is none.

In a country like India which itself planning, preparing and making various policies for inclusion of all people of the country to be among the developed countries of the world, the portrayal of woman in Hindi media is so bad and only lavishing. The negligence women's real issues like education, empowerment, and self actualization cannot be accepted as a healthy trend of bolly wood media.

Although various scholars in the past have embarked on studying the construction of women characters in Bollywood media, but this comparative work on women's negative portrayal in Indian media a new assisting work in that field. These studies did not always clearly study changes occurring over time. With the turn of the century/millennium, new global challenges as well as more global markets opening to the Hindi-media industry, this study is timely and one that will be of great value by means of a review of more recent film releases that will be compared to older films. The films selected are considered typical films of the era under consideration and provide a platform for the generalization of finding a certain way to the inclusion of Women.

REVIEW OF LITERATURE:

The literature will examines the converging fields of the Hindi-language film history, Indian culture studies, Indian sociology, and gender studies. Hence a multi-disciplinary framework is used to examine the literature and develop a relevant contextual base for the study of a number of selected films under consideration as case studies and content analysis. The literature review will focus firstly on some of the key elements of Indian culture, politics and the socio-economy that have a bearing on this study.

Secondly, key Feminist film theoretical framework (like John Berger ""ways of seeing ", Laura Mulvey: Visual pleasure and narrative media "and Cheris kramarae "Mute group theory") I believe that this will provide a critical foundation in understanding the context of the construction of women characters in Hindi-language media.

Thirdly, Hindi-language media is examined from a number of perspectives, notably the growth of Bollywood media over time, Bollywood genres, Bollywood films as cultural products, the negotiating forces between the community and filmmakers, . Lastly, the literature

considers existing scholarship on the portrayal of Muslim women characters in order to provide theoretical and analytical insights for examining and studying the construction of the women characters in the films selected for detailed study.

Cirksena and Cuklanz (1992) seek to examine five feminist frame works for communication studies liberal feminism (reason and emotion), socialist feminism (public and private), radical feminism (nature and culture), psychoanalytic feminism (subject and object) and cultural feminism (mind and body). Moreover in their study they also look at feminist critiques of communication research methods.

John (1998) discusses some alternate routes to address feminism in India as western concept of feminism is not appropriate in Indian context. The divergences in the conceptual legacies of western and Indian feminism are also discussed.

Davies (1997) examines the relationship between the men who viewed sexually explicit videos in a non experimental setting and their attitude towards feminism and rape. The main purpose of the research was to evaluate whether men who viewed more sexually explicit movies displayed more negative attitude towards feminism. The findings suggest that sexually explicit videos do not generate the calloused attitude. Such an attitude is deeply embedded in our society.

Laura Mulvey (1975), The visual techniques of media afford viewers to contradictory pleasures. First through the process of Freud films scoopophelia (pleasure in looking) we enjoy making other the objectifying of controlling gaze. Second, through a recess of identification that parallels the lacuna's famous mirror stage. We derive pleasure from identity with an ideal image on the screen (Visual Pleasure.)

Cheris Kramarae (1981) states that men and women speak a different language. According to popular belief, at least, the speech of

women is sensuous weaker and less effective than the speech of men. Our culture has many jokes about the quality of women's speech. ... Compared to male speech, the female form is supposed to be emotional, vague, euphemistic, sweetly proper, mindless, endless, high-pitches and silly".

J. Jain & Sudharaj (2005), The costume is often dazzling with sequins or a metallic finish brightly colored and revealing the partial contours of the body of the actress are frequently disfigured with pulling up bras from the specific above part of their body, buttock padding and to emphasize the unnaturally distended body proportion, the woman is frequently picturised and shot either from a low angle or, from a high angle to show the cleavage. The action of women in the dance often mimes sexual movement with numerous shot of just body parts like that have navel, breast of pelvic thrust. All these add up in objectifying and sexualizing the body of the woman for the benefit (male) viewers.

OBJECTIVES:

The objectives of the study area as follow.

- To explore the depiction of woman as sexual object in media in term of male gaze and stereotype images.
- To explain the portrayal of women as a submissive character in Indian cinema, media does not reflect women's issues properly.
- To explain the various schools of feminism in female-centered films.
- To evaluate which kind of feminism's schools are pre dominant in Indian films.

This study will be useful to the society and to adopt new phenomena in media with respect to the women.

METHDOLOGY:

An interpretive textual analysis will be employed to examine the changing construction of women characters as portrayed in print and electronic media. Cinema, Television, advertisement.internet, mobile phone and web journalism have been selected for this study. The primary data will be collected through questionnaires and observations.

Drawing on the converging fields of sociology, film, media and cultural studies, a multi-disciplinary framework will be used to examine the case studies, content analysis and expert interviews. In addition, the study will make reference to other relevant popular blockbusters to substantiate or illustrate the arguments. More specifically, the study examines the role and construction of the women on the basis of self-actualization and empowerment.

CONCLUSION:

It clarifies that media really is the most powerful and strongest medium of mass communication and whether authentic or biased messages are delivered through this, the products get an instant response in the market. It all depends on the media institutions, which should introduce the products or services with complete authenticity and without forgetting their responsibility towards the community and particularly women. Media also do have a social responsibility and it wouldn't be wrong to say that people can be successfully made aware of the all the concerned and relevant social issues through this significant medium of mass communication.

The women in Indian Media are here still to continue and to evolve in their multidimensional role as a sex object, a physical decorative, a home-marker, for the appeal of the advertisement. With greater monetary independence, and a considerable improvement in the way a woman is valued at home they are getting social status but on another side, with raising the slogans of women's empowerment and breaking

the conservative barriers media and corporate world are frequently using woman as "a commodity" and their portrayal as sex objects in advertisements and films particularly in Indian context which might to be strictly hindered

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

DESIGN AND THERMOMECHANICAL ANALYSIS OF GAS TURBINE BLADE MODIFICATION USING COOLING PASSAGES

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INTRODUCTION

The purpose of turbine technology is to extract the maximum quantity of energy from the working fluid to convert it into useful work with maximum efficiency by means of a plant having maximum reliability, minimum cost, minimum supervision and minimum starting time. The gas turbine obtains its power by utilizing the energy of burnt gases and the air which is at high temperature and pressure by expanding through the several ring of fixed and moving blades. To get a high pressure of working fluid which is essential for expansion, a compressor is required. Gas turbines have been constructed to work on the following: oil, natural gas, coal gas, producer gas, blast furnace and pulverized coal. Gas turbines may be classified on the basis of

a) On the basis of combustion process the gas turbine is classified as:

1) Continuous combustion or constant pressure type-The cycle working on this principal is called Joule or Brayton cycle.

2) The explosion or constant volume type-The cycle working on this principal is called Atkinson cycle.

b) On the basis of the action of expanding gases similar to steam turbine is classified as:

1) Impulse turbine 2) Impulse-reaction turbine

c) On the basis of path of working substance the gas turbine is classified as:

1) Open cycle gas turbine (working fluid enters from atmosphere and exhaust to atmosphere).

2) Closed cycle gas turbine (Working fluid is confined in the plant)

3) Semi closed cycle (part of the working fluid is confined within the plant and another part flows from and on the atmosphere).

d) On the basis of direction of flow:

1)Axial flow 2)Radial flow

A gas turbine is an engine where fuel is continuously burnt with compressed air to produce a steam of hot, fast moving gas. This gas stream is used to power the compressor that supplies the air to the engine as well as providing excess energy that may be used to do other work.

The engine consists of three main parts.

- The Compressor
- The Combustor and
- The turbine.

The Turbine compressor usually sits at the front of the engine. There are two main types of compressor, the centrifugal compressor and the axial compressor. The compressor will draw in air and compress it before it is fed into the combustion chamber. In both types, the compressor rotates and it is driven by a shaft that passes through the middle of the engine and is attached to the turbine .

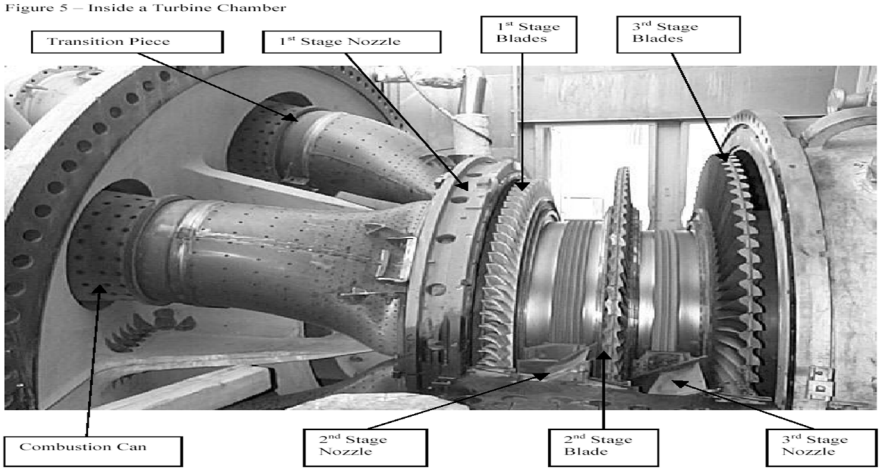
Turbine Blade

The rotor blades of the turbo machine are very critical components and reliable in operation of the turbo machine as a whole depends on their repayable operation. The major cause of break down in turbo machine is the failure of rotor blade. The failure of the rotor blade may lead to catastrophic consequences both physically and economically. Hence, the proper design of the turbo machine blade plays a vital role in the proper functioning of the turbo machine.

Construction of turbine rotor and their components

Knowing the fluid conditions at exit of the gas generators, a value of static pressure was assumed at the turbine outlet. From this, the corresponding enthalpy drop required in the power turbine was calculated. The limitation in fixing the velocity triangles come from the peripheral speed of rotor and flow velocities. It is preferable to keep the both in reasonable range so as to minimize the losses.

Figure 5 – Inside a Turbine Chamber



After the primary fixing of velocity triangles between the axial gaps of the turbine blade rows, the blade profile is selected. In blade section there are two approaches, the direct and indirect approach. In the present work the direct approach is followed in which the base profile is

taken from standard profiles available and is analyzed later for flow conditions through any of the theoretical flows analysis method. In the present work the potential flow approach is considered in analysis of flow in the blade passage. The blade profile selected should yield the flow angle required to give the desirable enthalpy drop. Also the pressure distribution at the end of stage should be uniform. If it is not so, the blade angles are changed to match these requirements.

The next step involves the mechanical design of the turbine unit in which the stator and rotor elements were designed. The various rotor elements designed are the blade root, rotor rim section, rotor disc turbine shaft and the keyway. In stator parts design we have the diaphragm and the turbine casing.

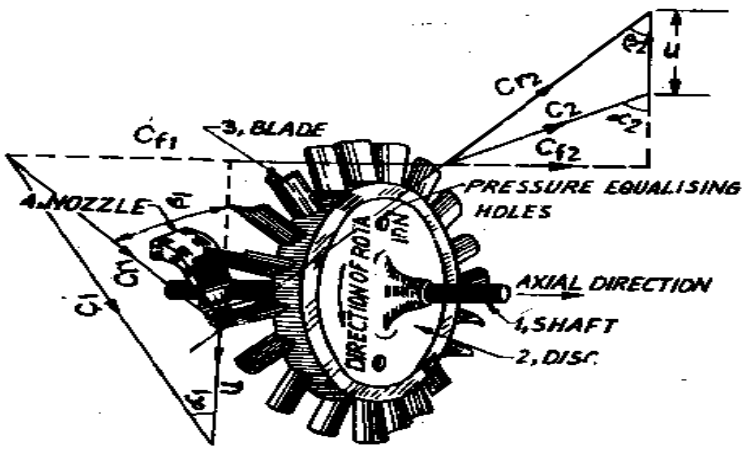
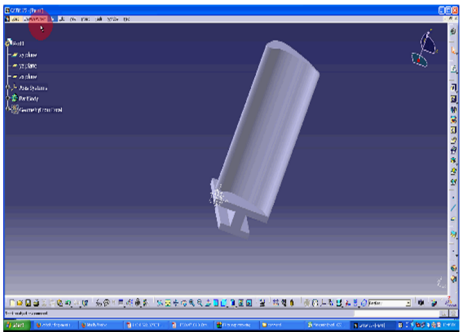


Fig. 5.1

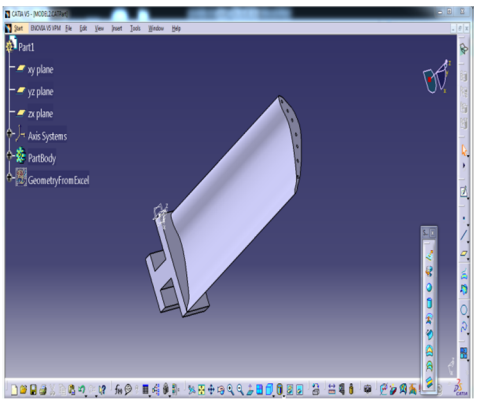
Construction of turbine rotor blade

Prospectus:

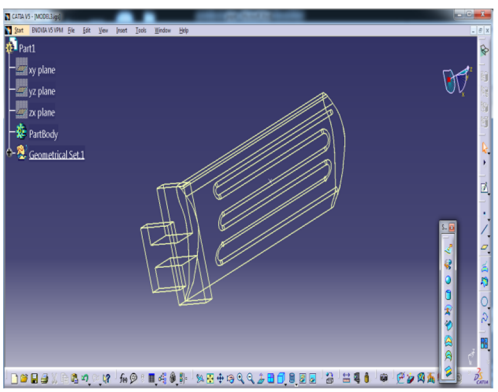
In present work three types of models are created in catia like solid turbine blade, second one is cooling ducts in turbine blade and last for serpentine model.



Solid rotor blade created in CATIA



Cooling ducts model created in CATIA



Serpentine model created in CATIA

Finite Element Analysis

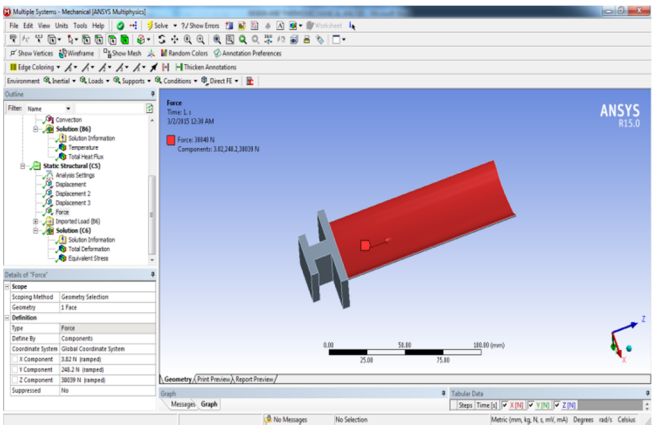
The purpose of a finite element analysis is to re-create mathematically the behavior of an actual engineering system. In other words, the analysis must be an accurate mathematical model of a physical prototype. In the broadest sense, this model comprises all the nodes, elements, material properties, real constants, boundary conditions and other features that are used to represent the physical system. ANSYS software is used to run the structural and thermal analysis for three type of model with six different materials.

MATERIAL PROPERTIES

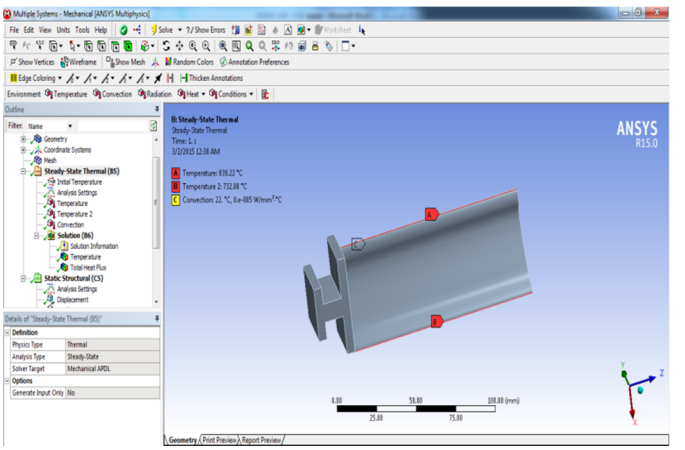
For the design calculations below properties are taken into consideration

PROPERTIES	UNITS	AL	GTD-111	IN-738	STAINLESS STEEL	TITANIUM	U-500
Young's modulus (E)	G.Pa	73	130	149	200	205	210
Poisson's ratio(μ)		0.33	0.33	0.3	0.3	0.33	0.3
Density(ρ)	Kg/m^3	2725	8870	8550	8025	4700	7800
Thermal Conductivity(K)	W/mK	180	16	14.3	33.5	10	16.2
Specific heat($C_{p)}$	J/KgK	880	460	510	448	544	500
Thermal Expansion(α)	^0C	23.3	9	12.5	14.5	8.8	17.5
Mass of 1st model(m)	Kg	0.155	0.507	0.488	0.458	0.266	0.4375
Mass of 2nd model(m)	Kg	0.152	0.497	0.479	0.45	0.2636	0.445
Mass of3rd model(m)	Kg	0.15	0.46	0.465	0.38	0.26	0.441

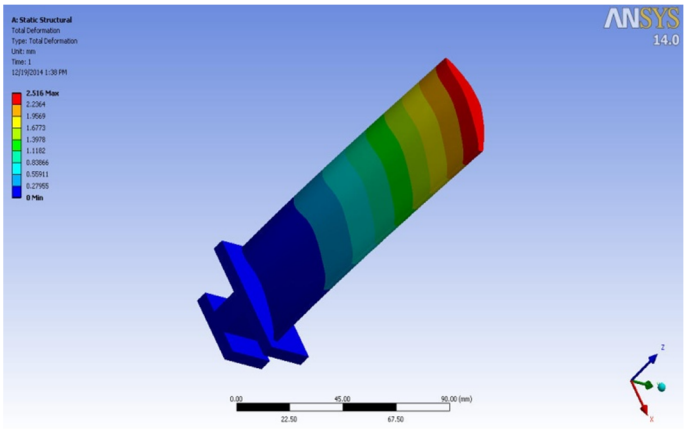
Symmetrical boundary condition is applied at support of rotor blade and axial, radial and centrifugal loading is considered as along X-direction 3.82 N , Y-direction 248.199 N and 3809 N loading applied in Z- direction. And thermal loading also applied as 839.22^{0}C temperature at load facing edge, 732.88^{0}C temperature applied at another edge and also convection coefficient is taken into analysis.



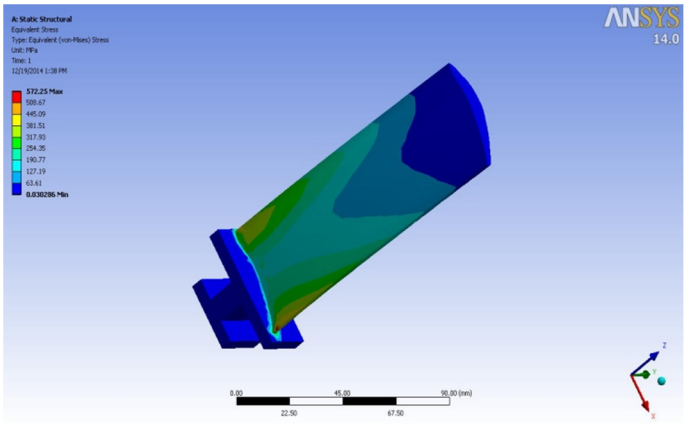
Structural loading applied in ANSYS



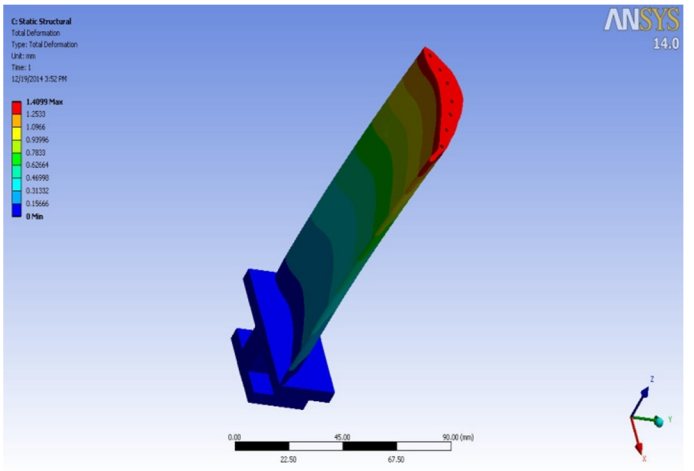
Thermal loading applied in ANSYS



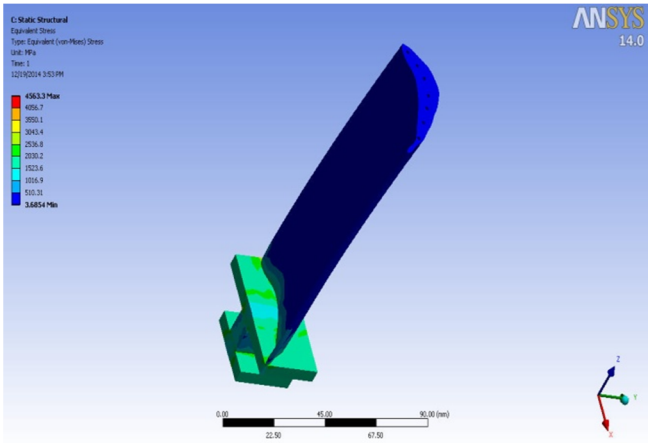
Deformation of aluminum solid model



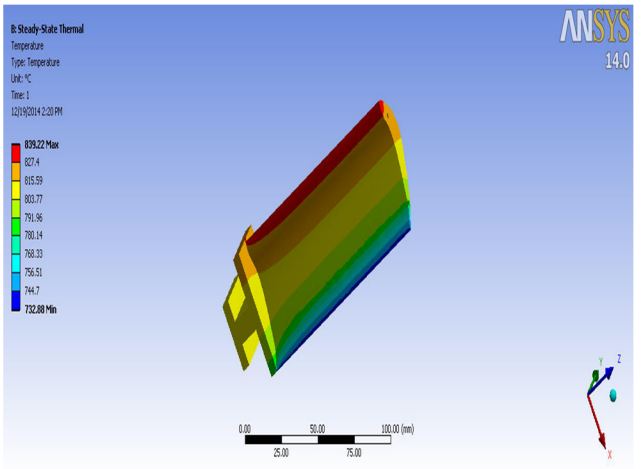
Stresses of aluminum solid model



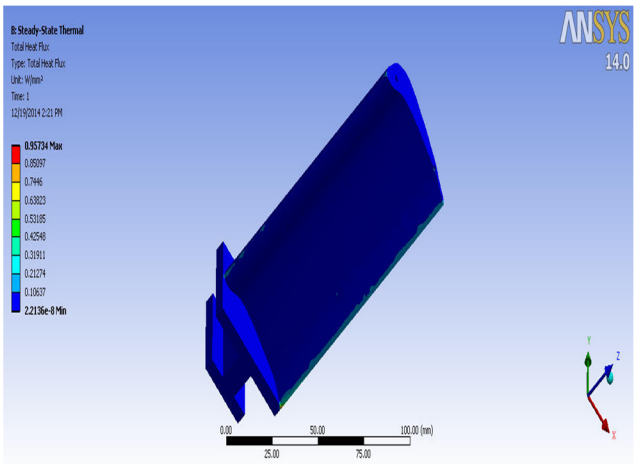
Deformation of titanium cooling ducts model



Stresses of titanium cooling ducts model



TEMP distribution of U-500 serpentine model



Heat flux of U-500 serpentine model

RESULT:

Coming to the analysis of all the six materials in three models, following values came into result.

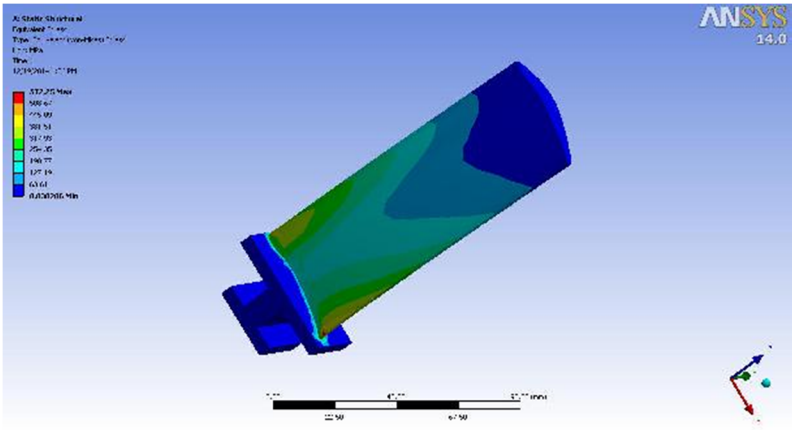
STRUCTURAL ANALYSIS

MODEL – 1 MODEL –2 MODEL --3

Deformation	Max	Min	Max	Min	Max	Min
AL	2.516	0	2.4542	0	2.456	0
GTD-111	1.4128	0	1.3781	0	1.3792	0
IN-738	1.2363	0	1.2056	0	1.2065	0
ST. STEEL	0.92104	0	0.89815	0	0.89882	0
TITANIUM	**0.89593**	**0**	**0.87394**	**0**	**0.87458**	**0**
U-500	0.87718	0	0.85538	0	0.856.2	0
Von-mises						
AL	572.25	0.030286	600.05	0.014802	605.68	0.028912
GTD-111	572.25	0.030286	600.05	0.014802	605.68	0.028911
IN-738	570.25	0.038237	593.93	0.027892	598.98	0.029968
ST. STEEL	570.25	0.038237	593.93	0.027892	598.98	0.029968
TITANIUM	**572.25**	**0.030286**	**600.05**	**0.014803**	**605.68**	**0.028911**
U-500	570.25	0.038237	593.3	0.027892	598.98	0.029968

Whenever the material properties changes, deformation may vary within the materials whereas stresses may not vary as in deformation. As we know that deformation is formulated as (PL/A**E**) in which young's modulus vary from material to material, so deformation varies in different materials.

Coming to stresses whenever load is induced in a material then only result vary in the material. Here we took only different material properties but the load induced is same on all the materials. So values in von-mises of different materials are almost same.


ANSYS
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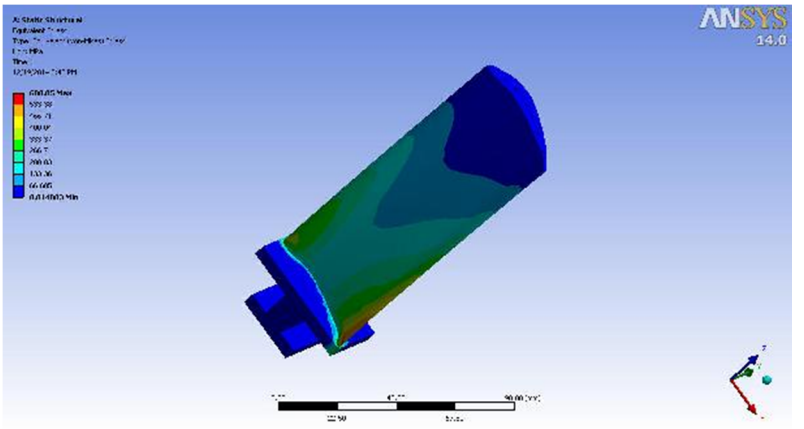
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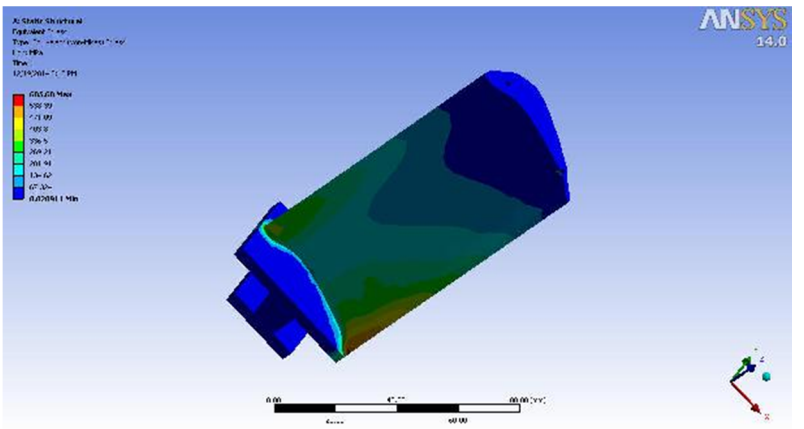
ANSYS
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As the turbine rotates the blade should deform in minimum length orelse there would be an impact between stationary and rotary parts in turbine. Hence there should be a minimum deformation in the rotor blade.

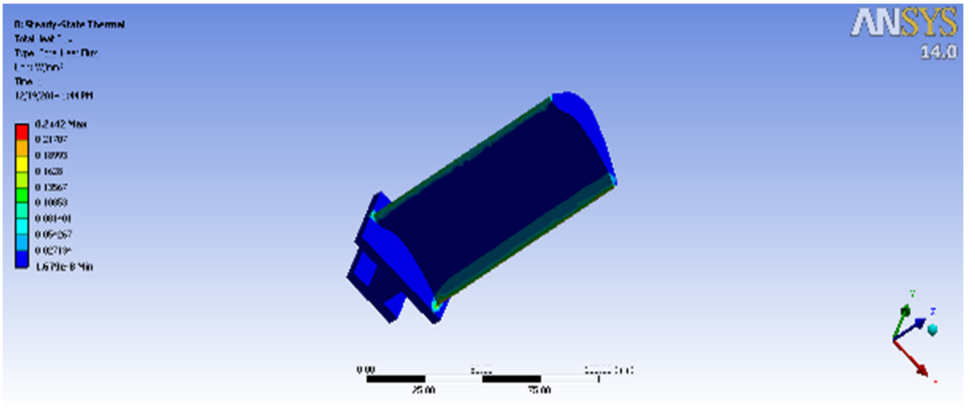
By taking this into consideration Titanium and U-500 has minimum deformation. From the turbine blade design properties density is low for titanium. So from structural analysis for three models **Titanium** is suited material for turbine blade.

THERMAL ANALYSIS

MODEL – 1 MODEL –2 MODEL --3

Temp	Max	Min	Max	Min	Max	Min
AL	839.22	732.88	839.22	732.88	839.22	732.88
GTD-111	839.22	732.88	839.22	569.83	839.22	732.88
IN-738	839.22	732.88	839.22	550.28	839.22	732.88
ST. STEEL	839.22	732.88	839.22	672.19	839.22	732.88
TITANIUM	839.22	732.88	**839.22**	**481.89**	839.22	732.88
U-500	839.22	732.88	839.22	571.93	839.22	732.88
Total heat flux						
AL	4.3956	3.0223	8.5761	9.0551	8.8145	9.5928
GTD-111	0.39072	2.6865	1.62	5.6597	0.94552	2.1863
IN-738	0.34921	2.401	1.5644	5.7736	0.84506	1.954
ST. STEEL	0.81808	5.6248	1.984	3.3988	1.9797	4.5776
TITANIUM	**0.2442**	**1.679**	**1.3832**	**5.8398**	**0.59095**	**1.3664**
U-500	0.39561	2.72	1.6261	5.644	0.95734	2.2136

Maximum temperatures are observed at the blade tip section and minimum temperature variations at the root of the blade. Temperature distribution is almost uniform at the maximum curvature region along blade profile. From the thermal analysis minimum temperature at the root of the blade is indicated in titanium.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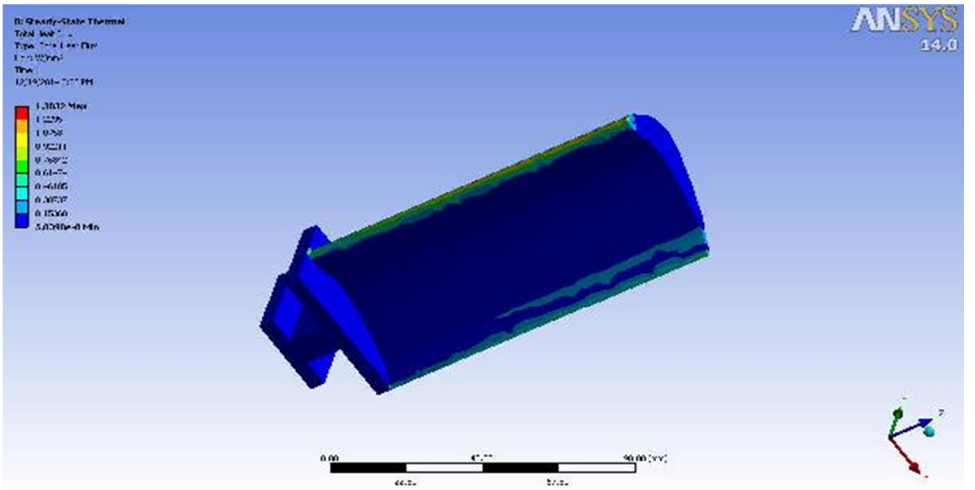
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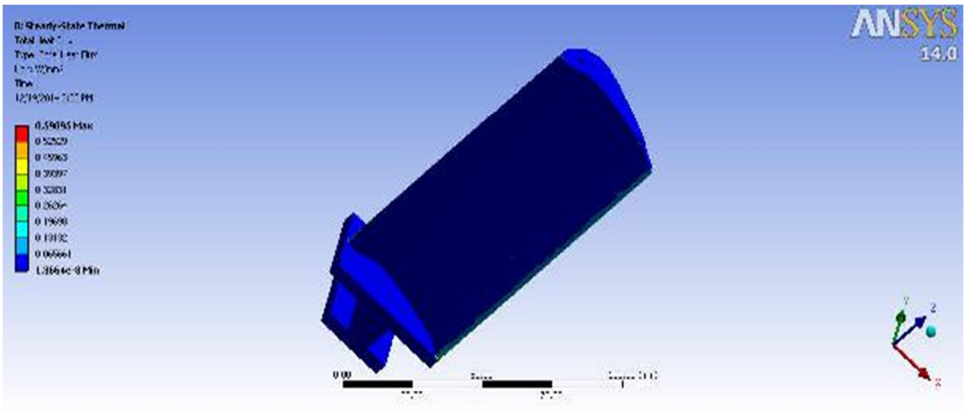
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Total heat flux is heat dispatched at the time of working of the turbine blade. The heat should dispatch in low rate and it was clearly examined in thermal analysis that Titanium is having low heat flux comparing to other materials.

CONCLUSION

Coming to three models, from the Ansys values, model 2 i.e., rotor blade with holes on the surface is having minimum stresses and heat is also less dissipated in the cooling passage model. Maximum temperatures are observed at the blade tip section and minimum temperature variations at the root of the blade.

We can also conclude that if the serpentine cooling passages are more in number than the holes on the rotor blade model, we can get better results in the serpentine model.

A serpentine cooling circuit, i.e., the aft switchback, may be utilized in high heat/high mechanical load areas, while tunable machined cooling holes may be used in lower heat load areas. This approach improves the overall efficiency of a cooling system, which allows less coolant usage, and reduced expense.

Hence from this analysis titanium is the best suited material with holes placed on the surface for the rotor blade.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

MODELING AND STRUCTURAL ANALYSIS OF MARINE PROPELLER BLADE

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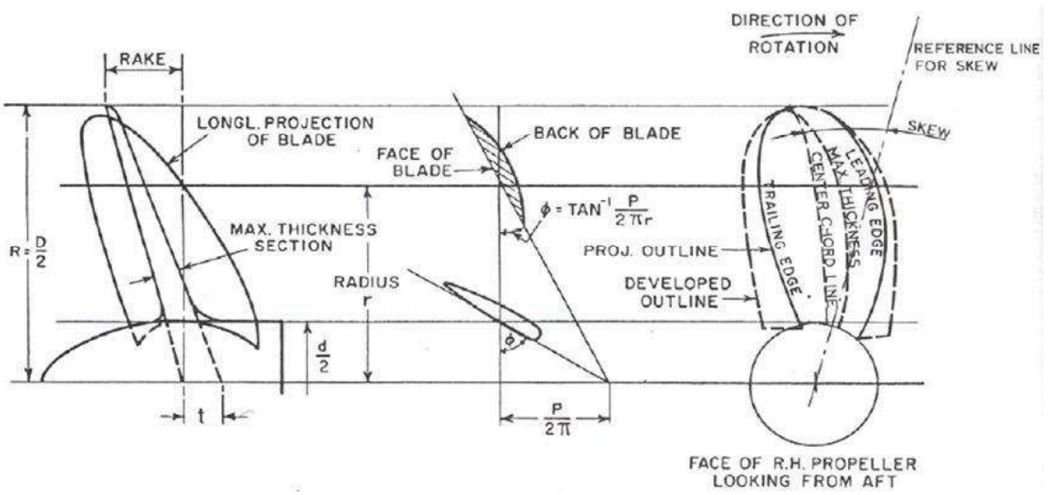
1.0 INTRODUCTION

Movement of a ship through water is achieved by the power so developed in the engine via the propeller shaft to the propeller in water. The distance or forward motion depends mainly on the propeller pitch which is defined as how far the propeller can travel for one revolution of the shaft. Propeller is a type of a fan that transmits power by converting rotational motion into thrust. A pressure difference is produced between the forward and the rear surfaces of the air foil-shaped blade, and a fluid (such as air or water) is accelerated behind the blade. Propeller dynamics can be modeled by both Bernoulli's principle and Newton's third law. A propeller is sometimes colloquially known as screw. In sculling, a single blade is moved through an arc; from side to side taking care to keep presenting the blade to the water at effective angle [1]. The innovation introduced with the screw propeller was the extension of that arc more than 360° by attaching the blade to a rotating shaft. Propellers can have a single blade, but in practice there is nearly always more than one so as to balance the forces involved. Typical propeller geometry is shown in Fig. 1 which outlines some of the terms used in designing a propeller for a ship. The drawing starts with the elevation view, which shows the side view, including the blade thickness and the rake angle. Rake takes advantage of the fact that the flow into the propeller is slightly inwards. It also increases the clearance between the blade and the hull. The blade thickness reduces away from the shaft center, so the nominal thickness

is the thickness projected as if the blade went all the way to the centerline.

The elevation view, which shows the sections and skew. Skew makes the propeller enter a given flow area less suddenly as it spins than if all of the sections were aligned. This reduces noise and change the loading along the blade . The fundamental theory of screw propeller is applicable to all forms of marine propellers. In its present form a screw propeller consist of a stream lined hub attached outboard to a rotating engine shaft on which are mounted two to seven blades. The blades are either solid which the hub detachable or movable. The screw propeller which has the characteristics motion of a screw revolves about the axis along which it advances; the blades are approximately elliptical in outline. The screw propeller is divided into the fixed pitch and controllable pitch propellers which are of the two types mainly used in the marine sector. The fixed screw propeller has a constant pitch with an increasing thickness from blade tip to the boss. The pitch of the propeller at any point is constant so that the value of the pitch will be ideal for calculation purposes. Controllable pitch propeller has a variable pitch; where the blades are rotated normally to the drive shaft by additional machinery usually hydraulic, the hub and control linkages running down the shaft. This allows the drive machinery to operate at a constant speed while the propeller loading is changed to match operating conditions. It also eliminates the need for a reversing gear and allows for more rapid change to thrust, as the revolutions are constant. This type of propeller is most common on ships such as tugs where there can be enormous differences in propeller loading when towing. This is comparable to running free, a change which could cause conventional propellers to lock up as insufficient torque is generated.



Designing formulas for 4 blade propeller (Wageningen B series propeller)

The initial design variable requirements of the propeller are given below:

1. Delivered power (*KW*)
2. Propeller rate of rotation (rpm)
3. Speed of ship (m/s)
4. Number of blades
5. Taylor's wake friction (*w)*.

The speed of ship (*Vs*), the number of propeller revolution (*n*), the blade number (*Z*) and the blade area ratio (A_e/A_0) are known while pitch ratio (P/D)

The speed of advance *VA* is obtained from *Vs* by model test or by using the formula:

Va= Vs (1 w)

Where w is the Wake friction (w=0.15).

The relationship between

$P_s = P_b \times \eta_s$

P_d= delivered power

$P_d = P_s \times \eta_s$

The power coefficient *Bp* can be calculated using

$B_p = P_d^{0.5} \times n / V_a^{2.5}$

Propeller thrust can be calculated using equation

$T = P_d \times \eta_0 / V_a$

η_0= propulsive coefficient

The optimum diameter of the propeller is given as

$D = \zeta \text{ opt} \times V_a / n$

Blade thickness ration = t0/ D

to = Maximum blade thickness

D = Propeller diameter

To determine the hub (Boss) diameter of the propeller, the relation
Boss (hub) diameter ratio *d* =

0.18D

Engine Brake Power (B P) - 85 Hp

Ship Speed (Vs) - 30Knots

Propeller diameter (D) - 11.5ins

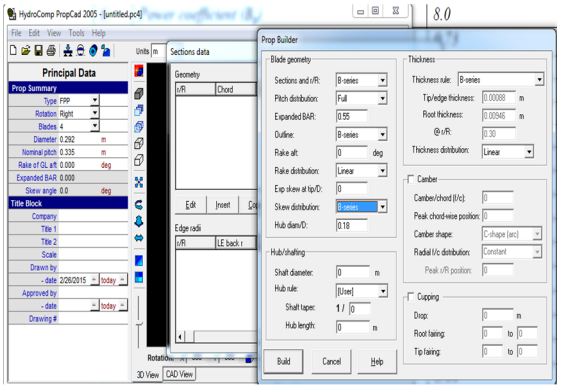
Pitch (P) - 13.2ins

Boss (Hub) diameter - 2.1ins

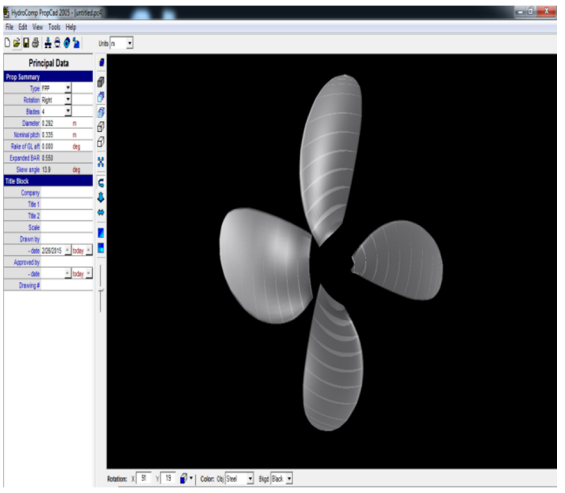
Expanded area ratio (A_E/A_o) - 0.55

HydroComp PropCAD:

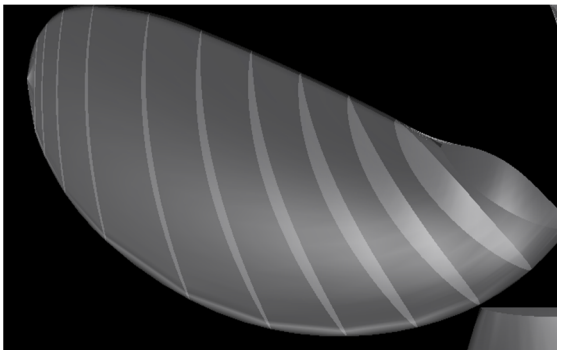
HydroComp PropCad is the industry-standard software for geometric modeling of marine propellers for design and manufacture. This tool provides automatic preparation of 2D design drawings, 3D offsets, thickness classification reports, and CAD/CAM data. Manufacturers, researchers and designers rely on PropCad for their modeling needs. The tool is widely used in over 40 countries for quickly generating propellers and design variants from small outboard production lines to large merchant ship propellers.



Dimensions considered in hydrocomp propcad

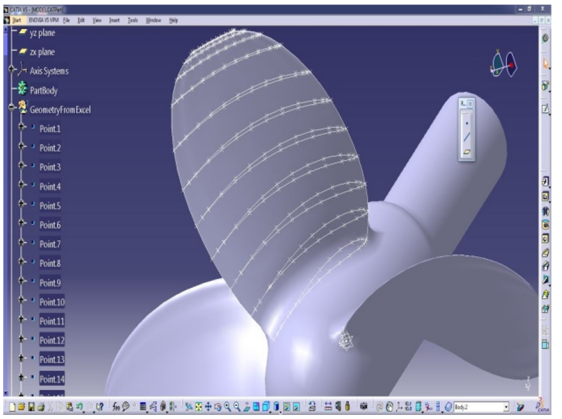


Automatically sections are created in software

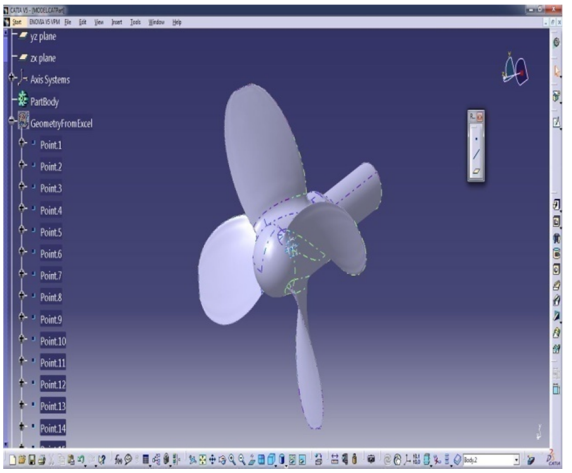


Detail view of single blade sections.

Initially, CATIA name is an abbreviation for Computer Aided Three-dimensional Interactive Application the French Dassault Systems is the parent company and IBM participates in the softwares and marketing. Here nearly 12 section x, y and z coordinates are taken from propcad software and imported in to CATIA using macros. And using multi-section solid, shaft commands total 3d propeller was created and shown as below.

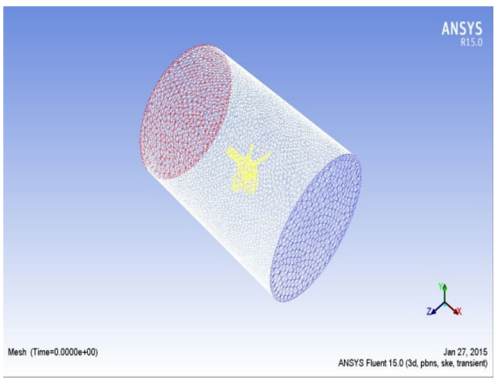


Model created in CATIA with sections

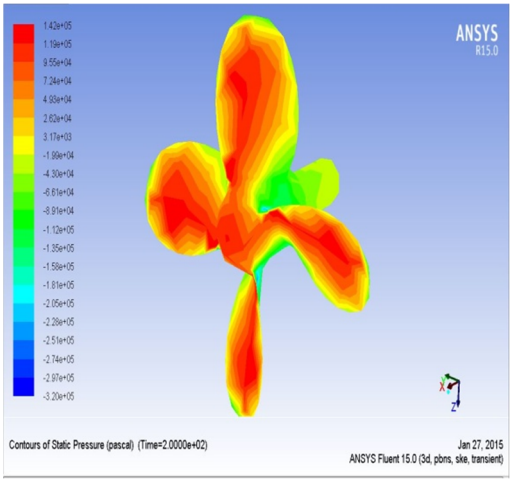


3d model prepared in CATIA

Fluent Inc. general-purpose computational fluid dynamics (CFD) software ideally suited for incompressible and mildly compressible flows. Utilizing a pressure-based segregated finite-volume method solver, FLUENT contains physical models for a wide range of applications including turbulent flows, heat transfer, reacting flows, chemical mixing, combustion, and multiphase flows. FLUENT provides physical models on unstructured meshes, bringing you the benefits of easier problem setup and greater accuracy using solution-adaptation of the mesh.



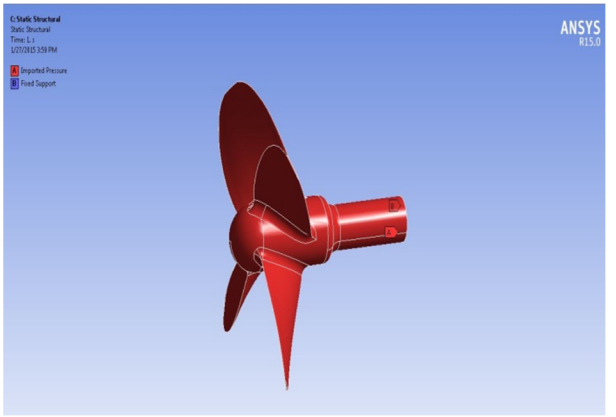
Domain prepared for fluent analysis



Pressure distribution in wall of propeller

FINITE ELEMENT METHOD

Finite element analysis is a computer based numerical technique for calculating the strength and behavior of engineering structures. It can be used to calculate deflection, stress, vibration, buckling behavior and many other phenomena. It can analyze elastic deformation or “permanently bent out of shape” deformation. The computer is required because of the astronomical number of calculations needed to analyze a large structure. The power and low cost of modern computers has made finite element analysis available to many disciplines and companies.

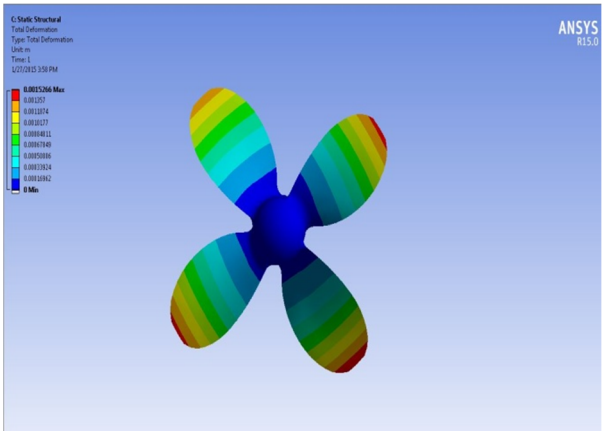


Imported pressure values from CFD to structural.

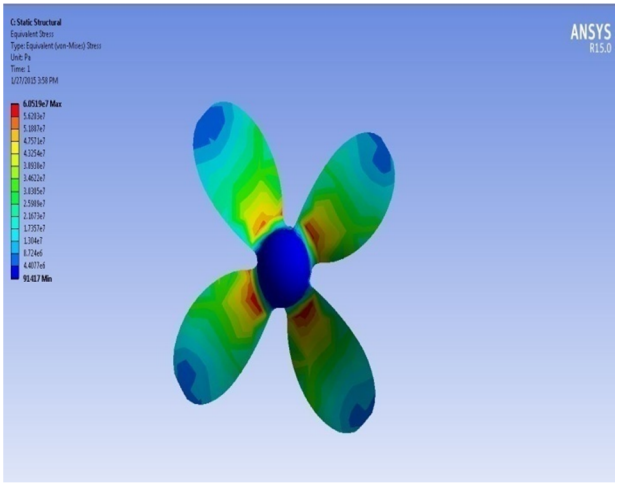
The same pressure distribution data imported to structural analysis in ANSYS to find of the deformation, stresses for three types of materials like aluminum, carbon epoxy and glass epoxy.

Material properties

	GLASS EPOXY (GEP215)	CARBON EPOXY(USN 150)	AL
EX(G.Pa)	35.5	131.6	
EY(G.Pa)	17.2	8.2	
EZ(G.Pa)	17.2	8.2	72
PRXY	0.22	0.281	
PRYZ	0.22	0.281	
PRZX	0.22	0.281	0.3
GXY(G.Pa)	3.7	4.5	
GYZ(G.Pa)	3.5	3.5	
GZX(G.Pa)	3.7	4.5	
DENSITY(Kg/m3)	2050	1550	2400



Deformation in propeller of aluminum



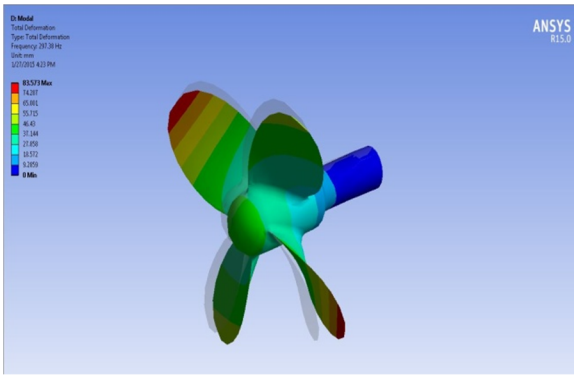
Stresses acting in propeller of aluminum

	AL	CARBON EPOXY	GLASS EPOXY
DEFORMATION (mm)	0.152	1.07	0.84
STRESSES (MPa)	6.05E+07	1.49E+08	6.53E+07

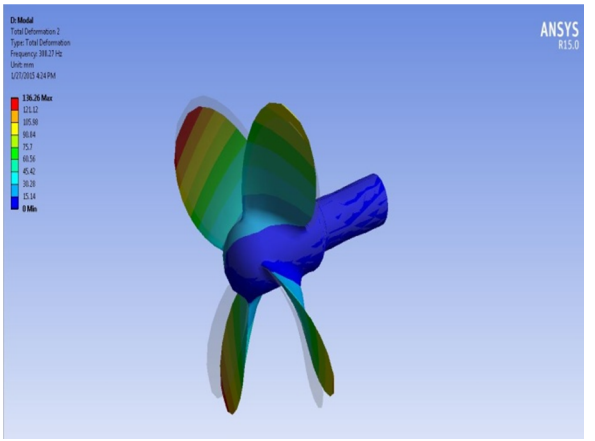
Deformation and stresses results obtained from ANSYS.

MODEL ANALYSIS

In present work model analysis is performed for three type of materials using fixed boundary condition at hub. First five model shapes are observed and maximum frequencies are occurred in aluminum propeller and minimum frequencies are in glass epoxy. Here glass epoxy material propeller has taken as optimum and minimum frequency model. The results are shown in table below.



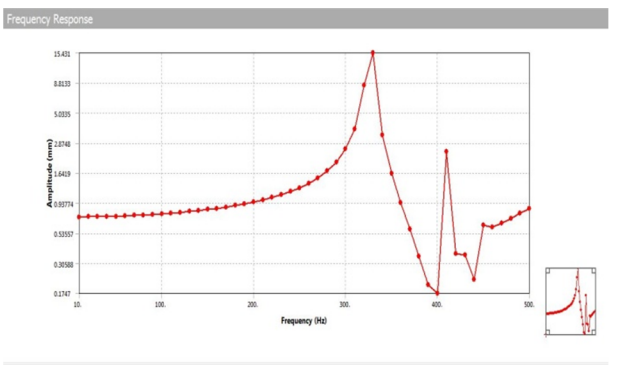
1ST mode shape of GLASS-EPOXY propeller



2 ND mode shape of GLASS-EPOXY propeller

	AL	CARBON EPOXY	GLASS EPOXY
1ST MODE	362.61	3267	297.38
2ND MODE	363.05	409.2	300.2
3 RD MODE	659.8	43755	300.76
4 TH MODE	946.3	444.1	465.01
5 TH MODE	956.4	600.7	481

Frequency response analysis are generally using for where the resonance will occur. Here same boundary conditions are considered and pressure applied and imported from fluent software. Nearly up to 1000 Hz are noted for harmonic analysis and at 659.8 Hz aluminum propeller having more deformation, 326.7 Hz resonance frequency for carbon epoxy and 465.01 Hz for glass epoxy.



Frequency response along Y-direction of carbon epoxy material.

Conclude

1. Propeller model dimensions are designed according to theoretically.

2. Model is prepared using PropCad and CATIA softwares.

3. Fluent, static, model and frequency response analysis are performed.

4. Minimum deformation propeller is aluminum propeller and second one is carbon epoxy material

5. Stresses also minimum in aluminum and glass epoxy materials and stresses are in allowable limit.

6. Minimum frequency model say optimum model and carbon epoxy having minimum values for five mode shapes. Using these frequencies harmonic analysis has been done.

7. According to weight and results carbon epoxy model is selected as optimum propeller.

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INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

জীবনানন্দের উপন্যাস : উপমা, চিত্রকল্প ও প্রতীক

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জীবনানন্দ দাশ তাঁর উপন্যাস রচনায় ভাষা প্রয়োগে অভিনবত্বের দাবি রাখে। ভাষার গুরুত্বপূর্ণ উপাদান হিসাবে উপমা, চিত্রকল্প ও প্রতীক-কে তিনি যথেষ্ট গুরুত্ব দিয়েছেন। বিশেষ বিশেষ তাৎপর্য বোঝাতে তাঁর উপন্যাসগুলিতে এদের ব্যবহার করেছেন। এক্ষেত্রে জীবনানন্দের শিল্প দক্ষতায় উপদানগুলিও যথেষ্ট অর্থবহ হয়ে উঠেছে। প্রসঙ্গত, জীবনানন্দের প্রথম পর্বে (১৯৩৩ সাল)'র থেকে দ্বিতীয় পর্বে (১৯৪৮ সাল)'র উপন্যাসগুলিতে উপমা, চিত্রকল্প ও প্রতীকের ব্যবহার অনেক বেশি। দ্বিতীয় পর্বের উপন্যাসের অনেক অংশ কলকাতা মহানগরীকে অবলম্বন করে রচিত হয়েছে। তাই নগরসভ্যতার বীভৎসতা এবং সেখানে বসবাসকারী মানুষজনের সীমাহীন লোভ, লালসা ও কদর্যতা প্রকাশ করার জন্য লেখকের উপমা, চিত্রকল্প ও প্রতীকের মত উপাদানের বিশেষ প্রয়োজন ছিল।

আলোচনার সুবিধার্থে পর্যায়ক্রমে জীবনানন্দের উপন্যাসে ব্যবহৃত উপমা, চিত্রকল্প ও প্রতীক-এর প্রসঙ্গ ও প্রয়োগের একটি সংক্ষিপ্ত পরিচয় দেওয়া হল।

উপমা :

জীবনানন্দের উপন্যাসে ভাষার গুরুত্বপূর্ণ উপাদান হল উপমা। এক্ষেত্রে তাঁর প্রতিভা প্রবাদে পরিণত হয়েছে। ''বোঝাবার ভাষা যেখানে শেষ হয় সেখানেই কথা বলে উপমা।''[১] প্রসঙ্গত, জীবনানন্দের প্রথম পর্বে (১৯৩৩ সাল)'র থেকে দ্বিতীয় পর্বে (১৯৪৮ সাল)'র উপন্যাসগুলিতে উপমা, চিত্রকল্প ও প্রতীকের ব্যবহার অনেক বেশি। দ্বিতীয় পর্বের উপন্যাসের অনেক অংশ কলকাতা মহানগরীকে অবলম্বন করে রচিত হয়েছে। তাই নগরসভ্যতার বীভৎসতা এবং সেখানে বসবাসকারী মানুষজনের সীমাহীন লোভ, লালসা ও কদর্যতা প্রকাশ করার জন্য লেখকের উপমা, চিত্রকল্প ও প্রতীকের মত উপাদানের বিশেষ প্রয়োজন ছিল।

জীবনানন্দ দাশ তাঁর উপন্যাসে প্রকৃতি ও প্রাণীজগতের সঙ্গে মানুষের উপমা ব্যবহার করেছেন। ''মানুষের সাধনা শরীরোত্তীর্ণতায় পৌঁছবার, কিন্তু তার সত্তা নানাভাবে খণ্ডিত ও কৃত্রিম। পশুসত্তা নির্মনন কিন্তু অখণ্ডিত, নির্মল। মানুষ অনেকখানই পশুবৃত্তির নিয়মের অধীন।''[২] তাই যৌনতাবোধের সংস্পর্শে এবং শ্বাসরোধকারী কিংবা সংকীর্ণ জীবন থেকে মুক্তি অথবা প্রাণের অন্তরঙ্গ ভালোবাসা প্রসঙ্গে জীবনানন্দ তাঁর উপন্যাসে পশু-পাখি, কীট-পতঙ্গ ও প্রকৃতিকে উপমা হিসাবে ব্যবহার করেছেন। পর্যায়ক্রমে এই সমস্ত উপমার প্রসঙ্গ ও প্রয়োগ সম্বন্ধে একটি সংক্ষিপ্ত পরিচয় দেওয়া যেতে পারে।

যৌনতাবোধে পশু ও কীট-পতঙ্গের উপমা -

১. 'যেন ভরা নদীর তীরে জঙ্গলের অন্ধকারে রাতের বাঘিনী
সহসা অনির্বাণ মানুষী হয়ে দাঁড়িয়েছে।' (সুতীর্থ)

২. যৌনকামনা লোলুপ অমরেশ - 'যেন দুটো ঠ্যাঙের বদলে আটটা ঠ্যাঙ অমরেশের মাকড়শার মতো, কেমন ল্যাং-ল্যাং, ল্যাং-ল্যাং করছে সবসময়েই; কখনো গাঢ় লাল কখনো গাঢ় সবুজ মাকড়শানীদের দেখছে বলে।' (মাল্যবান)

৩. সাপের উপমায় - 'চেহারার কোন বিষটিষ মরেনি তো? এখনও বেশ লেজে দাঁড়ায়?' (সুতীর্থ)

৪. 'মানুষটার দিকে তাকিয়ে টের পেলেন মণিকা যে এর ভেতর আবছা অজগর মোচড় দিয়ে উঠছে। সেটাকে মুহূর্তেই পাটের দড়িতে বদলে ফেলতে ফেলতে মণিকা বললেন।' (সুতীর্থ)

৫. 'পূর্ণ আড়মোড়া ভাঙতে ভাঙতে - বসে বাঁকিয়ে নতুন মাটির কেঁচোর মত শরীরটাকে পাক খাওয়াল কিছুক্ষণ।' (মাল্যবান)

৬. 'মেসের ঠাকুর বামদেব - মাঝে মাঝে মাকড়শার জালের মত জড়িত চোখের দৃষ্টি তুলে ঝি'র দিকে তাকাচ্ছে।' (মাল্যবান)

৭. 'কার্ত্তিক মাসের কুকুরের মতো দু্যাঙে দাঁড় করাব।' (সুতীর্থ)

এছাড়া হোঁদড়, হরিণী, বানর, শিয়াল, বেড়াল, ঘাসফড়িং, শুয়োপোকা, আরশোলা প্রভৃতি (পশু ও কীট-পতঙ্গ) উপমা হিসাবে ব্যবহৃত হয়েছে জীবনানন্দের উপন্যাসে।

শ্বাসরোধকারী কিংবা সংকীর্ণ জীবন হতে মুক্তি প্রসঙ্গে পাখির উপমা -

১. 'মণিকা একজন নিবিড় নিশীথটুঁটী স্বর্গীয় পাখির মতো নিমেষনিহত হয়ে ভাবছিলেন।' (সুতীর্থ)

২. 'কেমন বসন্ত রাতে ধনেশ পাখির মতন দেখাচ্ছে তার চোখ।' (জলপাইহাটি)

এছাড়া ময়ূর, মরাল, তিতির, চন্দনা, শামকল, মাছরাঙা, কাকাতুয়া, পেঁচা ও বিভিন্ন অনামা হলুদ ও সবুজ পাখিরা তাঁর উপন্যাসে উপমা হিসেবে ব্যবহৃত হয়েছে।

প্রাণের অন্তরঙ্গ ভালোবাসা প্রসঙ্গে প্রকৃতির উপমা -

১. 'আমি নির্ঝরের জল ভালোবাসি।' (জলপাইহাটি)

প্রাণের গভীর-গভীর তৃষ্ণার কথা বলতে গিয়ে এ ধরনের উপমা ব্যবহৃত হয়েছে। ওয়াটার-কুলারের জলভর্তি কাচের কুঁজো, রেফ্রিজারেটরে নানারকম পানীয় আর স্কোয়াশ, বরফ কুচি ফেলা ঠাণ্ডা কাচের গেলাস এই সবের সামনে বসে 'জলপাইহাটি'র নিশীথ সেনের কাতর আবেদন - 'আমি নির্ঝরের জল ভালোবাসি।' উপন্যাসের প্রেক্ষাপটে নির্ঝর-নির্ঝর-নির্ঝরের জল - শব্দটি বারবার ধ্বনিত হতে থাকে। তাই, কোন ব্যাখ্যার দ্বারা এই সৌন্দর্যকে ধরে ফেলা প্রায় অসম্ভব। সুতরাং 'আতার ক্ষীরের মত' প্রকৃতি থেকে নেওয়া এমন উপমা আমাদের অভিভূত ও মুগ্ধ করে।

উল্লেখিত উপমাগুলি ছাড়াও মানবজীবনের বিচিত্র রহস্যময়তা কিংবা মানব মনের কুটিল গ্রন্থির পরিচয় দিতে গিয়ে জীবনানন্দ দাশ তাঁর উপন্যাসে আরও অনেক উপমা ব্যবহার করেছেন। প্রসঙ্গত, সেগুলি সবই ভিন্ন

ভিন্ন অর্থে প্রযুক্ত। যেমন -

১. অনায়ত্ত পৃথিবী প্রসঙ্গে - 'সব সময়ই বাণ মাছের মত সটকে যাচ্ছে পৃথিবীটা।' (জলপাইহাটি)

২. প্রাচীন আদর্শের ব্যর্থতা বোঝাতে - 'যেমন পচা ডিমের পিচকরিতে পোঁদ ভিজিয়ে দাঁড়িয়ে থাকা।' (জলপাইহাটি)

৩. মানুষের রোগের প্রসঙ্গে - 'ওটা বুঝি বাস্তু সাপ, ঘরে ঘরেই আছে?' (সুতীর্থ)

৪. সমকালে কলকাতায় ট্রাম স্টাইক বোঝাতে - 'ওতো গৃহিনী রোগ, ও সারবে না।' (সুতীর্থ)

৫. সংশয় ও অনিশ্চয়তা - 'চিতল মাছের ঘাই মেরে অন্ধকারে জলের মতো পাক খেয়ে বিহ্বল হয়ে বললেন যেন বিরূপাক্ষ।' (সুতীর্থ)

৬. বীভৎসতা বোঝাতে - 'দেশলাইয়ের আগুনে ছোলা মাংসের চাঙ্গড়ের মতো দেখাচ্ছিল মল্লিকের মুখটাকে।' (সুতীর্থ)

৭. হঠাৎ ক্ষোভে ফেটে পড়া বোঝোতে - 'মাঝপথে টায়ার ফাটিয়ে দুরন্ত ট্রাকের মত ফেটে পড়ে ম্যানেজিং ডিরেক্টর বলল।' (সুতীর্থ)

৮. বহু পুরনো রোগ প্রসঙ্গে - 'মনে হল পাঁজরের ভেতর থেকে একটা গলিত ব্যাঙ হাঁকড়ে উঠেছে।' (সুতীর্থ)

৯. স্থূলস্বভাব বিরূপাক্ষ ও সূক্ষ্মমননী জয়তীর বাক্যালাপ - 'যেন হোঁদড়ে, হরিণীতে শীতসকালের কথিকা তৈরি হচ্ছে নদীর এপার-ওপার থেকে।' (সুতীর্থ)

১০. বিরূপাক্ষের সঙ্গে শীতলভাবে জয়তীর কথা - 'বর্ষাকালের লাউক্ষেতের কাঁকড়ানীর মতো।' (সুতীর্থ)

১১. মণিকার রূপ প্রসঙ্গে - 'দেবাংশী উজ্জ্বল চিতল মাছের মতো।' (সুতীর্থ)

১২. আত্মবিশ্বাসের অভাব বোঝাতে - 'বেড়ালের থেকে চিতে বাঘ, চিতে বাঘ থেকে বেড়াল সত্তায় আসা-যাওয়া করতে করতে বললে।' (মাল্যবান)

সুতরাং জীবনানন্দের উপন্যাসে বিভিন্ন উপমা বিভিন্ন অর্থে ব্যবহৃত হয়েছে। কোন কিছুই এখানে স্পষ্ট নয়। তাই জীবনানন্দের উপন্যাসের উপমা বহু পাঠকের কাছে বহু রকম ইঙ্গিত স্থাপন করে।

চিত্রকল্প :

ইংরেজী 'ইমেজ' শব্দের বাংলা প্রতিশব্দ 'চিত্রকল্প'। প্রখ্যাত ইংরেজ কবি সিসিল ডে ল্যুইস তাঁর সুপরিচিত গ্রন্থ 'দি পোয়েটিক ইমেজ' (১৯৪৭)-এ চিত্রকল্প বা ইমেজের সংজ্ঞা দিতে গিয়ে বলেন - ইমেজ (চিত্রকল্প) হল - 'আ পিকচার মেড আউট অব ওয়ার্ডস্।' অর্থাৎ 'শব্দ দ্বারা নির্মিত চিত্র'। এখানে 'পিকচার' অর্থাৎ 'ছবি' শব্দটি কেবল 'দৃষ্টিগ্রাহ্য' রূপ রচনার মধ্যেই সীমাবদ্ধ থাকে না। চোখ ছাড়াও অন্যান্য ইন্দ্রিয়গুলির

দ্বারা যে সংবেদন পাওয়া যায়, যেমন - শ্রুতি, ঘ্রাণ, স্পর্শ, স্বাদ এবং গতিময়তারবোধ-এর প্রতিটিকেই মূর্ত করে তোলে চিত্রকল্প বা ইমেজ শব্দটি। সুতরাং শব্দ দ্বারা নির্মিত যে কোন ইন্দ্রিয় সংবেদনার স্মৃতিনির্মাণই হল ইমেজ বা চিত্রকল্প।

একটি উদাহরণের সাহায্যে ইমেজ বা চিত্রকল্পের স্বরূপটিকে বুঝে নেওয়া যেতে পারে। প্রসঙ্গত, ''মানুষ যখন শব্দ শেখেনি, কিংবা বোঝেনি ভাষার - প্রকাশ ক্ষমতার কারিগরি- তখনও সে চোখ মেলে দেখেছে পৃথিবীর নানা দৃশ্য। মানুষের প্রথম শব্দজ্ঞানের সঙ্গে এই ছবির অনুভব ওতপ্রোত। শিশু একটি বস্তুর সঙ্গে একটি বিশেষ শব্দকে অন্বিত করতে শেখে। তারপর বস্তুটি না থাকলেও শব্দটি উচ্চারণ করলে তার মনে ভেসে ওঠে বস্তুটির স্মৃতিচিত্র। ...'গোলাপ' বললে প্রথমেই গোলাপের ছবি দেখব মনে মনে। 'গোলাপের গন্ধ' বললে গোলাপের রূপ ও ঘ্রাণ - দুই-ই মনে আসবে একই সঙ্গে। রূপ বাদ দিয়ে কেবল ঘ্রাণ নয়।''[৩] অতএব, কোন বস্তুর দৃষ্টি গ্রাহ্যরূপ নয়, বরং বস্তুটির স্পর্শ, ঘ্রাণ, স্বাদ অর্থাৎ ইন্দ্রিয় সংবেদনার স্মৃতি নির্মাণই হল ইমেজ বা চিত্রকল্প।

চিত্রকল্প বিষয়ে একটি গুরুত্বপূর্ণ প্রশ্ন আছে। কারণ, আমরা একই নিঃশ্বাসে উচ্চারণ করি 'উপমা চিত্রকল্প'। কিন্তু প্রশ্ন হল উপমা আর চিত্রকল্প কি একই? এ প্রসঙ্গে শ্রদ্ধেয় সমালোচক বলেন -''স্পষ্ট করে বলতে চাই - উপমা ও চিত্রকল্প এক নয়। কিন্তু আছে সাদৃশ্যের বহু উপাদান। 'উপমা' হল শব্দ বিন্যাসের দ্বারা দু-টি বি-সদৃশ্য বস্তুর মধ্যে সাদৃশ্যের একটি তুলনা করা। সেই তুলনার মধ্য দিয়ে কাব্যের উপভোগ্যতা বাড়ানো। আর 'চিত্রকল্প' হল শব্দ দিয়ে ছবি গড়ে তোলা। প্রতিটি উপমাই কোন না কোন অর্থে চিত্রকল্প। 'ফুলের মত শিশু' বললে 'ফুল' ও 'শিশু'র ছবি কল্পনায় দেখতে পাব। কিন্তু সব চিত্রকল্পই উপমা নয়, উপমাত্মক ব্যতীতও চিত্রকল্প হতে পারে। জীবনানন্দের 'রূপসী বাংলা'র মধ্যে তার অনেক দৃষ্টান্তও আছে। কেবলই বর্ণনা, উপমা নেই। কিন্তু পাঠকের মনে ভেসে ওঠে গ্রাম-বাংলার ছবির পর ছবি।''[৪]

প্রসঙ্গত, জীবনানন্দ দাশ তাঁর উপন্যাসে অনেক সময় শব্দ দিয়ে ছবি এঁকেছেন। দেখতে দেখতে যে ছবি অদৃশ্য হয়ে রূপান্তরিত হয় সঙ্গীতে। সেই সঙ্গে তার রণন দীর্ঘস্থায়ী বাজে হৃদয়ের অতলান্ত কোন বিন্দুতে। যেমন - ''প্রকৃতিতে এসে পড়ত রৌদ্রের ফোয়ারা, নীলউজ্জ্বল চক্রবাল, আকাশে হরিয়াল, ফিঙে, বক, বড় বড় সুন্দর ওয়াক পাখি, কলেজের ময়দান পেরিয়ে খানিকটা দূরে গেঁয়ো রাস্তা ঘেঁষে টি টি (ধূ ধূ নয়) ! তেপান্তর, ঝিল, কানসোনা, মধুকূপী পরথুপি ঘাস, শবের বন, শনের হোগলার ক্ষেত, অপরিমেয় কাশ, হঠাৎ এক আধটি নিখুঁত মুখ সৌষ্ঠব, স্ত্রী লোকেরই, আরো দূরে বুনো হাসের জলামাঠ, স্নাইপ, সকালের উড়িসুড়ি নিস্তব্ধতা তখন ভাল লাগত নিশীথের...''(জলপাইহাটি)। সুতরাং উদ্ধৃতিটিতে শব্দগুলো দিয়ে জীবনানন্দ যে ছবি এঁকে তুললেন, তা রসঘন হল ছবি মুছে গিয়ে সৃষ্টির মধ্যে। শব্দগুলো কল্পবক্ষে ছবি তৈরী করেই যেন শরীরের নানা সূক্ষ্মবৃন্তে এমন সমমেল সৃষ্টি করতে থাকল, জন্ম নিল সঙ্গীতে। যা শ্রাব্য কোন রাগের চাইতে সহস্রগুণ ক্ষমতাসম্পন্ন।

উদাহরণ হিসাবে আর একটি দৃশ্যের কথা উল্লেখ করা যেতে পারে। মধ্যরাতে নিশীথের ঘর দিয়ে, বন্ধুপত্নী নমিতা স্নানন্ত হেঁটে চলে গেল। এই টুকুই বাস্তব ছবি। এক্ষেত্রে জীবনানন্দ সাহিত্য বাস্তবতায় তা কিভাবে ছবি এঁকে সঙ্গীত সৃষ্টি করেছেন দেখে নেওয়া যেতে পারে। ''সমস্ত শরীরটাই জল; বাথরুমের থেকে নাইতে নাইতে জলের ভিতর থেকেই উঠে এসেছে সে। গা মোছা তো দূরের কথা, তোয়ালেটা অব্দি নিংড়ে নেয়নি। একেবারে ভিজিয়ে তিতিয়ে এসেছে 'নিশীথের ঘরটাকে, নিশীথ যদি জেগে ওঠে - ভিজে ঘরদোর, ভিজে বই-কাগজ দেখে কোন জলজিনী নারীর কথা ভাববে কি সে-ঢাকুরিয়া হ্রদ থেকে উঠে এসে রাতে হানা দিয়েছিল, নাকি

ছাদ চুঁইয়ে বৃষ্টি পড়েছিল - জানালা দিয়ে জলদেয়াসিনী ঢুকেছিল ঘরের ভিতর পঁচিশটা জল পায়রা উড়িয়ে? এই সব মিলিয়ে যা হয়, নমিতা একাই সেই জল, জলপায়রা, জলদেয়াসিনী, জলবৃষ্টি, হ্রদের জল'' (জলপাইহাটি)। সুতরাং - ''দেহ, জল, জলের দাগ, ভিজে তোয়ালে সমস্ত ছবির কোলাজ ফোকাসচ্যুত হয়ে বেজে উঠল মনের গভীরে সঙ্গীত। মিয়া কি মল্লার, নাকি, মিয়া কি মল্লারের সঙ্গে রাগবসন্ত-এর অদ্ভুত পাঞ্চ?''[৫]

এছাড়াও, জীবনানন্দের উপন্যাসে বহু চিত্রকল্পের ব্যবহার লক্ষ্য করা যায়। যেগুলি সমাজ ও সমকালের মানুষের নানান অভিব্যক্তির প্রকাশ বলা যেতে পারে। যেমন -

১. কামনাতপ্ত চিত্র - অমরেশের উদ্দেশ্যে বলা হয়েছে - 'আঁশটে দুধরাজের মতো ঝিকিয়ে উঠেছে।' (মাল্যবান)

২. মিলনাকাঙ্ক্ষামেদুর রূপচিত্রর বর্ণনা - 'অপরূপ চিত্রিণী যেন আজ শঙ্খিনী হয়ে উঠেছে - খাচ্ছে না কিছু উৎপলা।' (মাল্যবান)

৩. স্মৃতি চিত্র - 'রোদের ভেতর পেয়ালাগুলো হরিতকীর ধূসরতা পেরিয়ে হঠাৎ হীরে হয়ে ঝিকমিক করে উঠেছে।' (সুতীর্থ)

৪. অসৎ চিত্র - 'বিরূপাক্ষের মতন একটা মানুষ - ওর টাকা তো ভদ্র অভদ্র সব ঘরের বাঁট টেনে আদায় করা।' (সুতীর্থ)

৫. চরম অসহায়তার চিত্র - 'ঘাস খেতে খেতে হঠাৎ চুনো পাথরের মত রঙের এক একটা গাভী যেমন নাড়ীর একটানে চোখ তুলে, মুখতুলে দাঁড়ায়, খুঁটোয় টান পড়ে, গলায় টান পড়ে - দড়িটা একেবারে টান টান হয়ে গেছে বলে, অর্চিতা তেমনি কেমন একটা নিস্তব্ধ অব্যক্ত ভাবে দু-এক মুহূর্ত দাঁড়িয়ে রইল।'(মাল্যবান)

৬. দায়বদ্ধতার চিত্র - 'বিরূপাক্ষ একটা বড়, অবসন্ন হাই তুলে বললে - যত বড় বোয়ালেই হোক না কেন জয়ন্তী, আমার মত বঁড়শির কেঁচোর কাছেও তাকে আসতে হয়েছিল - ভালোবেসেছিলুম বলে।' (সুতীর্থ)

৭. সৌন্দর্য চিত্র - 'কিন্তু আপনি এসে গয়াসুরটিকে নিকেশ করে যা সাজিয়ে দিলেন ব্যাপারটা, ওরকম করে বিছানা সাজিয়ে বসে থাকে নতুন বউ।' (সুতীর্থ)

৮. অসম্ভবতার চিত্র - 'কিন্তু সেরকম কতগুলো ন্যাঙ ন্যাঙে মানুষকে দিয়ে ফ্যাক্টারি চালানোও যা অন্ধকার রাতে একটা বালিশকে ধানজমি ভেবে ক্ষেত্র প্রস্তুত করাও তাই।' (সুতীর্থ)

৯. ধূর্ততার চিত্র - 'কিন্তু বিরূপাক্ষ তো আজকের নয়ালপাখি নয়, অনেক দিনের পুরনো ভিটের হত্তেল ঘুঘু।' (সুতীর্থ)

সুতরাং জীবনানন্দের উপন্যাসে বাস্তব জীবনের সংগ্রাম অপেক্ষা মননজীবন ও তত্ত্বভাবনা বেশি প্রাধান্য পেয়েছে। তাই চিত্রকল্পলোকে উপমার মত পশু-সরীসৃপ-কীটের তুলনায় পাখি-মৌমাছি-ভ্রমর-

জিন-পরি-জলপরিরা প্রধান উপকরণ হিসাবে ব্যবহৃত হয়েছে। সেই সঙ্গে গ্রহতারকাময় নক্ষত্রলোকও সেখানে একটি প্রধান চিত্রকল্পের জায়গা নিয়েছে। সবশেষে, বলা যেতে পারে, জীবনানন্দের চিত্রকল্প নির্মাণের দিকে চোখ রেখে তাঁর উপন্যাস পড়তে গেলে ইমেজের অরণ্যে বারবার পথ হারাতে হবে আমাদের। প্রসঙ্গত, ''জীবনানন্দের চিত্রকল্পকে কোন স্থির ব্যাখ্যার ছক সাজিয়ে বোঝানো অসম্ভব। জীবনানন্দের চিত্রকল্পকে কেবল এজরা পাউণ্ড-এর উক্তি দিয়েই অনুভব করা যেতে পারে। 'পোয়েট্রি' পত্রিকায় (হ্যারিয়েট মনরো সম্পাদিত) 'আ ফিউ ডোন্টস (A Few Don'ts, মার্চ, ১৯৯৩) নামক একটি লিখনে তিনি চিত্রকল্প ব্যাখ্যা করতে গিয়ে বলেছিলেন - 'An 'Image' is that which presents an intellectual and emotional complex in an instant of time.' এই লেখাটিতে ইমেজের কোন সংজ্ঞা দেওয়ার চেষ্টা করা হয়নি। উপমাগুনের প্রসঙ্গই নেই। এজরা পাউণ্ড বলেছেন - ইমেজ এমন এক শিল্প-যৌগ যা মুহূর্তের মধ্যে মনকে ব্যাপ্তি ও মুক্তি দেয়, আর কিছুই নয়। সর্বোত্তম স্তরের ইমেজ সেই অভিজ্ঞতাই নিয়ে আসে আমাদের মনে।''[৬] সুতরাং জীবনানন্দের চিত্রকল্পগুলিও উপন্যাস পাঠকের মনকে মুক্তি দেয় অনন্ত - বিস্তারে।

প্রতীক :

ভাষা শিল্পে প্রতীকে (সিম্বল)'র আবির্ভাব শব্দ চিত্র হয়েই। যে বস্তুর সংকেত মাত্র মনে অনুভূতিপুঞ্জ জেগে ওঠে সেই বস্তু বা প্রাণীই হল প্রতীক। যেমন - 'জাতীয় পতাকা' বললে দেশপ্রেমের অনুভব জাগবে। 'প্রদীপ' বললে স্মৃতিতে জাগবে আলোকময়তা। সেই সঙ্গে 'সূর্য' বললে জাগবে মঙ্গলবোধ বা শাশ্বত শুভবোধ। ''চিত্রকল্প কিন্তু প্রায়শই এমন একটি বস্তুবাচক শব্দ নির্ভর নয়। চিত্রকল্পে একটি পূর্ণ ছবি চাই। সেই ছবির মধ্যে চাই, খুব সামান্য হলেও, একটু গতি - একটু কিছু ঘটে ওঠা। কিন্তু প্রতীকত্ব অনেকটাই স্থিরতর। চিত্রকল্প বিভিন্ন কবিতায় অনুভূতির বিভিন্নতা নিয়ে আসতে পারে। কিন্তু প্রতীক স্থির অনুভব নির্ভর। যেমন - 'অশ্ব' প্রতীক 'শৌর্যময় বেগ'কে বোঝায়। 'সর্প' প্রতীক বোঝায় খলতা।''[৭] সুতরাং দীর্ঘ সাহিত্য প্রয়োগ বাহিত হয়ে প্রতীক নির্দিষ্ট হয়। কিন্তু চিত্রকল্পে প্রতিটি ছবি স্বতন্ত্র।

জীবনানন্দের ভাষা প্রতীক পরিবাহী। যদিও জীবনানন্দ দাশ আক্ষরিক অর্থে প্রতীকবাদী লেখক নন। তবুও তিনি বলেছিলেন, মানুষের ভাষা অনুভূতির দেশ থেকে আলো না পেলে নিছক শব্দমাত্র। প্রসঙ্গত, তিনি শব্দের সীমা অতিক্রমণের কথা ভেবেছিলেন। এই অনুভূতির দেশে যেতে হলে আমাদের অবশ্যই প্রয়োজন প্রতীক। সাধারণ অর্থে প্রতীক নানাধরনের হতে পারে। যেমন - প্রচলিত প্রতীক, আকস্মিক প্রতীক, বিশ্বজনীন প্রতীক প্রভৃতি। সুতরাং যখন লেখকের মনোজগতের অন্তঃরহস্য জটিল ও আবিষ্ট হয়ে ওঠে, তখন সেই জটিলতার রহস্য ভেদ করার জন্য প্রতীকই হয়ে ওঠে লেখকের প্রধান অবলম্বন ।

জীবনানন্দের উপন্যাসে হরিণ, বনহংস, ঘোড়া, বিড়াল, ফড়িং, দোয়েল, চিল, শকুন, শেয়াল, বাঘ, প্যাঁচা, সাপ, শামুক, গুগলি, কাঁকড়া, চিংড়ি, মাকড়শা, টিকটিকি, ইঁদুর, শামকল, ভোঁদড়, বানর প্রভৃতি মানবেতর প্রাণীরা উপন্যাসে নিছক শব্দরূপে ব্যবহৃত হয় না। এরা প্রতীকরূপে ভিন্ন ভিন্ন অর্থে প্রযুক্ত হয় । যেমন -

১. হরিণ - প্রাণ, সৌন্দর্য, চাঞ্চল্য, ভীরুতা, শান্ত স্বভাব প্রভৃতি।
২. ঘোড়া - নির্জ্ঞান, যৌবনকামনা, শক্তি প্রভৃতি।
৩. সাপ - কামতাড়না, যৌন আকাঙ্ক্ষা প্রভৃতি ।
৪. ঘুঘু - ধূর্ত, চতুর প্রভৃতি।

৫. দোয়েল, ফড়িং - নিঃসহায়তা, অসহায়তা প্রভৃতি ।

৬. চিল - বিরহ ।

৭. শকুন - সাম্রাজ্যবাদ, অন্ধকারজগৎ প্রভৃতি।

৮. প্যাঁচা - বিজ্ঞতা, মৃত্যু, রাত্রি, কুশ্রী বা অসুন্দর প্রভৃতি।

৯. ব্যাঙ, ইঁদুর - কুশ্রী, নোংরা প্রভৃতি।

১০. শেয়াল - অন্ধকার, অদ্ভুত আঁধার প্রভৃতি।

১১. সজারু, কাকাতুয়া, শামুক, গুগলি, কাঁকড়া, চিংড়ি, টিকটিকি, বেড়াল, ভোঁদড়, বাঘিনী - কামনাতপ্ত, যৌন-ইচ্ছা প্রভৃতি।

১২. শিশির, ঘাস - কোমল প্রাণ প্রভৃতি।

১৩. শ্মশান - যুগচেতনা, শূন্যতা, বিষণ্ণতা প্রভৃতি।

১৪. নক্ষত্র - আলো, দূরের আলো প্রভৃতি।

জীবনানন্দের উপন্যাসে এই সমস্ত প্রতীক কখনও কখনও উপমা ও চিত্রকল্পের লক্ষণে আক্রান্ত হয়। তখন এদের সহজে আলাদা করা বা পৃথক কোন চিহ্নে চিহ্নিত করা প্রায় অসম্ভব হয়ে ওঠে।

তথ্যসূত্র :

১. চক্রবর্তী সুমিতা - জীবনানন্দ : সমাজ ও সমকাল, জীবনানন্দ এবং তাঁর গল্প উপন্যাস, সাহিত্যলোক, কলকাতা, মার্চ - ১৯৮৭, পৃ. ৬৫।

২. ঐ - পৃ. ৬৫।

৩. চক্রবর্তী সুমিতা - জীবনানন্দ : সমাজ ও সমকাল, চিত্রকল্পে জীবনানন্দ, সাহিত্যলোক, কলকাতা, ২য় সংস্করণ, ৮ মে - ২০০১, পৃ. ১৭৩।

৪. ঐ - পৃ. ১৭৪।

৫. রুদ্র সুব্রত - সম্পা - জীবনানন্দ : জীবন আর সৃষ্টি, জীবনানন্দের উপন্যাসে - আঙ্গিক : ছোট ও বড় সময়-সাধন চট্টোপাধ্যায়, নাথ ব্রাদার্স, কলকাতা, জানুয়ারী,১৯৯৯, পৃ. ৮৪৪।

৬. চক্রবর্তী সুমিতা - জীবনানন্দ : সমাজ ও সমকাল, চিত্রকল্পে জীবনানন্দ, সাহিত্যলোক, কলকাতা, ২য় সংস্করণ, ৮ মে - ২০০১, পৃ. ১৭৮।

৭. ঐ - পৃ. ১৭৪।

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

कस्तूरबा गॉधी बालिका विद्यालय एवं जीवन कौशल शिक्षा

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वर्तमान में बढ़ते शहरीकरण तथा आधुनिक जीवन शैली में युवाओं को अत्यन्त प्रभावित किया है। इस कारण किशोरों को माता–पिता, परिवार, मित्र तथा समाज के साथ तालमेल बिठाने में कठिनाई आ रही है। किशोर अवस्था में आ रहे शारीरिक बदलाव एवं उन्मुक्त विचारों व संयम की कमी जीवन को गलत दिशा की ओर मोड़ देती है।समाचार पत्रों की सुर्खिया एवं तेजी से बदलाव की ओर जाता हुआ हमार आधुनिक समाज हमें इस तथ्य की ओर संकेत करता है कि विद्यार्थियों को इस प्रकार की शिक्षा दी जावे, जिससे उसका संतुलित अच्छा विकास हो तथा वह भावी जीवन के समस्त तनावों का सामना दृढ़तापूर्वक कर सकें। इस कारण विद्यार्थी जीवन की अत्यन्त महत्वपूर्ण अवस्था किशोर अवस्था पर हमें अपना ध्यान केन्द्रित करना होगा । "एक आदर्श माँ ही एक आदर्श परिवार का निर्माण कर सकती है।" इसी सोच पर आधारित यह शिक्षा किशोरियों में सकारात्मक दृष्टिकोण का विकास कर, उनका मार्गदर्शन करती है।

आजादी के 60 साल बाद भारत को आखिरकार इस बात का अहसास हुआ कि शिक्षा को मौलिक अधिकार बनाना किस कदर महत्वपूर्ण है। 2001 में सर्वशिक्षा अभियान से शुरु हुई यह प्रक्रिया आज इस मुकाम पर पहुँच गई है कि 14 साल तक के सभी बच्चों के लिए शिक्षा को मुफ्त और अनिवार्य बना दिया गया है। इसके बावजूद आज भी प्राथमिक स्तर पर तीन लाख और माध्यमिक स्तर पर 1.70 लाख कक्षाओं की कमी है। साथ ही कुल स्कूलों में से आधे में सफाई व पानी जैसी बुनियादी सुविधाओं तक का अभाव है। यह वे चीजें है जो सुनिश्चित करेंगी कि बच्चों का आधार मजबूत बने।

यदि हमने शिक्षा प्रणाली में लिंग भेद को कम करने के प्रयास नहीं किए तो उपरोक्त कदम भी हमें अधूरा परिणाम देंगे और समाज के सिर्फ एक वर्ग को ही फायदा पहुँचाएंगे। मानव विकास सूचकांक में केरल का ऊँचा स्थान होने के पीछे महिलाओं की उच्च शिक्षा दर ही है। कई राज्य सरकारों ने बालिका शिक्षा को बढ़ावा देने के लिए महत्वपूर्ण कदम उठाया हैं, बस जरूरत है तो इन कोशिशों को रफ्तार देने

की। अनुसूचित जाति,अनुसूचित जनजाति, अल्पसंख्यक वर्ग,एवं पिछडा वर्ग की बालिकाओं को शिक्षित करने हेतु भारत सरकार द्वारा कस्तूरबा गॉधी बालिका विद्यालय की स्थापना एक सार्थक पहल है।

कस्तूरबा गॉधी बालिका विद्यालय ;ज्ञण्ळण्ठण्टण्द्ध का परिचय :

भारत सरकार द्वारा यह योजना अगस्त 2004 में प्रारम्भ की गई हैं। आवासीय विद्यालयों के रूप में यह योजना उच्च प्राथमिक स्तर पर बालिकाओं के लिये मुख्यतः अनुसूचित जाति, अनुसूचित जनजाति, अन्य पिछड़ा वर्ग एवं वंचित वर्ग के लिये प्रारम्भ की गई। प्रारम्भ में 750 आवासीय स्कूल खोले जाने की मंजूरी दी गई। केन्द्र द्वारा यह योजना **NPEGEL** और महिला समाख्या (**M**) के पारस्परिक सहयोग द्वारा दो वर्षों के लिये प्रारम्भ की गई, किन्तु अप्रैल 2007 से आवासीय विद्यालय बालिकाओं की प्रारम्भिक शिक्षा हेतु राज्य शिक्षा केन्द्र द्वारा संचालित सर्व शिक्षा अभियान (**S.S.A.**) के अंतर्गत कार्य कर रहे हैं।

यह योजना शैक्षिक रूप से पिछड़ें हुए उन विकासखण्डों में प्रारम्भ की गई जहाँ ग्रामीण महिला साक्षरता के राष्ट्रीय औसत (46.13 प्रतिशत) और जहाँ साक्षरता में लैंगिक अंतर अधिक है। ऐसे विकासखण्डों में **K.G.B.V.** आवासीय विद्यालय खोले गये हैं, जहाँ –

1. ग्रामीण क्षेत्रों की अनुसूचित जनजाति की बालिकाएँ विद्यमान हैं।
2. ग्रामीण क्षेत्रों की अनुसूचित जाति एवं अन्य पिछड़े वर्ग की बालिकायें है।
3. ऐसे क्षेत्रों से जहाँ महिला साक्षरता कम है।
4. ऐसे क्षेत्रों से जहाँ माध्यमिक विद्यालय नहीं हैं।

प्रारम्भिक स्तर की शिक्षा में ग्रामीण क्षेत्रों और वंचित समुदायों के बीच में लैंगिक असमानता अधिक हैं। नामांकन के रूझान को देखते हुए लड़कों की तुलना में लड़कियों में एक महत्वपूर्ण अंतराल हैं अतः कस्तूरबा गॉधी बालिका विद्यालय का उद्देश्य उच्च प्राथमिक स्तर पर वंचित समूहों की बालिकाओं की गुणवत्ता में सुधार लाना है।

यहाँ अध्ययनरत छात्राएँ निर्धन परिवारों की होने से भौतिक सुख सुविधाओं से भी वंचित रहती है। इन आवासीय विद्यालयों में प्रवेश से लेकर इन्हें समुचित पारिवारिक वातावरण तो मिलता ही है, आगे बढ़ने के लिये शिक्षा के साथ–साथ व्यवसायिक कौशल की दक्षता भी प्राप्त होती है।

व्यवसायिक कौशल :

व्यवसायिक शिक्षा के लिये दो शिक्षिकाओं की नियुक्ति की जाती है जो इन छात्राओं को सिलाई, कढ़ाई, पेन्टिग, मेहन्दी, रांगोली, ग्रीटिंग कार्ड बनाना, बेग बनाना अन्य कई वस्तुकारी कलाओं में दक्ष करती है।

शैक्षिक भ्रमण :

कस्तूरबा गाँधी बालिका विद्यालय के छात्रावासों में रहने वाली बालिकाओं को शैक्षिक भ्रमण भी करवाया जाता है। भ्रमण हेतु आसपास कोई किला या कोई ऐतिहासिक इमारत, अस्पताल, पोस्ट आफिस, पुलिस स्टेशन, फैक्ट्री, फायर स्टेशन, नदी, तालाब, ट्रेन की यात्रा अथवा कोई शैक्षिक भ्रमण स्थल इत्यादि का चुनाव किया जाता है।

अनुभव आदान–प्रदान :

छात्रावास में अध्ययनरत बालिकाओं को महिला डाक्टर, वकील, महिला पुलिस अधिकारी आदि से भेंट करवाई जाती है। अधिकारियों से प्रेरणा लेकर, जीवन के अनुभवों को सुनकर बालिकायें अपने भविष्य में कुछ लक्ष्य निर्धारित करें व उसे मेहनत एवं लगन से प्राप्त करने का प्रयास करें।

सांस्कृतिक गतिविधियाँ एवं साहित्यिक प्रतियोगिता :

छात्रावास में बालिकाओं के सर्वांगीण विकास हेतु सांस्कृतिक प्रतियोगिताओं का आयोजन समय–समय पर किया जाता है। जिससे छात्राओं की छिपी हुई प्रतिभा को मंच प्रदान किया जा सके।

माँ–बेटी मेला :

माँ–बेटी की प्रतियोगिता आयोजित की जाती है, जिसमें खेल, मेहन्दी, भजन आदि गतिविधियाँ होती है। माँ–बेटी के द्वारा बनाई गई वस्तुओं को बिक्री के लिये रख जाता है।

जीवन कौशल शिक्षा :

किशोरों को समाज में समायोजित व्यक्ति के रूप में विकसित होने के लिए जीवन कौशलों को जानने की आवश्यकता है। जीवन कौशल व्यक्ति को वह सामर्थ्य देते हैं जिससे वह ज्ञान को (जो कुछ वह जानता है) तथा दृष्टिकोणों या जीवन मूल्यों (जिनमें वह विश्वास करता है और अनुभव करता है) को कार्यरूप में परिणत करने के योग्य बनाता है। ज्ञान के विस्पफोट तथा जनसंचार माध्यमों में उभार ने युवा की जीवनशैली को बदल दिया है। उनमें उचित मूल्यों और विश्वासों को स्थापित करना अति आवश्यक है।माता–पिता, अध्यापकगण, विद्यालयों, समुदायों, जनसंचार माध्यमों और स्वयं विद्यार्थियों का यह संयुक्त उत्तरदायित्व बन जाता है। मुख्य जीवन कौशलों जैसे तनाव और भावनाओं से जूझना, व्यवसाय का चयन, आत्मसम्मान हेतु निर्णय लेना, आलोचनात्मक चिन्तन,प्रभावशाली वैचारिक आदान–प्रदान, यौन विषयक स्वास्थ्य शिक्षा तथा इन्हें कैसे विकसित किया जाए इस हेतु मार्गदर्शन आवश्यक हैं। किशोर अवस्था उम्र का सबसे नाजुक दौर है, इस उम्र में शरीर के साथ–साथ मस्तिष्क में हो रहे परिवर्तनों के कारण वे अपने आप को उलझा हुआ एवं असुरक्षित महसूस करते है। राष्ट्र के निर्माण में किशोर पीढ़ी की अत्यन्त महत्वपूर्ण व अहम् भूमिका होती है, अतः किशोर पीढ़ी को जब तक शिक्षा के माध्यम से शक्ति संचयन के रहस्य और उसके सुपरिणामों से अवगत नहीं कराया जावेगा तब तक उनकी उपलब्धि उतनी नहीं हो सकती जितनी आपेक्षित है।

वर्तमान में बढ़ते शहरीकरण तथा आधुनिक जीवन शैली में युवाओं को अत्यन्त प्रभावित किया है। इस कारण किशोरों को माता–पिता, परिवार, मित्र तथा समाज के साथ तालमेल बिठाने में कठिनाई आ रही है। किशोर अवस्था में आ रहे शारीरिक बदलाव एवं उन्मुक्त विचारों व संयम की कमी जीवन को गलत दिशा की ओर मोड़ देती है। किशोरों की स्वास्थ्य संबंधी आवश्यकताओं, विशेषकर प्रजनन और यौन संबंधि आवश्यकताओं पर ध्यान दिए जाने की जरूरत है। चूंकि इन आवश्यकताओं का संबंध यौन या यौनिकता से है जो सांस्कृतिक रूप से संवेदनशील मुद्दा है, विद्यार्थियों को

उचित सूचना पाने के अवसरों से वंचित रखा जाता है।यौन संबधि उनकी समझ सुनी–सुनाई बातों, मिथकों या भ्रांतिपूर्ण धरणाओं पर आधरित होती है, इस कारण वे खतरनाक स्थितियों में पड़ जाते हैं। इससे नशीले पदार्थ या उनमें एचआईवी/एड्स संक्रमण आदि का खतरा बढ़ जाता है। आयु–आधरित और संदर्भ–विशिष्ट हस्तक्षेपों को जगह दी जाए, जो किशोर के यौन स्वास्थ्य से संबंध्ति हों, ताकि एचआईवी/एड्स और नशे की आदतों से उनको सावधन किया जा सकें। इसलिए बच्चों को इस संबंध में ज्ञान बढ़ाने और जीवन के कौशल सिखाने की दिशा में प्रयास आवश्यक है, ताकि वे बढ़ती उम्र की समस्याओं से जूझ सकें।

समाचार पत्रों की सुर्खिया एवं तेजी से बदलाव की ओर जाता हुआ हमार आधुनिक समाज हमें इस तथ्य की ओर संकेत करता है कि विद्यार्थियों को इस प्रकार की शिक्षा दी जावे, जिससे उसका संतुलित अच्छा विकास हो तथा वह भावी जीवन के समस्त तनावों का सामना दृढ़तापूर्वक कर सकें। इस कारण विद्यार्थी जीवन की अत्यन्त महत्वपूर्ण अवस्था किशोर अवस्था पर हमें अपना ध्यान केन्द्रित करना होगा क्योंकि यह एक ऐसी अवस्था होती है जिसमें न बाल्यावस्था होती है और न ही प्रौढ़ावस्था की श्रेणी में आती है। किशोरावस्था वह अवस्था है जब किशोर और किशोरियों में तीव्र शारीरिक, मानसिक और संवेगात्मक परिवर्तन होते है। इन्हीं परिवर्तनों के लक्षण हमें उनके व्यवहार में परिलक्षित होते है।

विश्व स्वास्थ्य संगठन (भ्ब्) के अनुसार भारत में 10 प्रतिशत मादक पदार्थों का सेवना से, 50 प्रतिशत मादक औषधियों के सेवन से मर चुके है। 14–25 आयु वर्ग के किशोरों में आत्महत्या के प्रकरणों में तीन गुना वृद्धि हुई है।

इन सभी समस्याओं के कारणों को खोजकर उनका प्रभावी हल खोजना होगा। यदि हम 'शिक्षा' के माध्यम से विद्यार्थियों में परिवर्तन' की पहल करे तो निश्चित रूप से इसका हल संभव है।

"परिवर्तन का एक सशक्त माध्यम है – शिक्षा" – इस धारणा को केन्द्र में रखकर किशोरों की उपरोक्त समस्याओं को दूर करने के लिये, उनको इस वर्तमान स्थिति से बाहर निकालने के लिये तथा आगे आने वाली भावी पीढ़ी के मार्गदर्शन के लिये जीवन कौशल शिक्षा की आवश्यकता है, अर्थात् जीवन + कौशल।

किशोरों को समाज में समायोजित व्यक्ति के रूप में विकसित होने के लिए जीवन कौशलों को जानने की आवश्यकता है। जीवन कौशल व्यक्ति को वह सामर्थ्य देते हैं

जिससे वह ज्ञान को तथा दृष्टिकोणों / जीवन मूल्यों को कार्यरूप में परिणत करने के योग्य बनाता है। जीवन कौशल को इस प्रकार परिभाषित किया जा सकता है कि सकारात्मक व्यवहार की वे योग्यताएँ जो जीवन में सही चुनाव करने में हमारी सहायता करती हैं, इन्हें जीवन मूल्य कहते हैं। (कर्टिस और वैरेन, 1973)

कौशल विकास की प्रक्रिया जीवन पर्यन्त चलती है। यह एक ऐसी प्रक्रिया है जो व्यक्तियों को विकसित और परिपक्व होने में सहायक सिद्ध होती है, अपने निर्णयों के संबंध में विश्वास रखना सिखाती है तथा अपने अंदर और बाहबाहर से शक्ति के स्रोतों को खोजना सिखाती है (मीना,2010)

कौशल एक अस्पष्ट संकल्पना है। शब्दकोशों में इसके अर्थ को विभिन्न रूपों में वर्णित किया गया है जैसे–" निपुणता, प्रवीणता और कार्यकुशलता।"अभ्यास और अधिगम के माध्यम से किसी कार्य को कर सकने की योग्यता। सामान्यतया कौशल का प्रयोग अभियांत्रिाक योग्यता वेफ संदर्भ में अथवा तकनीकी निपुणता अथवा तकनीकी ज्ञान जो कि किसी कार्य को सम्पन्न करने की विधियों और साधनों पर आधरित है जैसे किसी साइकिल या मोटर साइकिल की मरम्मत करना अथवा लकड़ी का फर्नीचर तैयार करना आदि के लिए किया जाता है। कौशल का प्रयोग शिक्षा में विस्तृत अर्थ में लंबे समय से होता आया है। जीवन कौशलों की संकल्पना का प्रवेश शिक्षाशास्त्र के शब्दकोश में कुछ समय पूर्व ही हुआ है और इसका विशेष संदर्भयुक्त अर्थ है।" (इग्नू, 2007)

जीवन कौशलों वेफ उपागम कक्षा आधारित क्रियाओं के संक्रियात्मक वर्ग से कहीं अधिक हैं। यह सशक्तिकरण का उपागम है जो छात्राों को सकारात्मक कार्यों में मदद करता है जिससे वे स्वस्थ व्यवहारों को स्वीकार करने का बल प्रदान करें।

- जीवन – कौशलों की शिक्षा का केंद बिदु जीवन – कौशलों का अधिगम है।

- जीवन – कौशलों की शिक्षा बच्चों को इस योग्य बनाती है कि वे कौशलों से सीख सकें और प्रमुख स्वास्थ्य एवं सामाजिक समस्याओं के परिप्रेक्ष्य में अभ्यास कर सकें।
- जीवन काशैलों की शिक्षा जिस दशर्न पर आधरित है, वह यह है कि किशोरों को अपने कार्यों का अधिक उत्तरदायित्व लेने केलिए उन्हें सशक्त करना। सभी युवाओं के व्यक्तित्व के विकास के लिए जीवन कौशलों के विकास की आवश्यकता होती है।

विद्यालय का दायित्व शिक्षार्थी को ज्ञान देने भर तक नहीं है अपितु उन्हें इस प्रकार विकसित करने में सहायता प्रदान करना है जिससे वे समाज के परिपक्व एवं संवेदनशील सदस्य बन सकें। जीवन कौशल शिक्षा, विशेष रूप से यौन विषयक स्वास्थ्य शिक्षा एच.आई.वी./एड्स की शिक्षा का दायित्व केवल माता–पिता तथा अध्यापकों का ही नहीं हो सकता। विद्यालय और समुदाय के बीच एक अच्छा सहयोगात्मक संबंध स्थापित होना आवश्यक हैं जिससे अध्यापक प्रभावी ढंग से ,सामंजस्यपूर्ण वातावरण अपनी भूमिका का निर्वाह कर सकें। जीवन कौशल आधरित शिक्षा के समुचित विकास के लिए हमें प्रशिक्षित अध्यापक का होना आवश्यक हैं ।

जीवन कौशल शिक्षा की जानकारी शाला में प्रशिक्षित महिला शिक्षकों द्वारा दी जाती है। इसके अंतर्गत –

(1) स्वजागरूकता, (2) प्रभावी संप्रेषण, (3) अर्न्तवैयक्तिक सम्बन्ध, (4) निर्णय लेने की क्षमता, (5) समस्या समाधान, (6) तनावों से जूझना, (7) भावनाओं से जूझना आदि का परिचय करवाया जाता है।

प्रत्येक कौशल के लिये चर्चा व संवाद के साथ–साथ अनुभवों, कहानी, नाटक के साथ ही 1. पूछताछ या खोजबीन करना 2. मूल्य स्पष्टीकरण 3. अन्य अंतःक्रियात्मक / सहभागितापरक विधियाँ 4. पाठ्यसहगामी क्रियाएँ 5. परामर्श 6. दृश्य–श्रव्य / मुद्रित सामग्री का प्रयोग का सहारा लिया जाता है।

बालिकाओं में किशोरावस्था में होने वाले परिवर्तन की जानकारी, समस्या का समाधान, यौन शिक्षा, की जानकारी जीवन कौशल की शिक्षा के द्वारा समाज में जीवन स्तर को ऊँचा उठाना है।

निष्कर्ष

वर्तमान समय में कोई भी राष्ट्र उच्चकोटि के शिक्षित तथा कुशल व्यक्तियों की प्रचुर आपूर्ति का आश्वासन दिए बिना सामाजिक या आर्थिक विकास के बारे में सोच ही नहीं सकता। अब केवल वे ही राष्ट्र उभर कर आ सकते हैं जिनके पास अपने नागरिकों को शिक्षित करने के साधन हैं ।मात्र जानकारी संप्रेषित करने से विद्यार्थी इस विषय में अधकचरा ज्ञान प्राप्त करते हैं और उनकी जिज्ञासा उन्हें गलत माध्यमों से अधिक जानकारी प्राप्त करने की ओर ले जाती है जिसका नतीजा गलत होता है। आज की ज्वलंत समस्या है किशोरों में तनाव के कारण बढता मादक पदार्थों का सेवन ।

"एक आदर्श माँ ही एक आदर्श परिवार का निर्माण कर सकती है।" इसी सोच पर आधारित यह शिक्षा किशोरियों में सकारात्मक दृष्टिकोण का विकास कर, उनका

मार्गदर्शन करती है। उन्हें रचनात्मकता की ओर अग्रसर कर आत्मविश्वास के साथ–साथ दायित्वों के बोध से भी परिचित करवाती है। यह किशोरियों में सामाजिक संबंधों को परखने की समझ व समन्वयकारी दृष्टिकोण का विकास करती है। अतः विद्यालयों में ऐसे अध्यापकों की नियुक्ति करनी चाहिए जो प्रोत्साहन प्रदान कर छात्राओं में सकारात्मक व्यवहार की शुरुआत कर सकें । यदि हम चाहते हैं कि बच्चों में यौनाचार के प्रति स्वस्थ दृष्टिकोण विकसित हो तो हमें यौन शिक्षा को गंभीरता से लेना होगा। यही कारण हैं कि कस्तूरबा गॉधी बालिका विद्यालय की सीटों की संख्या 200 कर दी गई है। अतः निःसन्देह कस्तूरबा गॉधी बालिका विद्यालय ;ज्ञण्ळण्ठण्टण्द्ध एक सार्थक पहल है।

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11ीजजचरूण्नदचिंण्वतहण्पद

12 भारतीय आधुनिक शिक्षा अप्रैल 2012

13राष्ट्रीय पाठ्यचर्या की रूपरेखा–2005, पृष्ठ–64–65

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY EDUCATIONAL RESEARCH
ISSN : 2277-7881; IMPACT FACTOR - 2.972; IC VALUE:5.16
VOLUME 4, ISSUE 3(4), MARCH 2015

Electron Paramagnetic Resonance Spectra of Fe(III) Ionsin Lithium Borate Glasses

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Abstract:

Electron paramagnetic resonance spectra of Fe^{3+} ions in Lithium borate glasses have been studied. The spectra are typical of Fe^{3+} ions with sharp resonances at g = 43 and broad resonance at g = 2 and a resonance at g = 9.7 appear as a shoulder at lower magnetic field value. Peak-to-peak width ΔH_{pp} and the number of spins participating in the resonance have been evaluated. It was found that the number of free spins in the glass system depends on the iron ion concentration.

Introduction:

To use EPR as a tool to study structure and other properties of a solid one needs to introduce EPR centres or probes in it.. Two classes of EPR paramagnetic probes/centres are generally used: (i) substitutional impurities such as transition metal or rare-earth ions, and (ii) radiation-induced defects/centres. Since the pioneering EPR work and its meaningful application of this method to glasses by Sands in 1955 [1], transition metal ions are by far the most extensively studied EPR centres in glassy solids than the rare-earth ions because their outer d-electron orbitals have rather broad distributions and their responses to the surrounding cations are very sensitive. The inorganic glasses containing transition metal ions have been the subject of many investigators because of their potential applications in electronic devices, tunable solid state lasers, luminescence materials, fiber optic communications, etc. In some of these applications an understanding of the energy level configuration of these ions in glasses is required. Since the energy levels of paramagnetic ions get split under the action of the ligand fields, EPR technique can be applied to measure spinHamiltonian parameters and to yield information on the energy levels and coordination sites surrounding the EPR probe. A number of excellent review articles describes in detail the usefulness of the EPR technique to glasses using transition metal ions as paramagnetic centres [2 -10].

In the first transition series, the outermost 3d electrons act as the paramagnetic probes. These electrons are, therefore, exposed to the electrostatic field of the ligands. The interaction between the electrons and the ligand field is usually so large that the orbital motion gets quenched. In other words, the orbital motion of the electrons gets locked into the field of the ligand and, therefore, is not able to contribute to the magnetism. The electron spin, on the other hand, with its magnetic moment, does not couple directly with the electrostatic field, and remains free to orient in an external magnetic field. Thus, one can conclude that the magnetic behaviour of the 3d electrons in the transition metals is essentially due to the "spin-only" magnetism. The situation is quite different for the rareearth ions in which the unfilled electron shell is an inner 4f shell, hence, it can hardly see any electrostatic field due to the ligand. Therefore, the paramagnetism of these ions is nearly that of free ions having contributions from both spin and orbital motions.

The transition metal ions which have been extensively used as EPR probes in glasses are Cu^{2+}, Mn^{2+}, V^{4+} (as VO^{2-}), Fe^{3+} and Cr^{3+}. In case of rare-earth ions, Gd^{3+} has been used. In this work, Fe^{3+} ion has been used as the EPR probe to investigate a series of lithium borate glasses doped with Fe_2O_3.

Fe^{3+} ion has a $3d^5$ electronic configuration and the ground state is $^6S_{5/2}$ in free atom and possesses zero orbital angular momentum. Therefore, one would expect any magnetic behavior of this ion to be due to its spin only and, therefore, a resonance with g value lying very close to the free electron value of 2.0023. However, it is possible for "g" to increase by 10 to 20% above the spin-only value due to the spin-orbit coupling which may induce sufficient orbital momentum to change the g value.

Sands[1] reported observation of two resonances with g = 4.2 or 6 in a number of glasses which he ascribed to some unknown impurities. Later, it became clear that these resonances were due to the Fe^{3+} impurity present in the glasses. Now a pure S state ion like Fe^{3+} will not have its ground state split either by a crystalline field or by the spin-orbit coupling. Although not completely understood, the observed zero field splitting has been explained as a result of the admixture of excited states into the ground state [11, 12]. In a subsequent experimental EPR study of Fe^{3+} doped soda-lime-silica glasses, Castner et al [13] observed strong resonance at g = 4.27 for all the glasses. Since then Fe^{3+} doped glasses most of the time show resonances at g = 4.3, 2.0, 9.7 and 6.0. In some cases some of these resonances are suppressed but invariably g ≈ 4.3 resonance is present in most glasses containing iron and may be the strongest as well.

Borate glasses, in particular, sodium, potassium, barium, calcium and lead oxide as well as mixed alkali based borate glasses have been investigated extensively by many techniques [9, 14] including EPR with various transition metal probes. However, only limited literature is available on the investigation of iron oxide doped/substituted glasses by the EPR technique. As mentioned before, Castner et al [13] investigated soda-lime glasses. Kurkjian and Sigety [15] studied Mössbauer, optical and EPR for Fe^{3+} in silicate and phosphate glasses, Moon et al [16] used magnetic susceptibility and EPR to investigate xFe_2O_3 - (1-x) [BaO-$4B_2O_3$] glasses for $0 < X < 0.10$, Gupta et al [17] studied (PbO-$2B_2O_3$).Fe_2O_3, Dance et al [18] and Sunandana et al [19] studied calcium-alumino borate glasses with Fe^{3+} ions. Hirayama et al [20] used EPR to study alkaline earth phosphate glasses. All these investigations show that EPR signal at g ≈ 4.3 is always present and in most cases it is the strongest. Other EPR signals at g ≈ 2 and 6 are also observed depending upon the glass composition. Anavekar et al [21] reported signals at g ≈ 4.2 and 2.0 for 45ZnO-(55-*x*) B_2O_3:xFe_2O_3 glasses. Among non-borate iron oxide containing glasses reference is made to the works of the group of J.L. Ra in sulphate and acetate glasses [22] in which they also observed EPR signals at one or more g values of 2.0, 4.3, 6.0 and 9.7.

As far as EPR studies of lithium borate glasses with Fe^{3+} impurity / doping are concerned not much work has been published. Tanaka et al [23] studied (Li_2O-*x* B_2O_3 : 4 mol% Fe_2O_3) glasses where *x* = 9.6, 19.2, 28.8, 38.4 and 48. They observed a sharp resonance at g ≈ 4.3 and a broad resonance at g ≈ 2.0. They further found that the fraction of isolated ions increased upto about 30 mol% Li_2O, and then decreased with increasing Li_2O. This observation was explained terms of the dependence of the flexibility of the glass network structure upon Li_2O content, which results from the variation in oxygen coordination number of the boron ion and change in the number of nonbridging oxygen ions with glass composition. The most recent EPR work on lithium borate is that of Berger et al [24] who studied (1-x)($0.63B_2O_3 - 0.37Li_2O$):*x mol%* Fe_2O_3 with *x* ranging from 0.001 to 0.1. They observed a sharp peak at g ≈ 4.3 accompanied by a shoulder continuing down to g≈9.7 for all the samples. The resonance g ≈ 2.0 was observed at higher iron contents of *x* = 0.01 or more and was interpreted as micro-clusters not incorporated in the random network, with smaller distances between the paramagnetic ions.

Keeping in view that not many reports are available on the EPR investigations of iron oxide doped/substituted lithium borate glasses and there is limited published literature on the effect of the variation of iron oxide in these glasses, it was considered to be useful to study these glasses in more detail.

Experimental:

The list of lithium borate glasses investigated using Fe^{3+} probe is given in Table 1. The chemicals Li_2CO_3, H_3BO_3 or B_2O_3, ZnO and Fe_2O_3 were of Analar grade or better. Glass samples were prepared by using the Melt Quenching technique. Glassy samples were free from the air pockets and these were from totally transparent to dark brown colour depending upon the iron oxide content. X-ray characterisation did not show any crystalline peaks confirming the glassy nature of the samples. All the samples were annealed between 400 and 500°C to remove strain, etc. After annealing the samples for 24 hours the glasses were ground into fine powder. The EPR spectra of all the samples were measured at room temperature on a JEOL-

FE3X ESR spectrometer operating in the X-band frequencies and with a modulation frequency of 100 kHz. A polyciystalline DPPH with an effective g value

Table 1
List of Lithium-Borate Glasses with Iron Oxide Doping / Substitution

1. $(Li_2O \cdot B_2O_3)_{1-x}\ (Fe_2O_3)_x$

   $x = 0.005, 0.01, 0.025, 0.05, 0.075$ and 0.10

2. $(Li_2O \cdot 2B_2O_3)_{1-x}\ (Fe_2O_3)_x$

   $x = 0.01, 0.025, 0.05, 0.075$ and 0.10

3. $(Li_2O \cdot 3B_2O_3)_{1-x}\ (Fe_2O_3)_x$

   $x = 0.01, 0.025, 0.05, 0.075$ and 0.10

4. $(Li_2O \cdot y\ B_2O_3)_{1-x}\ (Fe_2O_3)_x$

   $x = 0.20$ and $y = 1, 2, 3$ and 4

5. $4Li_2O \cdot 6B_2O_3 : x$ mol% Fe_2O_3

   $x = 1, 2, 5, 10, 15$, and 20

of 2.0036 was used as a standard field marker. Same experimental conditions were kept for almost all the samples while taking the EPR spectra including weight of the samples. In some cases, when it was absolutely necessary to change the conditions then the final results were normalised to the standard conditions used for other samples so that the comparison among various samples becomes meaningful. The scan time for ±2500 gauss of magnetic field was at least 8 minutes to avoid variations of the resonance linewidths because of fast scanning.

Results and Discussion:

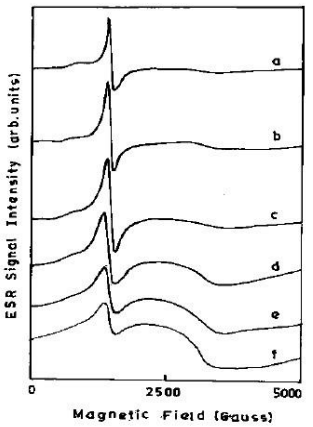
ESR results

No EPR signal was observed for glasses without iron oxide content. When Fe_2O_3 was added to the glasses, all of them showed resonance at g 4.3, a very broad resonance at g ≈2.0 and a shoulder extending to g ≈9.7. Room temperature EPR spectra for various glasses are shown in Figures 1, 3, 5, 7 and 8. No resonance with g_{eff}≈6.0 was observed in any of the samples investigated. The peak to peak line width, ΔH_{pp}, of the sharpest resonance line corresponding to g ≈4.3 was found to vary with Fe_2O_3 content/concentration in all the samples. Fig. 1 to 9 show the BPR spectra and variation of $\Delta H_{pp}$and the number of spins N participating in the resonance g ≈4.3 for various glasses. N has been calculated using the procedure of Moon et al. [16] who have shown it to be proportional to the product of peak-to-peak height [I_{pp}] and square of the peak-to-peak width, ΔH_{pp}, of the resonance line, i.e.,

$$N = I_{pp} \cdot (\Delta H_{pp})^2 \qquad (1)$$

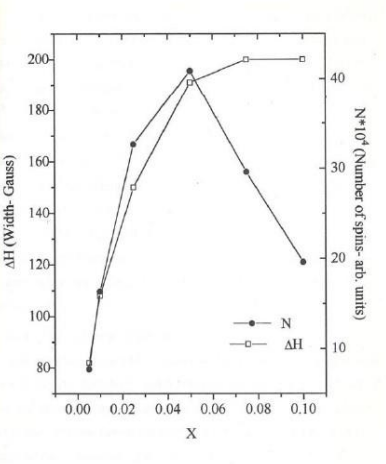
FIGURES

Figure 1



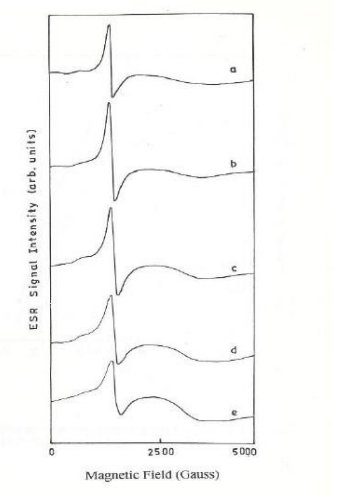
ESR spectra of $(Li_2O\text{-}B_2O_3)_{(1-x)}(Fe_2O_3)_{(x)}$ glass system where (a) x=0.005, (b) x=0.01, (c) x=0.025, (d) x=0.05, (e) x=0.075 and (f) x=0.1.

Figure 2



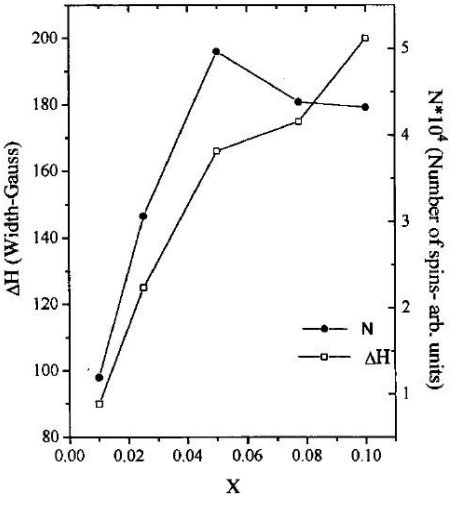
Changes in number of spins N and linewidth ΔH with x for $(Li_2O\text{-}B_2O_3)_{(1-x)}(Fe_2O_3)_{(x)}$ glass system

Figure 3



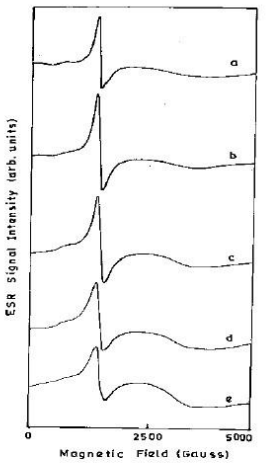
ESR spectra of $(Li_2O\text{-}2B_2O_3)_{(1-x)}(Fe_2O_3)_{(x)}$ glass system where (a) x=0.01, (b) x=0.025, (c) x=0.05, (d) x=0.075 and (e) x=0.1.

Figure 4



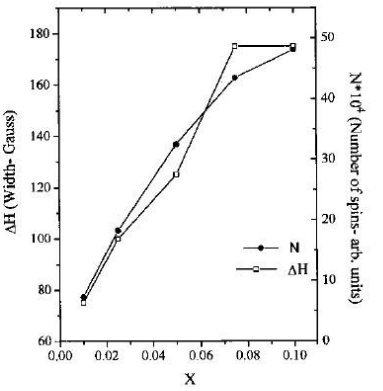
Changes in number of spins N and linewidth ΔH with x for $(Li_2O\text{-}2B_2O_3)_{(1-x)}(Fe_2O_3)_{(x)}$ glass system.

Figure 5



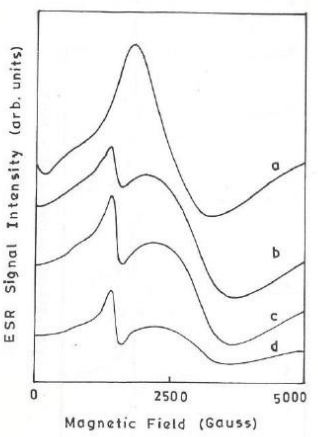
ESR spectra of $(Li_2O\text{-}3B_2O_3)_{(1-x)}(Fe_2O_3)_{(x)}$ glass system where (a) x=0.01, (b) x=0.025, (c) x=0.05, (d) x=0.075 and (e) x=0.1.

Figure 6



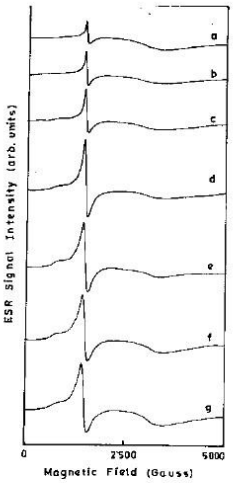
Changes in intensity N and linewidth ΔH with X for $(Li_2O\text{-}3B_2O_3)_{(1-x)}(Fe_2O_3)_{(x)}$ glass system

Figure 7



ESR spectra of $(Li_2O\text{-}yB_2O_3)_{0.8}(Fe_2O_3)_{0.2}$ glass system where (a) y=1, (b) y=2, (c) y=3, and (d) y=4.

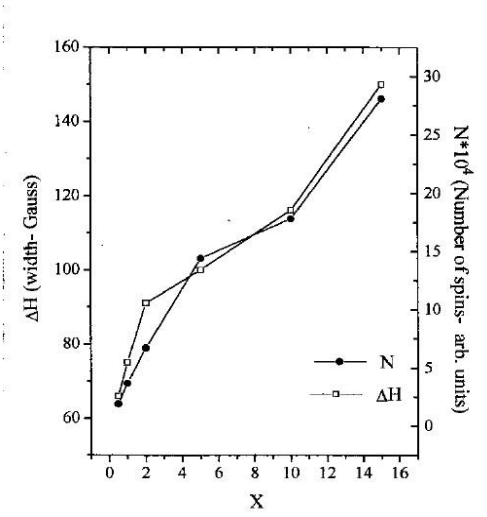
Figure 8



ESR spectra of $41Li_2O\text{-}6B_2O_3$:x mol% Fe_2O_3 glass system where (a) x=0.5, (b) x=1, (c) x=2, (d) x=5, (e) x=15, (f) and (g) x=20.

x=15

Figure 9



Changes in number of spins N and linewidth ΔH with x for $4Li_2O$-$6B_2O_3$:x mol% Fe_2O_3 glass

Berger et al [24] have recently reported all the three resonances in their EPR studies of lithium borate glasses doped with iron oxide (upto 10 mol%). The resonance at g ≈2.0 was only observed at a higher iron oxide concentration (5mol% - 10 mol%). Previously Tanaka et al [23] reported resonances in their lithium-borate glasses with 4 mol% Fe_2O_3 at g ≈2.0 and 4.3. All the samples show three resonances at g ≈2.0, 4.3 and 9.7. As stated earlier Fe^{3+} ions belong to d^5 configuration with $^6S_{5/2}$ as the ground state in the free ion and there is no spin-orbit interaction [2]. Thus a g-value that lies very near to the free electron value (g_e = 2.0023) often occurs like an isotropic g value at 4.3, a shoulder at g ≈6.4 and a weak signal at g ≈9.7.

As previously indicated, Sands [1] reported observation of unknown resonances with g ≈4.2 and 6 in a number of glasses. The subsequent correlation of the g ≈ 4.2 resonance with Fe^{3+} content in several glasses and the physical explanation of this unusual value of g in terms of S = 5/2 spin state was given by Casther et al. [13]. To explain the g values observed in iron containing glasses, Castner et al. considered the spin Hamiltonian [3, 13]

$$H = g\beta H.S + D\,[S_z^2 - \{S(S+1)/3\}] + E\,(S_x^2 - S_y^2) \qquad (2)$$

with g =2 and S= 5/2 and D and E are the axial and rhombic structure parameters. The spin-Hamiltonian can be analysed with the limiting values of λ defined as the ratio E/D. It has been shown by Wickman et al [25] that λ = 0 to 1/3 covers practically all significant crystal field situations arising in solids from fully axial (λ=0) to fully rhombic (λ = 1/3) symmetry. In the limit E >> gβH (taking D= 0) and for H=0 they showed that the crystal field term splits the six-fold spin degeneracy of an S = 5/2 ion into three Kramer doublets with energies W = 0, $\pm 2(7)^{1/2}$ E. Application of the Zeeman field splits the spin degeneracy of the Kramer doublets. As the crystal field splitting is normally much greater than the Zeeman energy, resonances are observed due to the transition within the Zeeman split Kramer doublets. By treating the Zeeman term in degenerate perturbation theory they showed that the central, W = 0 doublet is characterized by g = 30/7 =

4.286 independent of the orientation of the magnetic field with respect to the crystal axes. The upper and lower doublets were shown to have strongly anisotropc values of g, the principal values being 9.68, 0.86 and 0.61. They also showed that for D >> gβH and E=0 or E/D=0, one gets $g_{//}$=2 and g⊥= 6 for the ground level. Thus, their assignment of the above g = 2, 4.3 and 6 values results from the following configurations.

(a) g = 2 due to weak cubic crystal field terms.
(b) g = 4.28 due to rhombic distortion of the crystal field about a site of tetrahedral or octahedral symmetry.
(c) g =6 due to the axial distortion of the crystal field.

Transitions within the upper and lower Kramers doublets, mentioned above, accounts for the edge or shoulder in the Fe^{3+} spectrum near g ≈9.7-10.

The work of Castner provided essentially the whole explanation of the EPR spectrum of the isolated Fe^{3+} in glasses. Theoretical analysis of EPR spectra of Fe^{3+} ions in varying crystal field situations has been given by Dowsing and Gibson [26] and Aasa [27].

Later Kurkjian and Sigetty [15] suggested, with the help of the results of Mössbauer studies, that the g = 2 signal at higher concentration of iron oxide is due to the coupling of Fe^{3+}- Fe^{3+} ions and the resonance at g = 4.3 can be produced by low symmetric (rhombic) sites of either tetrahedral or octahedral coordination which was later supported by Loveridge and Parke [28].

Moon et al [16] observed three EPR resonance lines corresponding to g = 2, 4.3 and 6 in glasses with compositions xFe_2O_3- (1-x)BaO.$4B_2O_3$. Their Mössbauer measurements on the same samples lead to their suggestion that the g = 4.2 EPR signal was due to Fe^{3+} ions in tetrahedral sites. The signal at g = 2, which was observed to be very broad, was attributed to coupling of the magnetic ions Fe^{3+}- Fe^{3+} Gupta et al [17] have also observed similar EPR behaviour in (PbO-B_2O_3).Fe_2O_3.

Kurkjian and Sigetty [15], Moon et al [16] have attributed the g = 2 resonance line to spin-spin interactions between Fe^{3+} ions where the formation of clusters of two or more ions is possible. Moon et al [16] have assigned the g = 2 resonance line to axially distorted site also only in the presence of g = 6 resonance line that is due to axial crystal field alone.

In this work, the resonance observed at g = 4.3 is attributed to isolated Fe^{3+} ions in rhombic sites. The g = 2.0 resonance may be assigned to both axially distorted sites and Fe^{3+} ion pairs coupled by spin-spin interactions [15]. If the g = 2.0 line is due to axial crystal field alone, the g = 6.0 resonance should also be observed. Since the resonance line only at g = 2.0 is observed in the present work, it can therefore be only attributed to spin-spin interaction between Fe^{3+} ions. The g = 9.7 resonance can be assigned to the transitions between upper Kramer's doublet levels (i.e., | ±5/2>). Below results on individual glass systems are described.

A. *$(Li_2O$-$B_2O_3)_{1-x}$. $(Fe_2O_3,)_x$ glasses*

Room temperature EPR spectra of $(Li_2O$-$B_2O_3)_{1-x}$ (Fe_2O_3) glasses, where x= 0.005, 0.01, 0.025, 0.05, 0.075 and 0.1, are shown in Fig. 1. Three resonances at g= 2.0, 4.3 and 9.7 are observed as indicated by the arrows on one of the spectra in Fig. [1]. The resonance at g = 4.3 is sharp, the resonance g = 2 is broad and the resonance g = 9.7 appears as a shoulder at the lower magnetic field value. It is clearly seen that for x = 0.01 sample, the g = 2 resonance is very weak and so is the resonance at g = 9.7 (shoulder in the spectrum at low H values). As x increases, i.e., for x = 0.025, the signal for g = 4.3 increases so does for g = 2 although not that much in comparison with that of g = 4.3. Further increase in x starts increasing the intensity of g = 2 at the expense of the resonance at g = 4.3 and the shoulder corresponding to the resonance at g = 9.7 starts becoming diffused, and for x = 0.1 the resonance intensity of g = 2 is maximum (compared

to lower x values) but the resonance at g = 4.3 still remains the strongest and the shoulder at g = 9.7 seems to have nearly merged with the resonance g = 4.3. Since the g = 2 resonance is present even when x = 0.01, although very weak, it indicates that this broad resonance is not necessarily only due to interaction between Fe^{3+} ions since one does not expect that at such low concentrations Fe^{3+} ions are close enough to interact. It seems that this resonance arises due to some intrinsic structural arrangement in addition to any other interaction which is responsible for a large broadening of the signal.

Figure 2 shows ΔH_{pp} and N for g = 4.3 resonance as a function of x, the concentration of Fe_2O_3. The number of spins participating in g = 4.3 resonance increases first with the iron content upto x = 0.05, thereafter it decreases monotonically. This indicates that for x > 0.05 formation of Fe^{3+} ion clusters starts [23]. Similar observations have been reported by Anavekar et al in Fe_2O_3 doped $ZnO\text{-}B_20_3$ glasses [21]. The peak-to-peak linewidth, $\Delta H_{pp,}$ increases with the Fe_2O_3 content. The increase in ΔH_{pp}vs. x is not quite linear. It increases fast as x is increased from x = 0.01 to 0.05, thereafter the increase is not so fast and it flattens out at higher x values indicating that the broadening at low x values is most probably due to increase in the interaction due to Fe^{3+} ion becoming closer to each other but at higher x values cluster formation leads to the saturation effect.

B. *$(Li_2O\text{-}2B_2O_3)_{1-x}$ $(Fe_2O_3)_x$* glasses

The room temperature EPR spectra of $(Li_2O\text{-}2B_2O_3)_{1-x}(Fe_2O_3)_x$ (where x 0.01, 0.025, 0.05, 0.075 and 0.1) glasses are shown in Fig. 3. It is seen that the results are similar to that for $(Li_2O\text{-}B_2O_3)_{1-x}$ $(Fe_2O_3)_x$ glasses, that is, they all show three resonances at g = 9.7, g = 4.3 and g = 2 and the quality of these resonances is similar as that for the $(Li_2O\text{-}B_2O_3)_{1-x}(Fe_2O_3)_x$ glasses, i.e., g = 4.3 resonance is sharp, g =2 resonance is very broad and g = 9.7 appears as a shoulder at lower fields. The variation in the intensity is also nearly similar for each resonance cited. Fig. 4 shows the variation of ΔH_{pp} and N vs. *x*. N for these glasses also shows a maximum at *x*= 0.05 and then decreases for higher values of x but not as sharply as for the previous glass system $(Li_2O\text{-}B_2O_3)_{1-x}$ $(Fe_2O_3)_x$, for higher values of x. ΔH_{pp} increases with x but non-linearity of the increase is not as much and it does not saturate at higher values of x. The variation of ΔH_{pp} with *x* is such that one can fit it into a straight line. The result of the fitting is

$$\Delta H_{pp} = 1137.2x + 91.50 \quad (3)$$

The magnitudes of ΔH_{pp} and N are also nearly similar although values of N at higher *x* values seems to be a little higher indicating more free spin for the same value of *x* in these glasses in comparison with the $(Li_2O\text{-}B_2O_3)_{1-x}$ $(Fe_2O_3)_x$, glasses. Increase in ΔH_{pp} continuously and decrease of N at Fe_2O_3 again indicates that the cluster formation of iron ions is taking place at higher values of Fe_2O_3 concentrations.

C. *$(Li_2O\text{-}3B_2O_3)_{1-x}$ $(Fe_2O_3)_x$ glasses*

The EPR spectra of the glass system $(Li_2O\text{-}3B_2O_3)_{1-x}(Fe_2O_3)_x$(where*x*=0.01, 0.025, 0.05, 0.075 and 0.1) are shown in Fig. 5. These glasses also show the similar behaviour as the earlier two glass systems, namely, $(Li_2O\text{-}B_2O_3)_{1-x}(Fe_2O_3)_x$, and $(Li_2O\text{-}2B_2O_3)_{1-x}$ $(Fe_2O_3)_x$. Three resonances at g = 9.7 (shoulder at low fields), g = 4.3 (sharp resonance) and g = 2 (very broad) are observed. Fig. 6 shows plots of ΔH_{pp} and N as a function of Fe_2O_3 concentration (*x*). The number of spins N for the g = 4.3 resonance increased up to x = 0.075 and it remains nearly constant for *x*=0.1. Here the peak-to-peak width ΔH_{pp} for the resonance g = 4.3 increases in a similar way as for $(Li_2O\text{-}2B_2O_3)_{1-x}$ $(Fe_2O_3)_x$, i.e., it monotonically increases with slight non-linearity. A straight line filled to this data gives –

$$\Delta H_{pp} = 1186.68x + 68.29. \quad (4.04)$$

The values of ΔH_{pp}, for the g = 4.3 resonance nearly similar to those of $(Li_2O\text{-}B_2O_3)_{1-x}$ $(Fe_2O_3)_x$, and $(Li_2O\text{-}2B_2O_3)_{1-x}$ $(Fe_2O_3)_x$ glasses. However, there is a distinct difference of N with x at higher values of iron concentration. No maximum is observed in N vs. *x* indicating that in this glass the cluster formation of Fe^{3+} ions is not strong enough to decrease the free spin numbers.

D. *$(Li_2O\text{-}yB_2O_3)_{0.8}$ $(Fe_2O_3)_{0.2}$*

A study of glasses with fixed amount of Fe_2O_3 (that is 20 mol%) in which B_2O_3 varied, was also studied. The glass system is $(Li_2O\text{-}yB_2O_3)_{0.8}(Fe_2O_3)_{0.2}$with y=1,2, 3 and 4 . Fig. 7 shows the EPR spectra of these glasses. It is seen that for $y \geq 2$, signals at g ≈ 4.3 and 2.0 are clearly separated. The relative intensity of g≈2.0 increases with decrease in the value of y and when y = 1, the two resonances seem to overlap considerably resulting in only one peak. There is also a shoulder of low intensity at lower fields which seems to move to lower fields as the y value decreases from 4 to 1. The g- value of the broad signal at higher fields (g ≈ 2) seem to increase a little bit as y decreases. This may be indicative of the spin-spin interaction between Fe^{+3} ions due to cluster formation.

E. *$4Li_2O\text{-}6B_2O_3$: x mol% Fe_2O_3 glasses*

The EPR spectra of the glass system $4Li_2O\text{-}6B_2O_3$: *x* mol% $(Fe_2O_3)_x$ (where x = 0.5, 1, 2, 5, 10 and 15) are shown in Fig. 8. As expected, three resonances at g=9.7 (shoulder at low fields), g = 4.3 (sharp resonance) and g = 2 (very broad) are observed. These glasses show a slightly different behaviour as the earlier three glass systems, namely, $(Li_2O\text{-}B_2O_3)_{1-x}(Fe_2O_3)$, $(Li_2O\text{-}2B_2O_3)_{1-x}$ $(Fe_2O_3)_x$ and $(Li_2O\text{-}3B_2O_3)_{1-x}$ $(Fe_2O_3)_x$ as far as the intensity variation is concerned. The intensity increases here with *x* although the intensity of x = 5 sample seems to be slightly larger than that of x = 10 sample. Fig. 9 shows plots of ΔH_{pp} and N for the resonance g = 4.3 as a function Fe_2O_3 concentration (*x*). The number of spins N as well as ΔH_{pp} increase almost linearly. A straight line fit to data ΔH_{pp} vs. *x*, and N vs. *x* gives the following results.

$$\Delta H_{pp} = 5.12x + 71.08, \quad (5)$$

and

$$N = 16904.98x + 26559.54 \quad (6)$$

These results indicate that free spins in this system is increasing in proportion to the Fe^{3+} concentration. This obviously indicates that somehow the distribution of the iron sites is far enough in this glass system to avoid spin-spin interaction.

Conclusions:

Lithium borate glasses doped with Fe_2O_3 have been investigated using EPR technique. The relative ratio of Li_2O and B_2O_3 was varied as well as for a given composition Fe_2O_3 dopant amount was varied. The EPR spectra of all glasses show three resonances at g ≈ 9.7, g ≈ 4.3 and g ≈ 2.0 as observed in many other glasses. The resonance at g ≈9.7 appears as a shoulder at low field values, the resonance at g ≈ 4.3 is strongest and sharp while the resonance at g ≈ 2.0 is rather broad. For a given compositional ratio of Li_2O and B_2O_3, the linewidth and the number of spins vary nearly linearly at low concentration doping of Fe_2O_3 indicating that Fe^{3+} ions remain isolated, however in some glasses, the number of spins participating in the resonance decrease indicating possibility of the clustering effects.

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