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Knowledge to Wisdom

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CHAIRPERSON'S MESSAGE

It is a great responsibility to continue an endeavor to "ignite" the young minds to think for a better future. The current issue of the *Journal of Indian Research* is a veritable feast of ideas. Ambassador Stobdan delves into the complexity of new contours emerging in the High Himalayas and proposes decoupling Ladakh from the irredentist issue of Jammu & Kashmir so that India can connect to Central Asia and further to Eurasia through Ladakh. With the opening of China-Pak Economic Corridor(CPEC), Ladakh should be viewed seriously as a strategic opportunity. The cost of neglecting the regions distant from Delhi has been huge.

Ladakh occupies the crown position on relief map of India. Geologically, this is the oldest part of Indian plate to have joined the Asian plate. When geopolitics has returned with its venomous fangs, the region has gained high significance in strategic calculus.

The *Journal of Indian Research* has emerged as a site for spreading fresh perspectives in different disciplines. India still lags behind in innovative thinking. Our research centers are bogged down by mediocrity. We cannot excel until and unless we allow fresh breeze of 'out-of-box" ideas. While the world is grappling with discovery and generation of new life forms, working upon robot-mothers who can identify the fittest offspring and unleash evolutionary bio-engineering in machine-lives, Indian thought-leaders are fixated upon a culture of bans and censorship. We have merely handful of global thinkers and scientists. A culture of boasting and boasting of culture may turn into nemesis of our dreams. It is high time that the academic community transcends the ideological barriers and joins hands together to build gigantic towers of transformational ideas.

Dr. Ashok Kumar Gadiya

EDITORIAL

We are happy to bring another issue of the *Journal of Indian Research*. We are grateful to the contributors and the Mewar University for their inspirational support and courage to carry over a Herculean task of spreading the light of wisdom in the world. This is the tenth uninterrupted issue of the Journal. Tenth step is quite significant in Indic tradition. Buddhist Mahayana literature mentions about the Ten Bhūmis or the stages on the Bodhisattva's path of becoming a Buddha. Vaishnavites believe in the ten incarnations of the divine, the tenth being the Kalki, the final avatar who will defeat the forces of evil and usher in the Satyuga. For our small team, bringing tenth issue is akin to entering a new phase of institutionalization of the effort.

We often realize that majority of the researchers in social sciences are preferring easy route of analyzing certain empirical data. This rarely adds to the existing knowledge and keeps on recycling prejudices of certain authorities. The research is losing the "touch of joy". The bland research can hardly inspire the young scholars to undertake adventurous forays into the unknown realm of knowledge. It is necessary to make research an adventure, an experiential encounter with the unknown. Can we elevate experiential aspect of research over empirical dimension?

In Asian traditions, most of our traditional wisdom is still encapsulated in the poetic form. Our poets moved the society and the culture. American philosopher Hakim Bey rightly observes, "In N. India even non-musical recitation provokes noise & motion, each good couplet applauded, "Wa! Wa!" with elegant hand-jive, tossing of rupees…". Therefore, our poets bore the brunt of the ruthless powers. The west excelled in oratory. Their poetry are, Bey points out, "like some SciFi brain in a jar--at best a wry chuckle or grimace, vestige of simian rictus--the rest of the body off on some other planet." In the west, Bey points out, "the link between poetry & body died with the Bardic era--we read under the influence of a Cartesian anaesthetic gas."

Indic thinking is rooted in this connection of body and thought. The gestures (*mudra*) depicted in the iconography are language-in-itself. The body itself becomes a text—dances, drama, discourse, asana, *nyasa* only reiterate body's positionality in the thinking process. Our poets changed the course of history. But, when the poetry lost the connection with body, it not only lost the power to move the "bodies of audience",but also the depth that could shake the "powers". The role has been taken up by images- cinemas, TV, computers. The contemporary poets no longer touch our hearts and souls, they prefer easier path of touching the feet of political masters and has declared the death-bell of dissent. Pornography-the extreme images-invaded our culture when poets lost the power of "touching" our bodies. The pornography stands as an insurrection against the surveillance power of the Orwellian State.

In this age of smart technology, touch has regained the primacy. The smart phones, iPods, tablets, laptops, biometrics, smart cameras employ the feature of "touch". If the world knowledge system evolved from oral tradition based upon the primacy of the sense of "hearing" (श्रवण) to the written tradition based upon the primacy of the sense of "sight" (दृश्य), it

is imperative at this juncture to employ the sense of "touch" (त्वक्) to revolutionize thinking. This requires the shifting back our attention to our "bodies" and connecting the thoughts with body. We must move beyond Cartesian disembodied minds and start preparing for synthesis of triumvirate senses in enriching the global wisdom pool. The *Journal of Indian Research* will readily host such attempts.

– Niraj Kumar

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Politics

INDIA NEEDS A ROBUST LADAKH POLICY: CASE FOR A SEPARATE STATE OF LADAKH

P. Stobdan*

ABSTRACT

The paper discusses the geopolitical environment in India's immediate vicinity especially China's new aggressive economic and connectivity policies under the One-Belt-One-Road (OBOR) idea plus China's $46 billion infrastructure spending plan through PoK that could transform the security landscape around India's northern borders. The Chinese activities in PoK cannot be seen in isolation without the backdrop of its historical tag with this region.Once China's hold over PoK gets tighter, it would inevitably have implications for Ladakh as well. The paper examines the conferment of "full Statehood" to Ladakh after taking on strategic consideration, drawing on a newly expansive Chinese foreign policy, aggressive Pakistani design for sponsoring terrorism, emerging new Islamic region north of Ladakh and growing opportunities for engagement with the Eurasian region.

Keywords: Corridor, *kikisoso-laargalo,* Ladakh Autonomous Hill Development Council (LAHDC), One-Belt-One-Road (OBOR), Pangong Lake , Tibetanization

INTRODUCTION

Ladakh is the thicket piece of highland fallen from the sky to India. But for Ladakh, the Chinese PLA would have been sitting on the southern foothills of the Himalayas to co-support the Pakistani Army to snatch Kashmir from India.

But this strategically most critical part of the country has received little or no attention as compared to the Northeast and Kashmir. India's primary interest and policy actions for Ladakh have mainly been driven by security concerns and they are being dealt with robust defence preparedness.

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For most Indian political and intellectual class, Ladakh still remains a *Lost Horizons* - the tendency now is to view it from touristic angle-reducing it to Pangong Lake, Khardong-la, 'Three Idiots' etc. The complete lack of a political interest and overlooking of Ladakh's unambiguous regional personality as one of the erstwhile Himalayan Kingdom may have cost India heavily. Ladakh's vast borderland is vulnerable to encroachment by adversaries. It is not a good statecraft.

India's first Prime Minister Jawaharlal Nehru made a blunder by spurning Ladakh's popular demand for complete merger in India and be a part of then East Punjab. Instead, he left Ladakh's fate be decided by Sheikh Abdullah.

This cruel irony of Ladakh's current politically adjunct status to J&K, completely incompatible to its glorious history as well as to its geopolitical importance, is somewhat becoming critical and untenable in the 21st century.

Ladakh has showed no irredentist tendencies and there still isn't any ambiguity about its choice to be with India but for India's own neglect. Soldiers of the most decorated wing of Indian Armed Force *Ladakh Scouts* continue to battle cry *kikisoso-laargalo* to defend the land of *Buddha & Dhamma*.

Answers for the prolonged neglect of Ladakh are hard to come by; the most convenient alibi cited is Ladakh's demographic deficiency thus no importance for electoral politics; it holds no importance to national economy as its copious water resources are benefited only by Pakistan. Article 370 may have come in the way of investment flow. Tourism remains unsustainable due to absence of land connectivity. Ladakh's lack of political articulation apart, its rhetorical perspective vis-à-vis Kashmir plus the Chinese aggressive destruction of Buddhism in Tibet may have afforded India to ignore Ladakh. But will these approaches work anymore?

New Delhi continues to view Ladakh's destiny linked with and complicated by the Kashmir dispute. It sees Ladakh's elusiveness providing a contrasting case to debilitate the Kashmiri Azadi call. This may not be the correct assessment though and deserves further analysis.

The current arrangement of a two separate Ladakh Autonomous Hill Development Council (LAHDC) for Leh and Kargil has certainly helped diminish anti-Kashmiri sentiments among people, but the concept is unlikely to remain a magic option for solving national interests.

The LAHDC was simply taken as a sop. The sabotaging of the Ladakh Union Territory Front (LUTF) in 1997 proved to be death knell for Ladakh movement. Such a handling is not a good sign for mature democracy and would backfire sooner or later.The BJP promised abrogation of article 370 to facilitate UT status for Ladakh. Obviously this was not to be so and this leaves the UT case for Ladakh in limbo.

The situation in Ladakh seems changing rapidly. A semblance of serenity by no means should be mistaken for peace. Retrospections seem fast underway and the old model simply may not be working. Not apparently visible yet, a pent up frustration may be simmering; divisive elements are already creeping in to fuel internal divisions. Meanwhile the local angst against Kashmir is waning; instead incidents of stone pelting on non-locals, often tourists are increasing year by year. A simmering undercurrent of tension between the locals and the Army

over land could have implications in other areas.

The change in mood is evident from complete silence among people over PLA's incursions in Eastern Ladakh. More seriously, the Tibetanization of Ladakh surely not happening without a reason and without supports coming from external sources is not a good portent. Assertion by high Tibetan Lamas could threaten the peace in Ladakh. In the final analysis, Tibetanization of Ladakh could only benefit China and not India.

The evolving situation in this sensitive region could potentially create a string of political electrons, threatening peace in the Himalayas.

Ladakh's call for separation from J&K has antecedents and can no longer be ignored under the pretext of Kashmir problem. It is not a choice but a necessity for there are far bigger strategic imperatives for India to advance its interests beyond the Himalayan frontiers.

Firstly, India's strategic thinking failed to draw on Ladakh importance; its vast swathes of territory and its political history was never factored in defining equation with China. India needed to have a robust Ladakh policy rather than a Tibet policy. India's priority has been to neutralize Tibet from China rather than securing vast track of Eastern Ladakh extending up to Purang covering Rudok, Guge and Kailash that were once captured by the troops of the 5th Dalai Lama in the 17th Century. But for Aurangzeb's military assistance to Ladakh King in 1679-1684, the entire Ladakh would have been captured by Tibet thereby China today. In fact, who controls Lhasa should not have been India's concerns; priority should be to retrieve area up to Kailash Mansarovar from China. The Dalai Lama while he is still alive should be pressed to make a statement that his previous incarnation did commit atrocities on Ladakh and the grabbing of Eastern Ladakh to incorporate in Tibet was a gross mistake.

Secondly, Ladakh and Gilgit-Baltistan (GB) despite constituting over 82 per cent of J&K's territory never factored in India's strategic calculus in dealing with Pakistan. Imagining a *Smart Ladakh* policy would have limited Kashmir gaining the traction that it has acquired currently. At least, Pakistan has for whatever reasons separated GB from 'Azad Kashmir' to call it Northern Areas. In contrast, India continues to tag Ladakh with J&K without understanding the long term consequences.

Thirdly, the geopolitical environment in India's immediate vicinity especially China's new aggressive economic and connectivity policies under the One-Belt-One-Road (OBOR) idea plus China's $46 billion infrastructure spending plan through PoK could transform the security landscape around India's northern borders. The Chinese activities in PoK cannot be seen without the backdrop of its historical tag with this region. But, the current context is more about preventing Islamic threat to Xinjiang. But, once China's hold over PoK gets tighter, it would inevitably have implications for Ladakh as well. India is faced with a difficult option to either accept China's presence in PoK or it remains a stranglehold of terrorists.

Fourthly, newly emerging Islamic region extending from Chechnya, Ferghana to Xinjiang in close vicinity of Ladakh should be a concern. Against this backdrop, India's engagement with Eurasian region under the Shanghai Cooperation Organization (SCO) has become critical. A reason why, combating terrorism and including the threat from the Islamic State (ISIS) was a

major theme of Prime Minister Modi's discussion with Central Asian leaders. India is unlikely to succeed in achieving its goal in Eurasia with the current mess in Kashmir.

Sixthly and therefore, India needs to untie the most difficult J&K knot that remains unresolved despite diplomatic, military and economic efforts. The only way out left is to unknot the distortions borne out of history and take a bold political step to separate Ladakh from J&K and give it a separate State status on the lines of Arunachal Pradesh. This could be a masterstroke or a *coups de maître* in India's long-term home and foreign policy to finally overcome the internal contradictions as well as external security challenges.

Internally, Kashmir could be better counterbalanced when Ladakh enjoys a stronger political weight and leverages. To meet the external challenges, New Delhi needs to stop looking at Ladakh only from defence prism. The region offers far bigger strategic perspective for India to be a key player in High Asia. Restoring Ladakh's lost trade linkages with the Silk Route could be the kernel to India's strategic outreach; it could unfold a historic opportunity for the country to physically connect with markets in China, Eurasia, Europe and beyond.

India's counter strategy to China's Silk Road should thus envisage offering China an alternative transport, energy, trade and communication corridor originating from a port in Gujarat running across Northern India to connect Kashgar through Indus valley in Ladakh. The proposal would have multiple advantages for India, a) Chinese investment will boost jobs and economic opportunities, b) India could earn billion from pipeline transit fee, c) China would be nudged to depend on India for energy corridor thereby buying guarantee against misadventure across the border, d) India can bargain with China for getting long-distance energy pipelines from Russia and Central Asia to India, e) and finally a corridor to China through Ladakh will offset and blunt the China-Pakistan Economic Corridor project. For China, a corridor through India would be less hazardous and more reliable than risking investments in terrorism-plagued Pakistan. India could also offer other outlets nearer to Chinese growth centres.

If pushed forward, it could become a grand splurge by India for its economic engagement with China and something akin to how Russia and China started two decades ago. This could pave the way for strengthening trust between the two countries and eventually towards the solution of the boundary problem.

The ultimate divisibility of J&K is a political reality; the status quo is unendurable and is against the democratic aspirations of the people who wish to escape the strange paradoxical identity crisis. Certainly, Ladakh does not have the requisite political and economic bargaining strength. Certainly it does not enjoy either the intellectual support base needed for internal and external lobbying nor are the people ready to take a violent path.

But these can't become reasons for not taking Ladakh seriously. Reordering of J&K can also be a keystone for regional stability. Severe glacial attrition from global warming implies future water scarcity. Protection of Ladakh glaciers and a possible plan for diverting the Indus River water should become the underpinning factor. An amicable divorce of Ladakh from J&K is arguably desirable despite many constitutional hurdles. However, non-realization of it would entail more disorder at home and vulnerability from outside.

Statehood for Ladakh should be based on assessment of history, national interest and not driven by rhetoric. A strong Ladakh is in the interest of Kashmir as the first defence line against any threat to Islam in Kashmir – not an impossible scenario though given the current fate of Muslims in Xinjiang. Most critically, State of Ladakh must be taken on strategic consideration, drawing on a newly expansive Chinese foreign policy, aggressive Pakistani design for sponsoring terrorism, emerging new Islamic region north of Ladakh and growing opportunities for engagement with the Eurasian region. India should quickly lay the platform for long-term solution for Kashmir crisis as well as for nurturing the strategic utility of Ladakh for India's national interest.

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Politics

IMPACT OF DEMOCRATISATION ON MONGOLIA'S DOMESTIC POLITICS

Amba Shanker Bajpai*

ABSTRACT

Mongolia was a Soviet satellite state. After Gorbachev initiated reform in USSR, Mongolia began experimenting with Soviet reforms and developed its own model of perestroika (öörchlön baiguulalt) and glasnost (iL tod). But the real opening act of political liberalization came in December 1989 when at a plenum of the Mongolian People's Revolutionary Party (MPRP), Mongolian President, Jambyn Batmönkh publically criticized the Yumjaagiin Tsedenbal period(1952-1984) and condemned Horloogiin Choibalsm's cult of personality. Political and economic liberalization was initiated. There was shift in foreign policy goals. Mongolia opened up with the outside world. The political maturity of the leadership allowed Mongolia to overcome the transition period with low level of violence. The thriving democracy has opened up space for women and civil society groups to emerge as significant voices. The paper deals with the complex dynamics during the transition period of Mongolian democracy.

Keywords: *Glasnost,* Great Hural *, iL tod, öörchlön baiguulalt, Perestroika,* Third neighbour.

INTRODUCTION

The collapse of the former communist and authoritarian regimes in Eastern and Central Europe as well as Latin America was touted as the triumph of liberal democracy in several quarters. More than ever, democracy has now been elevated as the ideology of the New Age. This is evident from the fact that very "few countries disavow democracy in principle and fewer countries than in the past have betrayed it in practice" (Parry and Moran,1994). After taking over power in the USSR, Gorbachev, in his famous Vladivostok speech of 1986 introduced two innovative programme- *Perestroika* and *Glasnost.* This in turn triggered the domestic and foreign policy reforms. The programme had deep influence over the politics and society of the

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neighbouring Mongolia. As part of this process, Soviet troops in Mongolia were to be reduced, and a complete withdrawal of troops was decided in March 1989. Mongolia lost its geo-strategic importance for the Soviet Union and with it most of its foreign aid, much of which was provided as credits rather than 'free' grant-in-aid (Heaton, 1991). Gorbachev initiated revival of the stalled Soviet economy by proposing a "vague programme of reform" and called for fast technological modernization and increased industrial and agricultural production. He envisaged further domestic and foreign policy reform. These measures became the lamppost for the Mongolian liberalization,

At the same time, Gorbachev opposed violent reaction against anti-communist protest in satellite countries. Mongolia began experimenting with Soviet reforms and developed its own model of *perestroika* (*öörchlön baiguulalt*) and *glasnost* (*iL tod*). But the real opening act of political liberalization came in December 1989 when at a plenum of the Mongolian People's Revolutionary Party (MPRP), Mongolian President, Jambyn Batmönkh publically criticized the Yumjaagiin Tsedenbal period(1952-1984) and condemned Horloogiin Choibalsm's cult of personality. These statements triggered long repressed public debate about history and national culture, including the memory of the Stalinist purges of 1930s, when five percent or more of the population had been killed during Mongolia's 'transition' to communism. As in other communist countries, such debates in Mongolia too contributed to delegitimizing the existing regime. That was one aspect of reform policy that got momentum in Mongolia (Fritz 2008:770).

The second aspect of reform policy was the formation of a pro-democratic viable opposition. At the same time, some debating Mongolian groups, clubs known as "New Generation" led by S. Zoring and E. Bat-Uul and a club of young economists- many of whom having finished their studies in Europe and Moscow, returned to Mongolia and started working at National University or in various ministries, and played a crucial role in the formation of the political opposition. On 10 December 1989, they formed Mongolian Democratic Union (MDU). Soon after, the MDU started organizing demonstrations amid a session of the Mongolian Parliament (Great Hural) on 11-14 December, 1989 and submitted its demands to the Mongolian People's Revolutionary Party (MPRP)-led government. They demanded constitutional amendment of the Mongolian People's Republic to end One-Party Rule of the State, respect for the Universal Declaration of Human Rights, Freedom of the Press, renewal of the electoral system, and demanded elections to be held in June 1990. They further sought reorganization of the Great Hural into a permanently functioning Parliament. This was the period when the crucial struggle for the political liberalization took place in Mongolia between December 1989-March 1990 (Fritz 2008:771).

The ruling party, MPRP initially responded to undertake reform and MPRP started dialogue with MDU. The MPRP gave positive response to MDU demands to avoid domestic crisis and to form a committee to make new Constitution. Soon after the foundation of the MDU, other civil society organizations such as the Democratic Socialist Movement and the New Progressive Movement were also formed. Their purpose was similar and sought advocacy of democracy, a free press and domestic changes in Mongolia and to move over the Soviet influence.

CONSTITUTIONAL CHANGES

The demand for democratization of Mongolian polity and society took a step forward during December 1989 and early 1990. This marked a crucial moment in Mongolian political history when the country could have either moved towards democracy or remained communist. In 1990, Mongolia held the first free election in its 70 years of modern history and took important steps towards democracy (multiparty, pluralistic and democratic society) and market economy. Responding to the demands of growing opposition movements since December 1989, the ruling Mongolian People's Revolutionary Party (MPRP) amended the constitution to expose its front runner role and created a Presidential system and an additional, more representative legislative house. By mid-1990, political parties were legalized and an electoral law was passed. This experience provided an example of peaceful transition toward democratic and universal human values. Overall it was a dramatic shift towards democratization of Mongolian polity which gained momentum due to the collapse of the Soviet Union in 1991 and end of the Cold War (Soni 2008:34) . The main ruling party MPRP agreed to amend the 1960 constitution of Mongolia during extraordinary session in May 1990. The role of MPRP in country as "guiding force" as singular institution was removed. A legislative body known as State Little Hural (elected body by the proportional representative of parties) was established. The State Little Hural introduced a new electoral law for the general election. The first General Election (multi-party elections) for the Great Hural was held on July 29, 1990 in which the MPRP won 85% of the seats. Great Hural first met in Sept, 1990 and elected a President from MPRP, Vice-President from SDC (Social Democrats), Ministers from the MPRP and 50 members of the Little Hural. The Vice President was also nominated as the Chairman of the Little Hural.

In November 1991, the Great Hural began discussion on new Constitution with the creation of a Constitutional Drafting Commission under the chairmanship of President Orchirbat. The members of the Drafting Commission started public debate on the new Constitution. The commission submitted the first draft of revised Constitution before the National Government. This draft was later examined by the Great Hural. The Commission also took the assistance of International Commission of Jurists. In keeping with the extant strong national sentiment in Mongolia following the collapse of the old political regime, the title for the Constitution in both of these early drafts was *Ih Tsaadz* or *Undsen Huul*, evocative of the name of Genghis Khan's legendary code of laws (Morgan 1986:96-99).

Though many people argued that Mongolia should have a Parliamentary system, the first draft called for the strong Presidential system and a single chamber parliament. Finally, the new Mongolian Constitution (Fourth Constitution) with foreign advise was adopted on January 13, 1992 replacing the 1960 Constitution which brought considerable changes in Mongolia's political system. The miracle change made in this Constitution was replacement of two-chamber parliament (bi-cameral) known as the Great and Little Hurals with that of a single chamber (unicameral) known as the State Great Hural (SGH) comprising 76 deputies within one year of its introduction.

The six chapters that make up the Constitution address the matters of independence and territorial integrity, human rights and freedom, the state structure, local administration functions, the Constitutional Court, and amendment of the Constitution. The new Constitution

established a democratic political system with free market. The President is the Head of State and has the power to veto parliamentary legislation. He also heads the National Security Council and is the commander of the armed forces. The Prime Minister, on the other hand, serves as the head of the government and directs a cabinet drawn from the State Great Hural. The President became more powerful who would be elected by popular vote rather than by the legislature as before. A national majority popularly elects him for a four year term, which is however, limited to two terms. The President by the constitution proposed that a Prime Minister serve as head of the government and have a four-year term conformed by the SGH. After the adoption of new Constitution in 1992, the first SGH General Elections were held in June and the Presidential elections were held in June 1993, respectively. This was the beginning of new democratic practices and establishment of democratized institutions.

MULTI-PARTY ELECTIONS

In June 1992, the first election of Mongolian parliament was held. 76 members contested twenty-six multi-member districts in accordance with the new Constitution. In April 1992,the State Great Hural election law was adopted. Mongolia had 18 provinces that formed constituencies and three big cities. Darkham and Erdenet formed one constituency each, and the capital Ulaanbaatar city, comprised of six constituencies. Successful candidates were chosen on the plurality basis (Batbayar 1993:61-62). Before the election, the new Election Law was approved by the Parliament so that the contesting parties officially registered before April 1992 could run in the election. Two coalition and eight parties were registered to run in the first multi-party election. The MPRP which had won 70 seats out of 76 seats in the State Great Hural, received only 56 percent of popular vote. The democratic parties' alliance got four seats and the MSDC one seat. One seat was won by an independent candidate. A new Government with a new policy towards economic reform was formed under P. Jasari of the MPRP. One year later, on June 6, 1993, Mongolia had its first free multi-party Presidential election. Only parties holding seats in the State Great Hural were allowed to nominate Presidential candidate, who then participated in the two-round Presidential election. The Democratic Party's Presidential candidate, P Ochirbat, won the election with 58% of the vote. This election played a significant role in establishing a balance between the President and the Parliament. The outcome of this election saw the Communist party come into executive power and the democrats gain control of the parliament. Thus, this Presidential election made a balance between the two major political forces and that strengthened the democratic transition. (Batbayar 1994:41-42)

The democratic reform continued and in 1996 the Parliament election was conducted with revised election law in January 1996. The Mongolian National Democratic Party (MNDP) and Mongolian Social Democratic Party (MSDP) (with the support of several smaller democratic parties) formed a coalition called the Democratic Union Coalition (DUC). The DUC, in a surprise outcome, triumphed in the June polling, winning a combined 50 out of 76 seats-though one short of a quorum. This victory brought various challenges and difficulties for the democrats because experienced MPRP bureaucrats and well qualified professionals were replaced with the younger and less experienced DUC party members. Former MP and economist, Mendsaikhan Enksaikhan, head of the DUC was elected as the new Prime Minister.

The Government introduced judicial reforms and radical economic reforms freed the media and strengthened the legal system. In the second Presidential election held in May 1997, there were three candidates from different political parties; N Bagabandi, the former speaker of the SGH was nominated by the MPRP and other two, P. Orchirbat and Jambin Gombojav, were nominated by Democratic Alliance and United Conservative Party, respectively. N Bagabandi won the Presidential election with 60.8% vote. But democrats could not run the government smoothly due to lack of experience. Soon DUC candidate and Prime Minister resigned his post and T Elbegdorj, the leader of their parliamentary alliance, became Prime Minister. The political instability in Mongolian parliament continued till the end of December 1999 when the parties drafted Constitutional amendments for the appointment of Prime Minister and other procedural matters. Thus, democracy was further consolidated and strengthened in Mongolia.

Mongolia underwent third Parliamentary and Presidential Election in 2000 and 2001, respectively. It was a period of slowdown of economic reform and increasing poverty and unemployment. There were several new political parties in the fray. 24 political parties participated in 2000 SGH election. The MPRP, MSDP and MNDP, three major political parties, all ran 76 candidates. The MNDP fraction formed the Mongolian Democratic Party (MDP). The MPRP nominated its candidate, Enkhbayar, for the post of Prime Minister. He won with a landslide victory. 72 out of 76 seats went to the MDP, although he received only 50.3% of the vote. President Bagabandi again won the Presidential election in 2001.

Mongolian political system entered a new stage of volatility in 2004 when again political parties went alone to contest the SGH election. Political awareness had reached a new height by this time. The Mongolian Democratic Party formed a new alliance with the Motherland party. But this time, neither MPRP nor coalition won a clear majority. By the end of the year, MPRP and coalition came up with some agreement. The alliance had nominated Elbegdorj for the post of the Prime Minster and the MPRP had nominated Enkhbayar as the SGH chairman, with eight ministers from MPRP and six ministers from Alliance, thus, forming a coalition government for the first time.

The Mongolian politics entered a new stage of volatility. In the 2005 Presidential election, Enkhbayar, the MPRP candidate won the Presidential election and T Nyamdorj was elected the SGH chairman. In 2006, the MPRP ministers resigned from the Government and Tsakhiagiin Elbegdorj stepped down as the Prime Minister. Miyeegombyn Enkhbold formed the next coalition government soon after October 2007. Enkhbold was replaced as MPRP chairman and same month former diplomat Sanjaagiin Bayar served as Prime Minister. This was the phase of confusion and intense instability in Mongolian political scene. The government was not able to work because of very weak coalition.

In June 2008, the SGH election was held and the result gave clear majority to MPRP but the opposition parties did not accept the mandate. They started violence in Ulaanbaatar. The MPRP headquarter was burned down. More than five people were killed and more than 100 injured. The President called for four days State Emergency. More than 700 demonstrator were arrested, some convicted and sent to jail for damaging State property and violation of human rights. In mid-July, the results were certified and confirmed that MPRP got clear majority in SGH. Sanjaagiin Bayar was re-elected Prime Minister. N Altanjhiyag, the New Democratic

Party leader was nominated as his deputy. Bayar was doing a good job in reviving Mongolian economic development. But due to bad health, he stepped down and was succeeded by Sukhbaataryn Batbold, the then Minister of Foreign Affairs. Soon Batbold became a powerful figure in Mongolian political system. In November 2010, the MPRP decided new name for the party-Mongolian People's Party (MPP). The MPR participated in the SGH election in 2012 under the leadership of Sukhbaataryn Batbold. The Democratic Party won the election and formed a coalition government under Norovyn Altankhuyag with the support of Green and Will Party and MPP in opposition. A major development came in the form of reservation of 20% seats for the women candidates in Mongolian political system

In June 2009 Presidential election, Elbegdorj was victorious and he was the first democrat to enter this office over the twenty years of Mongolian democracy. Elbegdorj was re-elected for a second term as President during 2013 election. Thus, Mongolia made great progress towards democracy within a short span of time.

ROLE OF MEDIA, POLITICAL ELITE AND NGO

The role of civil society is crucial to a country's development. During the 1980s, one third of the world's countries were democracies, whereas by the 1990s, in a great wave of change, two-third of world's nations had become either democratic or were on path towards democracy. In this process, the role of civil society, Media and NGOs are essential. These NGOs are gaining significance as actors in decision making in countries around the globe, and they increasingly link to another in trans-border advocacy networks. The IT (Information Technology) revolution is a critical factor for boosting the role of NGOs by, for example, making it easier for staffer to stay in touch with members and with potential sources of funding, and increasing an NGOs access to information about what is going on inside and outside the country. But governments also play a vital role by creating a legal and regulatory environment that allows NGOs to flourish. NGOs around the world are becoming linked to one another. Cumulatively, one result is the rise of an international civil society. Mongolia is very much a part of this process of change that is going on in and among countries in Asia and elsewhere. A major development over this first decade of democracy in Mongolia has been the rise of NGOs playing a vital role in the consolidation of Mongolian democracy.[1]

In a society where democracy is proclaimed as fundamental goal, no initiative or reform will be successful without the active participation of citizens. The creation of these conditions is a prime goal of government organizations. Such principles as openness of any kind of information, accountability of governmental organizations to citizens, and responsiveness to the opinion and suggestions of citizens' organizations are the main mechanisms for the establishment of a civil society. In other words, governmental organizations should be under the control of citizens. "It is called a check and balance system."[2] If there is no control, or the control exists only on paper, corruption and the abuse of power will flourish. In the context of Mongolia, where equal relationships between the state and citizens have not yet been established and the government does not respect citizens, citizens criticize the government only among themselves but in fact fear the wrath of the government and officials. These are

the problems usually occurring in a transition period.

During the democratic transition period, Mongolian government firstly took initiative to free media and press which play a prominent role in democratization. The number of civil society organizations increased dramatically during the period of transition. By 2000, there were over 1800 NGOs registered with the Ministry of Justice and International Affairs (MJIA), and commentators consider the 1997 NGO law as particularly enlightened and favorable to the growth of civil society (Severinghaus 2001: 64). Within civil society, journalist and women's organization are the most vigorous and well-developed. The union of Mongolian journalist has been active in lobbying for less State control over the media, while the Press Institute of Mongolia has been active in educating and professionalizing young journalists. The Woman's Lawyer Association and the Liberal Woman's Brain Pool (LWBP) are examples of strong women's NGOs. In addition, some of these groups received foreign support, including funding from the Soros foundation for the Press Institute and the Asia Foundation and National endowment for the LWBP (Fish 1998: 136-137).

However, it has been noticed today that despite the vibrancy of civil society and levels of participation in the electoral process, there remains a significant degree of separation between the demands and activities of Mongolian citizens and the response of government. The general public has more confidence in the President than in Parliament, and they have low levels of trust in political party organizations, which may reflect some lack of connection among party leader, party representatives and party members and supporters.

EVOLUTION OF NEW MONGOLIAN FOREIGN POLICY

As a part of reform process, domestic and external scenario underwent a drastic change during the democratic transition, Mongolia's security and foreign policy objectives too figured prominently among the country's think-tanks (Soni 2006:27-39).[3] In June 1994, Mongolia made radical changes in its National Security and Foreign policy concepts as well as the Military Doctrine, which were finally endorsed by the Mongolian Parliament. The overall concerns for Mongolia's security, thus, aimed at achieving favorable internal and external conditions for ensuring vital national interests, which include the existence of the Mongolia people and their civilization, the country's independence, sovereignty, territorial integrity, inviolability of state frontiers, relative economic independence, sustainable ecological development and national unity.[4]

In 1991, foreign debt was the big issue of Mongolian foreign policy of external relations. Mongolian Prime Minister, Puntsagiin Jasrai, started his first visit to Russia to discuss the issue of debt. Both States agreed to review all the treaties. They signed a treaty in 1993 replacing Mongolia- Soviet friendship Treaty, which provided intergovernmental agreement for economic co-operation. But they could not resolve the big debt problem. By the end of 2003, Russia suddenly announced that the debt issue has been settled. Both countries started some joint ventures in mining areas and agreed not to form any military and political alliance against each other. Same time external relations with China, Central Asia, Japan, Korea EU, India, and USA touched a new height. Mongolia's involvement in international peace keeping

commenced. China emerged as the biggest economic partner and Russia as the second biggest, but Mongolia maintained equal relations with both, Russia and China. All these countries have worked closely with Mongolia providing policy advice and technical and financial assistance, a greater opportunity of FDI for rapid economic development. Mongolia finally abandoned "Satellite State" foreign policy and developed an independent, non- aligned, multi-pillar, open foreign policy concept based on guidance by its national interests.

DOMESTIC INFLUENCE ON FOREIGN POLICY

The domestic influence on Mongolia's foreign policy was most visible in securing sovereignty and identity.

Mongolian Sovereignty

Mongolia's position between Russia and China, and recent history of Soviet influence means that it rarely attained the conditions for full sovereignty. There was no autonomy in foreign policy making or exclusive control over internal affairs. Its position as a small 'developing' nation means that it is a relatively insignificant player in the global arena. Today, Mongolia relies on global institutions to give voice to its opinions, and recognition and guarantees of its sovereign status. Mongolia is a member of over twenty different international groups or organizations[5] , the most important being the United Nations (UN) in which Mongolia became a member only in 1961 after a protracted fifteen year campaign. The Mongolian Ministry of Foreign Affairs (MMFA) declared that Mongolia's membership has been *'the most viable guarantee of its independence and sovereignty'*. Tumerchuluun[6] (1999:286) illustrates this point using a statement made by the US which states that *'if Mongolia ever faces a threat and decides to refer the matter to the UN Security Council, the US, along with other members of the security council would consider appropriate steps to be taken'*. This threat of action should act as a deterrent to any country considering directly threatening Mongolia's territory. Mongolia actively participates in UN processes and actions, most notably recent UN sponsored peacekeeping activities, in particular the contribution of 250 military personnel to assist with reconstruction in Iraq. [7]

Not only are international institutions important but also individual nations. Ginsburg (1999:250) states that Mongolia has *'aggressively courted'* Europe, US and Asia in the search for a *'third neighbour'*[8] to guarantee national security. Initially there was optimism that the US or Japan might prove to be such a 'neighbour', however political realism has set in and as authors such as Ginsberg[9] (1999) and Bruun and Odgaard[10] (1997b) conclude, it is the international community as a whole that guarantees Mongolia's security and survival, rather than one individual nation.

Mongolian Identity

Mongolia is a relatively ethnically homogenous nation comprised of 86% Khalakh Mongols (Mayhew, 2001:34) and a small Kazakh minority. Its culture is very distinct from both Chinese and Russian cultures. Traditionally a nomadic society, there is a conflict in foreign policy making between those who see Mongolia's future in embracing this traditional identity and

forging closer ties to Central Asia with its similar culture, Soviet history and economic ties (Campi, 2003: 46-47) and those such as Prime minister Enkhbayar who believe nomadism to be uneconomic in a modern market economy that Mongolia is trying to become[11] and as such ties with *'modern'* countries in Northeast Asia should be encouraged.

Despite the greater potential for investment, trade and security, Campi (2003:48)[12] warns that *'tying itself mainly to Northeast Asia will not work economically and militarily, because Russia and China are the main developing economies which overwhelmingly attract investment money and trade.'* Therefore, he advises, Mongolia should reinforce links with Central Asia.

The relative importance accorded to Mongolia's different identities, both modern and traditional, impacts the priority it places on relations with its neighbouring regions. The 'Concept of Foreign Policy' indicates that in reality, Mongolia accords priority to its relationship with the Asia- Pacific region, and not Central Asia. It is further augmented by the fact that there are higher levels of diplomacy and trade with this region and interestingly plans to 'Latinise' the Cyrillic alphabet[13]. This will be the end of a significant common link between Mongolia, Russia and much of Central Asia.

EXTERNAL INFLUENCE ON FOREIGN POLICY

The external influences on Mongolia's foreign policy are largely geopolitical. Much focus is required to understand relationships with the three most important players in Mongolia's foreign relations, neighbours Russia and China, the US[14] and the significant role of international financial institutions.

Mongolia has a 3485-km border with Russia and a 4677-km border with China (Foreign Policy Blue Book, 2000:18). As already stated in the past both countries have held imperial ambitions for Mongolia and today they are still the biggest threat to its sovereignty. However, during his 1993 visit to China, the then Russian President Boris Yeltsin signed a joint declaration on the basic principles governing Sino-Russian bilateral relations. Tumerchuluun (1999: 279) notes that Article 3 of the declaration makes it clear that officially neither Russia or China has threatening intentions towards Mongolia; *'neither party should resort to force or the threat of force in any form against the other party, including the use of the territorial land, water and air space of a third country bordering the other party'*.

In Mongolia's Concept of National Security (Point 27, 2.2), top priority is accorded to maintaining a balanced relationship with Russia and China. This '*does not mean keeping equidistance between them or taking identical positions on all issues but this policy does mean strengthening trust and developing all-round good neighborly, relations and mutually beneficial cooperation*'.

COMMAND ECONOMY TO MARKET ECONOMY

After more than 70 years with a highly dependent, centrally commanded economy, Mongolia in the past decade has commenced a transition to a market-based one. There have

been economic successes, but that success has not been universal. Economic planning was introduced in 1948 through a Five-Year Plan system, but it did not have much of an impact (Soni 2002: 157). The real impetus to development came in the 1950s, when the newly born PRC competed to match the economic and technical aid provided by the USSR. Reinforcing a pattern of development heavily dependent on outside assistance, Mongolia became a full member of the Socialist Council for Mutual Economic Assistance (CMEA) in 1962 and remained so until the organization's collapse in 1990. Competition between Mongolia's two large neighbours hastened modernization and promoted urbanization as well as the development of industry and infrastructure. The establishment of several joint ventures with CMEA countries and the rapid expansion of the mining and manufacturing sectors accelerated industrial development after 1962. A major change in the country's trade and industrial structure was brought about in the late 1970s through a joint venture with the USSR to open a copper plant in Erdenet, and copper ore became Mongolia's most important industrial export. An offshoot of the rapid expansion of industry in this period was the sharp increase in the demand for power. Several coal-fired power generation stations were built to meet the need, which was particularly great in the country's industrial belt to the north (Morris Rossabi 2005: 43).

Mongolia emerged during the pre-transition period as a supplier of raw materials and food for the USSR's Siberian industries and towns. Soviet protection of Mongolia's independence and its assistance in developing the latter's economic and social sectors for 70 years came at a high price. But it is also true that Mongolia's political structure and economic development were shaped largely by its close relations with the USSR. This resulted in the country's transition from a peasant, feudal agrarian society with strong religious and cultural traditions to a state with a centrally planned economy. Owing partly to these circumstances and partly to its geography, Mongolia remained almost completely isolated from the international community for most of this period. The policies pursued during these seven decades produced a highly distorted economic structure typified by inefficient use of state assets, slow growth, and stagnation. The relics of 70 years of waste and mismanagement were evident throughout the country when Mongolia threw away central planning in 1990 and started constructing a market economy.[15]

In 1986, Gorbachev's reform policy was adopted. The MPRP introduced the economic reforms in Mongolian communist structure which embarked on a new five-year plan (1986-90) to achieve the goals and attract capital investment and foreign trade in agricultural sector. Mongolia's agricultural story was extremely complicated because during that period USSR withdrew the economic and military aid to Mongolia and suddenly Mongolian economy went down[16] with most of the industries shut down and the agriculture sector also affected. There was no proper accounting and the communist system collapsed. As a result, people's living standard came down. Soviet ties were maintained, but the flow of assistance declined in 1990 as the USSR itself experienced growing economic difficulties.

In the late 1980s, dissatisfaction with the economic stagnation of the last years of the former regime of Yumjaagiyn Tsedenbal and the influence of the Soviet *perestroika* led Mongolia to launch its own program of economic reforms (Dashpurev & Soni 1992:78-80). This program had five goals: acceleration of development; application of science and technology to

production; reform of management and planning; greater independence of enterprises; and a balance of individual, collective, and societal interests. Acceleration of development in general was to result from the attainment of these four goals. Scientific research was being redirected to better serve economic development, with electronics, automation, biotechnology and the creation of materials becoming the priority areas of research and cooperation with former COMECON countries (Pomferet 2000: 150).

Reform of management and planning began in 1986, with reorganization of governmental bodies dealing with the economy. These changes rationalized and streamlined state economic organizations; reduced the number of administrative positions by 3,000; and saved 20 million tugriks from 1986 to 1988.[17] The role of the planning bodies was to be reduced by limiting the duties of the State Planning and Economic Committee to overseeing general capital investment policy. The indicators specified in the Five Year Plan and Annual National Economic Plans were to be decreased. State committees and ministries, rather than the State Planning and Economic Committee, were to decide upon machinery and equipment purchases. Decentralization of economic management was also extended to provincial and city administrations and enterprises. These bodies were given greater autonomy in construction and production, and were also responsible for profits and losses. Efforts to devolve economic decision making to the enterprise level took began in 1986, when more than 100 enterprises began experimenting with financial autonomy. Enterprises were accountable for their own losses, and they were responsible for fulfilling sales contracts and export orders. The inflation rate became high in 1986 with GDP declining by 22.3%. The only major sector which escaped the overall downward trend was agriculture.[18]

In 1990, the path of democratization of the political system of the country and of transition to a market economy was chosen by Mongolia. Proper legitimate foundations were provided in the new Constitution of Mongolia which was approved in 1992.[19]The process of transition to a market economy was carried out under extremely hard conditions. During that time the national economy of the country was undergoing a crisis. The economic crisis started in 1990 and reached its peak during 1991 and 1992. The gross national output dropped by 9.2 percent and 9.5 percent in 1991 and 1992, respectively. Owing to this, Mongolia's per capita national product fell to a level which was experienced a decade earlier. The major causes for such a great decline were the following: firstly, the assistance and credits which were rendered by the former Soviet Union ceased and the terms and character of the cooperation in foreign trade changed radically, secondly, the process of introducing a new system of macroeconomic management had been stretched out (Sharma, 1997: 254). Output continued to decline in 1992 and 1993. These were also years of hyperinflation, a rapidly depreciating exchange rate and incipient dollarisation. Living standards noticeably declined, as the guaranteed services of the old system deteriorated and the greater availability and variety of goods promised by advocates of market-based reforms were scarcely visible. In the medium term, however, macroeconomic performance improved as positive GDP growth was recorded in 1994 and inflation began to abate (Hari D. Goyal 1999:365).

Both the characterization of Mongolia as a rapid reformer in the early 1990s and the interpretation of its economic performance as short-term plan prior to long-term gain had been

questioned. Murrell (1996) argues that price reform was liberal in proclamation but partial in practice.[20] After the first democratic election in 1992, the ruling party MPRP promised to improve the living standard and continues the privatization process initiated in 1991. But it was grounded to a halt in mid-1992 and little privatisation occurred beyond the small-scale, and the stock exchange was quiescent.[21] Financial reform was initiated with the replacement of the mono-bank by a two-tier banking system in 1991, but this step was followed by substantial disintermediation due to lack of public confidence in the banking system and the financial sector remained in a poor shape throughout the 1990s (Hahm & Yener 1998:26-35). Nevertheless, the principle of creating a market-based economy remained firm with two key achievements, de-collectivisation of livestock farming and the exit of the government from petty trading activities.

The relationship between policy and performance was attenuated by the role of aid and copper. Mongolia's apparent liberalism and geostrategic location made it a favoured aid recipient, especially when aid was measured on per capita basis. The large inflows reduced the need for domestic adjustment to maintain balance of payments equilibrium (IMF, 1999:10). Mongolia was also helped by buoyant world markets for copper, by far its largest export, in the early and mid-1990s. Lower copper prices in 1996 reduced the GDP growth rate and raised questions about the sustainability of Mongolia's post-1994 growth.[22] Even allowing for these reservations, the general impression, certainly within the country, was of a rapid transition from central planning which had resulted in considerable short-term hardship during the first half of the 1990s. In practically all Eastern European countries, domestic elections at this stage of the transition process revealed a backlash against reform with many explicitly former communist parties regaining political power. But in Mongolia's June 1996 election, the Democratic Coalition won a landslide victory.

The new Mongolian Government set as its goal the full-scale transformation of the entire economic and political system. It initiated a set of measures aimed at overhauling the system and integrating the country's economy with the rest of the world. Privatization, the centerpiece of the drive, was accompanied by reforms in many other areas including the financial, fiscal, and external sectors. Removal of controls on prices, tariffs, and wages constituted the other primary mechanisms guiding the transformation into a market-driven economy (Sharma 1997:255).

CONCLUSION

With Mongolia's political development- adoption of new constitution in 1992 and the rise of democracy, there came a great desire among Mongolian people to traverse the path of peace and prosperity. Multi-party elections and emergence of many political parties renewed the faith and confidence in Constitution. The participation of women was a milestone development of Mongolian political system. 20% seats were reserved for women in electoral system. Violence in 2008 election, timely and effectively controlled by the then President showed the maturity of nascent Mongolian democracy. Mongolia again adopted Mongolian Cyrillic and reopened monasteries in Ulaanbaatar and elsewhere. Mongolia developed

bilateral relations with all the major powers like USA, China, Russia, India, Japan and EU. The economic development received momentum with the advancement of bilateral economic cooperation. Mongolia attracted foreign countries much more to explore deposits of natural resources like coal, Uranium and other strategic mineral resources in Gobi region. This caused radical transformation of Mongolia's economy with fresh emphasis on initiatives towards liberalization and modernizing the financial sector through establishment of new banking and financial system as well as privatization.

ENDNOTES

1. See comments of Susan J. Pharr, Edwin O. Reischauer in *Mongolia's Political and economic Transition: Challenges and Opportunities*, Ulaanbaatar: The Asia Foundation, September 2000.
2. See comments by R. Narangerel, Ibid.
3. For more details See Soni, 2006: p. 27-39.
4. Concept of National Security of Mongolia, 1996: p. 173.
5. See Appendix.
6. Tumerchuluun, G. (1999). "Mongolia's Foreign Policy Revisited: Relations with Russia and the PRC into the 1990s", in Kotkin, S. and Elleman, B. (eds.). *Mongolia in the Twentieth Century, Landlocked Cosmopolitan*, New York: M.E. Sharpe, pp. 277-289.
7. See FCO (Foreign and Commonwealth Office) website.
8. The notion that Mongolia must find a nation or group of nations to counterbalance the traditional monopoly China and Russia exerted over Mongolia's foreign relations has been elaborately discussed by Campi, A. (2003). "Mongolia as a Bridge to Central Asia", in *The Geopolitical Relations between Contemporary Mongolia and Neighboring Asian Countries: Democracy, Economy and Security*, Taipei: Mongolian and Tibetan Affairs.
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13. See UB Post, July 25th 2003. Their significant influence is illustrated by the fact that they are the only nations with full-time defence attachés in Mongolia in *'The State Ikh Hural has adopted the National Program of the Latin Script'*, Available at http://ubpost.

mongolnews.mn/national.php?subaction=showcomments&id=1059096507&archive=&cnshow=news&start_from=&ucat=6.

14. Ibid.
15. Hari D. Goyal(1999). 'A development Perspective on Mongolia', *Asian Survey,* Vol. **39**(4), July/August, pp.363-364.
16. Mongolia's 90% requirements of machines and equipment, nearly 100% of natural oil products, raw and other materials, 50% of food stuffs and industrial consumer goods were met by the imports from the former USSR.
17. Tugrik is the Mongolian currency.
18. Europa Year Book 2004: 2878.
19. R.C. Sharma(1997). '*Mongolia: Tryst with Change and Development'*, New Delhi: Vision and Venture Publication, p.253.
20. Pomfret (1993:5-7) provides examples of government regulation of prices in order to alleviate the short-term impact of prices increases.
21. Secondary trading did not begin until August 1995. Corporate governance remained a major problem through the 1990s, as lack of transparency in accounting or rules prevented the stock market from playing a role in promoting good management.
22. UNDP (1998). *Mongolia Update* 1998, Ulaanbaatar :UNDP, p.7

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Management

A STUDY OF FEMALE CONSUMER BUYING BEHAVIOR FOR ORGANIZED RETAIL APPAREL STORES WITH SPECIAL REFERENCE TO AHMEDABAD CITY

Dr. Vasudev Modi*

ABSTRACT

Apparel is one of the basic necessities of human civilization along with food, water and shelter. The Apparel Industry reflects people's lifestyles and shows their social and economic status. Female as a consumer group have gained significant importance for marketers in recent years because of their growing purchasing power. The purpose of the study was to understand the Indian apparel market in terms of market size and growth and to study the important demographic, psychological and socio-economic factors which influence the consumer buying behavior for apparel with reference to females residents in Ahmedabad City. For ease of access of primary data, a questionnaire was prepared to collect data from female consumers of different areas of Ahmedabad. The collected data was analyzed using various quantitative tools. The relation between various demographic variables and consumer behavior on apparel has been explored. Apparel companies can target the right target segment in terms of gender, age group, family income, personality, culture, etc. by understanding the preferences of the female consumers and can devise strategies to enable the females to access their products easily.

Keywords: ANOVA, Apparel, Consumer Behavior, Female, Organized retail.

INTRODUCTION

Retailing industry may include subordinated services, such as delivery of items. Purchasers may be individuals or businesses. The retail sector in India can be widely split into the organized and the unorganized sector. The unorganized sector is though predominant.

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Literature Review

Apparel is one of the basic necessities of human civilization along with food, water and shelter. The Apparel Industry reflects the people's lifestyles and shows their social and economic status. The Apparel and Textile industry is India's second largest industry after IT Industry. At present, it is amongst the fastest growing industry segment and is also the second largest foreign exchange earner for the country. The apparel industry accounts for 26% of all Indian exports. The Indian government has targeted the apparel and textiles industry segments to reach $50 billion by the year 2015.

Kopp *et al* (1989) proposed price consciousness, quality consciousness, fashion consciousness, to understand consumer preferences in apparel industry. Several research has been conducted which has gained currency like Nicholl *et al.*'s (2002) window (leisure) driven shoppers, Kopp's recreational shopping, Boedekar's (1995) search for experience and recreation, Arnold and Reynolds' (2003) hedonic shopping motivations and Jin and Kim's (2003) leisurely motivated shoppers . With reference to store choice variables, Moye and Kincade (2003) reported that the occasion for which an apparel item is bought does influence the consumer's importance rating of the store environment and there were higher expectations for the environment of a store offering formal merchandize than a store offering casual merchandize.

Magleburg *et al.* (2004) suggested that the teenagers who shop often with their friends are more vulnerable to informational influence and less prone to normative influence. Prus (1993) in a qualitative study said that a number of dilemmas for consumers are created by shopping companions like additional definitions (encouragements, discouragements and distractions) of products, money, users as well as their concerns with the identities and the ensuing relationships implied by the presence of their companions. Mascarenhas and Higby (1993) have discovered the interpersonal influences in teenagers and found three major influence sources -peers, parents and the media.

RESEARCH METHODOLOGY

Statement of the problem

"*A Study of Female Consumer Buying Behavior for Organized Retail Apparel Store with special reference to Ahmedabad City*"

Objectives of the Study:

1. To find the Functional attributes that govern a Female Consumer's choice of an Apparel Retail Outlet.

2. To find the Psychological attributes that govern a Female Consumer's choice of an Apparel Retail Outlet.

3. To find the reasons behind Female's buying branded apparels.

Research Design

The research design adopted was descriptive. This research was undertaken to study the Female Consumer Buying Behavior for Organized Retail Apparel Stores with special reference

to Ahmedabad City.

Sampling design

Convenience Sampling Method

Research Instrument

A well-structured questionnaire was used for collecting the primary data from the employees of various call centers

Sample Size

134 Female respondents

Sampling Unit

Individual shopper in various apparel organized retail stores.

Sources of Data

Primary data: Data collected through a questionnaire.

Secondary data: Books, Websites, Magazines. Journals, Research Papers, etc.

DATA ANALYSIS AND INTERPRETATION

Demographic details

In current research, 134 respondents were chosen. Most of the respondents belong to the age range of below 25. The majority of the target audience is having Post-Graduation qualification followed by Graduate. Majority of the respondents are student followed by professional as their occupation. Majority is having a monthly family income range of above Rs. 50,000 followed by the band of Rs. 30,001 to Rs. 50,000.

The primary data based upon detailed questionnaire is summarized in Tables followed by the inferences derived.

a) **With whom do you like to go for shopping?**

Table 1: Companions During Shopping

	Frequency	**Percent**
Alone	11	8.2
With family	69	51.5
With friends	54	40.3
Total Respondents	134	100

Inference

From the Table 1, we can say that majority viz. 51% respondents are likely to go for shopping with family followed by with friends.

b) **What is your expenditure on apparel per year?**

Table 2: Annual Expenditure on Apparel

Expenditure Limit	Frequency	Percent
Less than Rs.2,500	10	7.5
Rs. 2,500 – 5,000	49	36.6
Rs. 5,001- 7,500	40	29.9
More than Rs. 7,500	35	26.1
Total Respondents	134	100

Inference

Table 2 shows that 36% respondents are spending in the range of Rs. 2,500-5,000 per year on apparel followed by 30% respondents in the range of Rs. 5,001-7,000 .

c) **Where do you buy your apparel?**

Table 3: Nature of Outlets

	Frequency	Percent
Branded apparel outlets	116	86.6
Any other outlets	18	13.4
Total Respondents	134	100

Inference

Table 3 shows that 116 respondents (86.6 %) respondents are buying the apparel from branded apparel outlets. Remaining 18 respondents (13.4 %) are buying from "any other outlets".

d) **Reasons for buying branded apparels**

Table 4: Reason for Buying

	Frequency
Price of apparel	33
Easy Availability	25
Quality of apparel	103
Status symbol	33
Comfortable	65
Brand Image	47
Durability	58
Value for money	51

Inference

Table 4 shows the reason behind the purchasing of branded apparel.

- 103 respondents are highly quality consciousness i.e. 103 respondents are buying the branded apparel for high quality purpose.
- 65 respondents are buying the branded garment for comfortability with branded apparels.
- 58 respondents are more concerned with the durability of apparels.
- 51 respondents are saying that they are placing the high value for money in branded apparels.

e) **Perception of functional attributes of preference of a retail apparel store**

Table 5: Perception of Functional Attributes

Descriptive statistics					
Attributes	**N**	**Minimum**	**Maximum**	**Mean**	**Standard deviation**
Price range	116	1	5	3.0948	1.22991
Location	116	1	5	3.3190	1.13131
Design availability	116	1	5	3.9224	1.07259
Credit facility	116	1	5	2.7414	1.26574
Range of Apparel	116	1	5	3.5086	1.10725
Type of apparel	116	1	5	3.6810	1.10807
Store name	116	1	5	2.8190	1.15419
Store size	116	1	5	2.3793	1.21337
Availability of latest trends in Apparels	116	1	5	3.9310	1.13232
Offers and Discounts	116	1	5	3.4914	1.23356
Service of the staff	116	1	5	3.7328	0.9458
After Sales Service	116	1	5	3.3534	1.02367
Loyalty programme	116	1	5	2.7672	1.17479
Parking Space Availability(Amenities)	116	1	5	2.8879	1.11723
Previous interaction with the outlet	116	1	5	3.4310	1.16637
Knowledge of the staff	116	1	5	3.3793	1.10851

Inference

Table 5 indicates that Availability of latest trend in Apparel and Design availability is the most important functional attributes for preference of retail Apparel store because the mean 3.9310 & 3.9224 are higher compared to mean of other functional attributes.

Other attribute like Range of Apparel, Type of Apparel, Location, and Offers are also playing significant role for preference of a particular retail store because the mean of these attributes are also around 3.50.

f) **Perception of Psychological attributes of preference of a retail apparel store**

Table 6: Perception of Psychological Attributes

Descriptive statistics					
Attributes	**N**	**Minimum**	**Maximum**	**Mean**	**Standard deviation**
Layout	116	1	5	3.0259	0.95518
Architecture of the store	116	1	5	3.0862	0.99187
Symbols	116	1	5	2.8966	1.23274
Colours	116	1	5	3.3017	1.32678
Advertising	116	1	5	3.3362	1.13401
Store sales personnel	116	1	5	3.2069	0.98261
Display	116	1	5	3.7241	1.04329
Points of sale material	116	1	5	3.4483	1.05985
Courteous staff	116	1	5	3.5431	1.08261
References	116	1	5	3.5517	1.16727

Inference

Table 6 indicates that the most important Psychological attribute for preference of retail apparel store is display of the branded apparel. This category has the highest mean value of 3.7241. Other attribute like layout, Architecture of the store, colours, Advertising, Store sales personnel, Point of sale material , Courteous behaviour of the staff, and reference are also playing the important role for preference of the retail apparel store, because all these attribute are having the mean value higher than 3.00.

HYPOTHESIS TESTING

Since there are more than two groups, to test differences between different means, the Analysis Of Variance, or the ANOVA test was conducted. Through ANOVA test, once can look at the way groups differ internally versus what the difference is between them. ANOVA calculates the mean for each of the groups i.e. the Group Means. Thence, it calculates the the Overall Mean for all the groups combined .Within each group, the total deviation of each individual's score from the Group Mean or the - Within Group Variation is calculated. Further, it calculates the deviation of each Group Mean from the Overall Mean i.e. Between Group Variation. And finally, ANOVA produces the F statistic which is the ratio Bbetween Group Variation to the Within Group Variation. If the Between Group Variation is significantly greater than the Within Group Variation, then it is likely that there is a statistically significant

difference between the groups.

ANOVA for Age- Perception

i) **Functional Attributes**

Table 7: ANOVA for Functional Attributes of Age perception

		Sum of Squares	df	Mean Square	F	Sig.
Price range (Functional attributes)	Between Groups	0.708	2	0.354	0.231	0.794
	Within Groups	173.249	113	1.533		
	Total	173.957	115			
Location	Between Groups	0.257	2	0.128	0.099	0.906
	Within Groups	146.941	113	1.3		
	Total	147.198	115			
Design availability	Between Groups	0.906	2	0.453	0.39	0.678
	Within Groups	131.396	113	1.163		
	Total	132.302	115			
Credit facilities	Between Groups	6.893	2	3.447	2.196	0.116
	Within Groups	177.348	113	1.569		
	Total	184.241	115			
Range of apparel	Between Groups	6.501	2	3.25	2.731	0.069
	Within Groups	134.491	113	1.19		
	Total	140.991	115			
Type of apparel	Between Groups	0.422	2	0.211	0.169	0.845
	Within Groups	140.777	113	1.246		
	Total	141.198	115			
Store name	Between Groups	0.543	2	0.271	0.201	0.818
	Within Groups	152.656	113	1.351		
	Total	153.198	115			
Store size	Between Groups	3.211	2	1.606	1.092	0.339
	Within Groups	166.099	113	1.47		
	Total	169.31	115			

Availability of latest trend in apparel	Between Groups	0.152	2	0.076	0.058	0.944
	Within Groups	147.297	113	1.304		
	Total	147.448	115			
Offers and discounts	Between Groups	6.285	2	3.143	2.105	0.127
	Within Groups	168.706	113	1.493		
	Total	174.991	115			
Service of the staff	Between Groups	2.574	2	1.287	1.452	0.238
	Within Groups	100.142	113	0.886		
	Total	102.716	115			
After sales service	Between Groups	0.941	2	0.47	0.445	0.642
	Within Groups	119.568	113	1.058		
	Total	120.509	115			
Loyalty programme	Between Groups	0.302	2	0.151	0.108	0.898
	Within Groups	158.414	113	1.402		
	Total	158.716	115			
Parking space (Amenities)	Between Groups	4.554	2	2.277	1.851	0.162
	Within Groups	138.989	113	1.23		
	Total	143.543	115			
Previous interaction with outlet	Between Groups	4.592	2	2.296	1.709	0.186
	Within Groups	151.856	113	1.344		
	Total	156.448	115			
Knowledge of the staff	Between Groups	6.083	2	3.042	2.542	0.083
	Within Groups	135.227	113	1.197		
	Total	141.31	115			

Inference

- Calculated Value of F statistics is 0.231 and probability value for testing our hypothesis is 0.794.Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age -wise perceptual difference regarding the price range as a preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.099 and probability value for testing our hypothesis is

0.906. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding location as preference for a retail apparel store over other.

- Calculated Value of F statistics is 0.390 and probability value for testing our hypothesis is 0.678. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding design availability as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.196 and probability value for testing our hypothesis is 0.116. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Age-wise perceptual difference regarding credit facility as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.731 and probability value for testing our hypothesis is 0.069.Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age -wise perceptual difference regarding range of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.169 and probability value for testing our hypothesis is 0.845. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding type of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.201 and probability value for testing our hypothesis is 0.818. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding store name as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.092 and probability value for testing our hypothesis is 0.329. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding store size as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.058 and probability value for testing our hypothesis is 0.944. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding availability of latest trend in apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.105 and probability value for testing our hypothesis is 0.127. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding offers and discounts as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.452 and probability value for testing our hypothesis is 0.238. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age -wise perceptual difference regarding service of the staff as preference for a retail apparel store over other.

- Calculated Value of F statistics is 0.445 and probability value for testing our hypothesis is 0.642. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age -wise perceptual difference regarding after-sales service as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.108 and probability value for testing our hypothesis is 0.898.Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age -wise perceptual difference regarding loyalty programme as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.851 and probability value for testing our hypothesis is 0.162. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding parking space availability (amenities)as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.709 and probability value for testing our hypothesis is 0.186. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding previous interaction with the outlet as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.542 and probability value for testing our hypothesis is 0.083. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding knowledge of the staff as preference for a retail apparel store over other.

ii) Psychological attributes

Table 8: ANOVA for Psychological Attributes of Age perception

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Layout (Psychological attributes)	Between Groups	2.568	2	1.284	1.418	0.247
	Within Groups	102.354	113	0.906		
	Total	104.922	115			
Architecture of the store	Between Groups	4.896	2	2.448	2.556	0.082
	Within Groups	108.242	113	0.958		
	Total	113.138	115			
Symbols	Between Groups	21.232	2	10.616	7.814	0.001
	Within Groups	153.527	113	1.359		
	Total	174.759	115			
Colours	Between Groups	5.748	2	2.874	1.651	0.196
	Within Groups	196.691	113	1.741		
	Total	202.44	115			

Advertising	Between Groups	21.232	2	10.616	9.472	0
	Within Groups	126.656	113	1.121		
	Total	147.888	115			
Store sales personnel	Between Groups	0.431	2	0.216	0.22	0.803
	Within Groups	110.603	113	0.979		
	Total	111.034	115			
Display	Between Groups	7.228	2	3.614	3.463	0.035
	Within Groups	117.944	113	1.044		
	Total	125.172	115			
Point of sales material	Between Groups	3.8	2	1.9	1.719	0.184
	Within Groups	124.89	113	1.105		
	Total	128.69	115			
Courteous staff	Between Groups	10.269	2	5.134	4.66	0.011
	Within Groups	124.516	113	1.102		
	Total	134.784	115			
Reference	Between Groups	5.924	2	2.962	2.22	0.113
	Within Groups	150.766	113	1.334		
	Total	156.69	115			

Inference

- Calculated Value of F statistics is 1.418 and probability value for testing our hypothesis is 0.247. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding layout as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.556 and probability value for testing our hypothesis is 0.082.Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding architecture of the store as preference for a retail apparel store over other.
- Calculated Value of F statistics is 7.814 and probability value for testing our hypothesis is 0.001.Because this value is less than 0.05, our null hypothesis is rejected. That means there is Age-wise perceptual difference regarding symbols as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.651 and probability value for testing our hypothesis is 0.196. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding colours as preference for a retail apparel store over other.
- Calculated Value of F statistics is 9.492 and probability value for testing our hypothesis

is 0.000. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Age-wise perceptual difference regarding advertising as preference for a retail apparel store over other.

- Calculated Value of F statistics is 0.220 and probability value for testing our hypothesis is 0.803.Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding store sales personnel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 3.463 and probability value for testing our hypothesis is 0.035. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Age-wise perceptual difference regarding display as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.719 and probability value for testing our hypothesis is 0.184. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding points of sale material as preference for a retail apparel store over other.
- Calculated Value of F statistics is 4.660 and probability value for testing our hypothesis is 0.011. Because this value is less than 0.05, our null hypothesis is rejected. Means there is Age wise perceptual difference regarding courteous staff as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.2.220 and probability value for testing our hypothesis is 0.113. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Age-wise perceptual difference regarding references as preference for a retail apparel store over other.

ANOVA for Educational Qualification

i) Functional Attributes

Table 9: ANOVA for Functional Attributes of Education perception

		Sum of Squares	df	Mean Square	F	Sig.
Price range (Functional attributes)	Between Groups	17.78	3	5.927	4.25	0.007
	Within Groups	156.177	112	1.394		
	Total	173.957	115			
Location	Between Groups	0.944	3	0.315	0.241	0.868
	Within Groups	146.254	112	1.306		
	Total	147.198	115			
Design availability	Between Groups	5.743	3	1.914	1.694	0.172
	Within Groups	126.559	112	1.13		
	Total	132.302	115			

Credit facilities	Between Groups	4.336	3	1.445	0.9	0.444
	Within Groups	179.905	112	1.606		
	Total	184.241	115			
Range of apparel	Between Groups	14.547	3	4.849	4.295	0.007
	Within Groups	126.444	112	1.129		
	Total	140.991	115			
Type of apparel	Between Groups	3.911	3	1.304	1.064	0.368
	Within Groups	137.287	112	1.226		
	Total	141.198	115			
Store name	Between Groups	6.306	3	2.102	1.603	0.193
	Within Groups	146.892	112	1.312		
	Total	153.198	115			
Store size	Between Groups	8.075	3	2.692	1.87	0.139
	Within Groups	161.235	112	1.44		
	Total	169.31	115			
Availability of latest trend in apparel	Between Groups	8.432	3	2.811	2.264	0.085
	Within Groups	139.017	112	1.241		
	Total	147.448	115			
Offers and discounts	Between Groups	2.609	3	0.87	0.565	0.639
	Within Groups	172.382	112	1.539		
	Total	174.991	115			
Service of the staff	Between Groups	1.835	3	0.612	0.679	0.567
	Within Groups	100.88	112	0.901		
	Total	102.716	115			
After sales service	Between Groups	2.711	3	0.904	0.859	0.465
	Within Groups	117.797	112	1.052		
	Total	120.509	115			
Loyalty programme	Between Groups	3.754	3	1.251	0.904	0.441
	Within Groups	154.962	112	1.384		
	Total	158.716	115			
Parking space (Amenities)	Between Groups	4.334	3	1.445	1.162	0.327
	Within Groups	139.209	112	1.243		
	Total	143.543	115			

Previous interaction with outlet	Between Groups	13.068	3	4.356	3.403	0.02
	Within Groups	143.38	112	1.28		
	Total	156.448	115			
Knowledge of the staff	Between Groups	4.166	3	1.389	1.134	0.339
	Within Groups	137.145	112	1.225		
	Total	141.31	115			

Inference

- Calculated Value of F statistics is 4.250 and probability value for testing our hypothesis is 0.007. Because this value is less than 0.05, our null hypothesis is rejected. That means there is education -wise perceptual difference regarding price range as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.241 and probability value for testing our hypothesis is 0.868. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education wise perceptual difference regarding location as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.694 and probability value for testing our hypothesis is 0.172. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education wise perceptual difference regarding design availability as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.900 and probability value for testing our hypothesis is 0.444. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education- wise perceptual difference regarding credit facility as preference for a retail apparel store over other.
- Calculated Value of F statistics is 4.295 and probability value for testing our hypothesis is 0.007. Because this value is less than 0.05, our null hypothesis is rejected. That means there is education wise perceptual difference regarding range of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.064 and probability value for testing our hypothesis is 0.368. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education wise perceptual difference regarding type of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.603 and probability value for testing our hypothesis is 0.193. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education wise perceptual difference regarding store name as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.870 and probability value for testing our hypothesis is 0.139. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education -wise perceptual difference regarding store size as preference of a

retail apparel store over other.

- Calculated Value of F statistics is 2.264 and probability value for testing our hypothesis is 0.085. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education wise perceptual difference regarding availability of latest trend in apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.565 and probability value for testing our hypothesis is 0.639. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding offers and discounts as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.679 and probability value for testing our hypothesis is 0.567. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding service of the staff as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.859 and probability value for testing our hypothesis is 0.465. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education -wise perceptual difference regarding after sales service as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.904 and probability value for testing our hypothesis is 0.441. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education- wise perceptual difference regarding loyalty programme as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.162 and probability value for testing our hypothesis is 0.327. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no education- wise perceptual difference regarding parking space availability (amenities)as preference for a retail apparel store over other.
- Calculated Value of F statistics is 3.403 and probability value for testing our hypothesis is 0.020. Because this value is less than 0.05, our null hypothesis is rejected. That means there is education- wise perceptual difference regarding previous interaction with the outlet as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.134 and probability value for testing our hypothesis is 0.339. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education-wise perceptual difference regarding knowledge of the staff as preference for a retail apparel store over other.

ii)Psychological attributes

Table 10: ANOVA for Psychological Attributes of Education perception

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Layout (Psychological attributes)	Between Groups	3.94	3	1.313	1.457	0.23
	Within Groups	100.983	112	0.902		
	Total	104.922	115			
Architecture of the store	Between Groups	0.206	3	0.069	0.068	0.977
	Within Groups	112.932	112	1.008		
	Total	113.138	115			
Symbols	Between Groups	17.661	3	5.887	4.197	0.007
	Within Groups	157.098	112	1.403		
	Total	174.759	115			
Colours	Between Groups	29.104	3	9.701	6.268	0.001
	Within Groups	173.336	112	1.548		
	Total	202.44	115			
Advertising	Between Groups	17.15	3	5.717	4.897	0.003
	Within Groups	130.738	112	1.167		
	Total	147.888	115			
Store sales personnel	Between Groups	2.004	3	0.668	0.686	0.562
	Within Groups	109.03	112	0.973		
	Total	111.034	115			
Display	Between Groups	2.783	3	0.928	0.849	0.47
	Within Groups	122.389	112	1.093		
	Total	125.172	115			
Point of sales material	Between Groups	4.993	3	1.664	1.507	0.217
	Within Groups	123.697	112	1.104		
	Total	128.69	115			
Courteous staff	Between Groups	4.981	3	1.66	1.433	0.237
	Within Groups	129.803	112	1.159		
	Total	134.784	115			
Reference	Between Groups	19.954	3	6.651	5.448	0.002
	Within Groups	136.736	112	1.221		
	Total	156.69	115			

Inference

- Calculated Value of F statistics is 1.457 and probability value for testing our hypothesis is 0.230. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding layout as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.068 and probability value for testing our hypothesis is 0.977. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding architecture of the store as preference for a retail apparel store over other.
- Calculated Value of F statistics is 4.195 and probability value for testing our hypothesis is 0.007. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Education- wise perceptual difference regarding symbols as preference for a retail apparel store over other.
- Calculated Value of F statistics is 6.268 and probability value for testing our hypothesis is 0.001. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Education- wise perceptual difference regarding colours as preference for a retail apparel store over other.
- Calculated Value of F statistics is 4.897 and probability value for testing our hypothesis is 0.003. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Education -wise perceptual difference regarding advertising as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.686 and probability value for testing our hypothesis is 0.562. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding store sales personnel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.849 and probability value for testing our hypothesis is 0.470. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding display as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.507 and probability value for testing our hypothesis is 0.217. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Education- wise perceptual difference regarding points of sale material as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.433 and probability value for testing our hypothesis is 0.237. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Education- wise perceptual difference regarding courteous staff as preference for a retail apparel store over other.
- Calculated Value of F statistics is 5.448 and probability value for testing our hypothesis is 0.002. Because this value is less than 0.05, our null hypothesis is rejected. That means

there is Education- wise perceptual difference regarding references as preference for a retail apparel store over other

ANOVA for Occupation

i) **Functional attributes**

Table 11:ANOVA for Functional Attributes of occupation perception

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Price range (Functional attributes)	Between Groups	4.723	4	1.181	0.774	0.544
	Within Groups	169.234	111	1.525		
	Total	173.957	115			
Location	Between Groups	2.711	4	0.678	0.521	0.721
	Within Groups	144.487	111	1.302		
	Total	147.198	115			
Design availability	Between Groups	6.59	4	1.648	1.455	0.221
	Within Groups	125.712	111	1.133		
	Total	132.302	115			
Credit facilities	Between Groups	8.009	4	2.002	1.261	0.29
	Within Groups	176.232	111	1.588		
	Total	184.241	115			
Range of apparel	Between Groups	10.729	4	2.682	2.286	0.065
	Within Groups	130.262	111	1.174		
	Total	140.991	115			
Type of apparel	Between Groups	1.764	4	0.441	0.351	0.843
	Within Groups	139.435	111	1.256		
	Total	141.198	115			
Store name	Between Groups	0.875	4	0.219	0.159	0.958
	Within Groups	152.323	111	1.372		
	Total	153.198	115			
Store size	Between Groups	11.202	4	2.8	1.966	0.105
	Within Groups	158.109	111	1.424		
	Total	169.31	115			
Availability of latest trend in apparel	Between Groups	8.11	4	2.028	1.615	0.175
	Within Groups	139.338	111	1.255		
	Total	147.448	115			

Offers and discounts	Between Groups	1.645	4	0.411	0.263	0.901
	Within Groups	173.346	111	1.562		
	Total	174.991	115			
Service of the staff	Between Groups	8.122	4	2.031	2.383	0.056
	Within Groups	94.593	111	0.852		
	Total	102.716	115			
After sales service	Between Groups	12.547	4	3.137	3.225	0.015
	Within Groups	107.962	111	0.973		
	Total	120.509	115			
Loyalty programme	Between Groups	8.999	4	2.25	1.668	0.162
	Within Groups	149.716	111	1.349		
	Total	158.716	115			
Parking space (Amenities)	Between Groups	8.598	4	2.15	1.768	0.14
	Within Groups	134.945	111	1.216		
	Total	143.543	115			
Previous interaction with outlet	Between Groups	11.118	4	2.78	2.123	0.083
	Within Groups	145.33	111	1.309		
	Total	156.448	115			
Knowledge of the staff	Between Groups	7.189	4	1.797	1.487	0.211
	Within Groups	134.122	111	1.208		
	Total	141.31	115			

Inference

- Calculated Value of F statistics is 0.774 and probability value for testing our hypothesis is 0.544. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding price range as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.521 and probability value for testing our hypothesis is 0.721. Because this value is higher than 0.05. Our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding location as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.455 and probability value for testing our hypothesis is 0.221. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding design availability as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.261 and probability value for testing our hypothesis is 0.290 .Because this value is higher than 0.05, our null hypothesis is accepted. That means

there is no Occupation- wise perceptual difference regarding credit facility as preference for a retail apparel store over other.

- Calculated Value of F statistics is 2.286 and probability value for testing our hypothesis is 0.065. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding range of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.351 and probability value for testing our hypothesis is 0.843. Because this value is higher than 0.05. Our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding type of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.159 and probability value for testing our hypothesis is 0.958. Because this value is higher than 0.05. Our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding store name as preference of a retail apparel store over other.
- Calculated Value of F statistics is 1.966 and probability value for testing our hypothesis is 0.105. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding store size as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.615 and probability value for testing our hypothesis is 0.175. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding availability of latest trend in apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.263 and probability value for testing our hypothesis is 0.901. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation-wise perceptual difference regarding offers and discounts as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.383 and probability value for testing our hypothesis is 0.056. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation -wise perceptual difference regarding service of the staff as preference for a retail apparel store over other.
- Calculated Value of F statistics is 3.225 and probability value for testing our hypothesis is 0.015. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Occupation- wise perceptual difference regarding after sales service as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.668 and probability value for testing our hypothesis is 0.162. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation-wise perceptual difference regarding loyalty programme as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.768 and probability value for testing our hypothesis is

0.140. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding parking space availability (amenities) as preference for a retail apparel store over other.

- Calculated Value of F statistics is 2.123 and probability value for testing our hypothesis is 0.083. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding previous interaction with the outlet as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.487 and probability value for testing our hypothesis is 0.211. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Occupation- wise perceptual difference regarding knowledge of the staff as preference for a retail apparel store over other.

ii) **Psychological attributes**

Table 12: ANOVA for Psychological Attributes of occupation perception

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Layout (Psychological attributes)	Between Groups	5.246	4	1.312	1.461	0.219
	Within Groups	99.676	111	0.898		
	Total	104.922	115			
Architecture of the store	Between Groups	10.889	4	2.722	2.955	0.023
	Within Groups	102.249	111	0.921		
	Total	113.138	115			
Symbols	Between Groups	35.574	4	8.894	7.093	0
	Within Groups	139.184	111	1.254		
	Total	174.759	115			
Colours	Between Groups	26.02	4	6.505	4.093	0.004
	Within Groups	176.419	111	1.589		
	Total	202.44	115			
Advertising	Between Groups	32.774	4	8.194	7.901	0
	Within Groups	115.114	111	1.037		
	Total	147.888	115			
Store sales personnel	Between Groups	2.804	4	0.701	0.719	0.581
	Within Groups	108.23	111	0.975		
	Total	111.034	115			

Display	Between Groups	6.993	4	1.748	1.642	0.169
	Within Groups	118.18	111	1.065		
	Total	125.172	115			
Point of sales material	Between Groups	4.569	4	1.142	1.022	0.399
	Within Groups	124.12	111	1.118		
	Total	128.69	115			
Courteous staff	Between Groups	10.397	4	2.599	2.32	0.061
	Within Groups	124.387	111	1.121		
	Total	134.784	115			
Reference	Between Groups	9.686	4	2.422	1.828	0.128
	Within Groups	147.003	111	1.324		
	Total	156.69	115			

Inference

- Calculated Value of F statistics is 1.461 and probability value for testing our hypothesis is 0.219. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Occupation-wise perceptual difference regarding layout as preference of a retail apparel store over other.
- Calculated Value of F statistics is 2.955 and probability value for testing our hypothesis is 0.023. Because this value is less than 0.05, our null hypothesis is rejected. Means there is Occupation-wise perceptual difference regarding architecture of the store as preference of a retail apparel store over other.
- Calculated Value of F statistics is 7.093 and probability value for testing our hypothesis is 0.000. Because this value is less than 0.05, our null hypothesis is rejected. Means there is Occupation-wise perceptual difference regarding symbols as preference of a retail apparel store over other.
- Calculated Value of F statistics is 4.093 and probability value for testing our hypothesis is 0.004. Because this value is less than 0.05, our null hypothesis is rejected. Means there is Occupation-wise perceptual difference regarding colours as preference of a retail apparel store over other.
- Calculated Value of F statistics is 7.901 and probability value for testing our hypothesis is 0.000. Because this value is less than 0.05, our null hypothesis is rejected. Means there is Occupation-wise perceptual difference regarding advertising as preference of a retail apparel store over other.
- Calculated Value of F statistics is 0.719 and probability value for testing our hypothesis is 0.581. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Occupation-wise perceptual difference regarding store sales personnel as preference of a retail apparel store over other.

- Calculated Value of F statistics is 1.642 and probability value for testing our hypothesis is 0.169. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Occupation-wise perceptual difference regarding display as preference of a retail apparel store over other.
- Calculated Value of F statistics is 1.022 and probability value for testing our hypothesis is 0.399. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Occupation-wise perceptual difference regarding points of sale material as preference of a retail apparel store over other.
- Calculated Value of F statistics is 2.320 and probability value for testing our hypothesis is 0.061. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Occupation-wise perceptual difference regarding courteous staff as preference of a retail apparel store over other.
- Calculated Value of F statistics is 1.808 and probability value for testing our hypothesis is 0.128. Because this value is higher than 0.05, our null hypothesis is accepted. Means there is no Occupation-wise perceptual difference regarding references as preference of a retail apparel store over other.

ANOVA for Family monthly Income

i) **Functional attributes**

Table 13: ANOVA for Functional Attributes of family monthly income perception

		Sum of Squares	df	Mean Square	F	Sig.
Price range (Functional attributes)	Between Groups	5.938	4	1.485	0.981	0.421
	Within Groups	168.019	111	1.514		
	Total	173.957	115			
Location	Between Groups	3.88	4	0.97	0.751	0.559
	Within Groups	143.319	111	1.291		
	Total	147.198	115			
Design availability	Between Groups	3.452	4	0.863	0.743	0.564
	Within Groups	128.85	111	1.161		
	Total	132.302	115			
Credit facilities	Between Groups	19.573	4	4.893	3.299	0.014
	Within Groups	164.668	111	1.483		
	Total	184.241	115			
Range of apparel	Between Groups	0.689	4	0.172	0.136	0.969
	Within Groups	140.303	111	1.264		
	Total	140.991	115			

Type of apparel	Between Groups	6.072	4	1.518	1.247	0.295
	Within Groups	135.127	111	1.217		
	Total	141.198	115			
Store name	Between Groups	3.617	4	0.904	0.671	0.613
	Within Groups	149.581	111	1.348		
	Total	153.198	115			
Store size	Between Groups	7.813	4	1.953	1.342	0.259
	Within Groups	161.498	111	1.455		
	Total	169.31	115			
Availability of latest trend in apparel	Between Groups	3.068	4	0.767	0.59	0.671
	Within Groups	144.38	111	1.301		
	Total	147.448	115			
Offers and discounts	Between Groups	7.876	4	1.969	1.308	0.272
	Within Groups	167.115	111	1.506		
	Total	174.991	115			
Service of the staff	Between Groups	4.724	4	1.181	1.338	0.26
	Within Groups	97.991	111	0.883		
	Total	102.716	115			
After sales service	Between Groups	11.25	4	2.812	2.857	0.027
	Within Groups	109.259	111	0.984		
	Total	120.509	115			
Loyalty programme	Between Groups	8.432	4	2.108	1.557	0.191
	Within Groups	150.283	111	1.354		
	Total	158.716	115			
Parking space (Amenities)	Between Groups	2.125	4	0.531	0.417	0.796
	Within Groups	141.418	111	1.274		
	Total	143.543	115			
Previous interaction with outlet	Between Groups	5.944	4	1.486	1.096	0.362
	Within Groups	150.504	111	1.356		
	Total	156.448	115			
Knowledge of the staff	Between Groups	7.201	4	1.8	1.49	0.21
	Within Groups	134.109	111	1.208		
	Total	141.31	115			

Inference

- Calculated Value of F statistics is 0.981 and probability value for testing our hypothesis is 0.421. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding price range as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.751 and probability value for testing our hypothesis is 0.559. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income -wise perceptual difference regarding location as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.743 and probability value for testing our hypothesis is 0.564. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding design availability as preference for a retail apparel store over other.
- Calculated Value of F statistics is 3.299 and probability value for testing our hypothesis is 0.014. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Income- wise perceptual difference regarding credit facility as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.136 and probability value for testing our hypothesis is 0.969. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding range of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.247 and probability value for testing our hypothesis is 0.295. Because this value is higher than 0.05,.our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding type of apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.671 and probability value for testing our hypothesis is 0.613. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income -wise perceptual difference regarding store name as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.342 and probability value for testing our hypothesis is 0.259. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding store size as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.590 and probability value for testing our hypothesis is 0.671. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding availability of latest trend in apparel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.308 and probability value for testing our hypothesis is 0.272. Because this value is higher than 0.05, our null hypothesis is accepted. That

means there is no Income- wise perceptual difference regarding offers and discounts as preference for a retail apparel store over other.

- Calculated Value of F statistics is 1.338 and probability value for testing our hypothesis is 0.260. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income -wise perceptual difference regarding service of the staff as preference for a retail apparel store over other.
- Calculated Value of F statistics is 2.857 and probability value for testing our hypothesis is 0.027. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Income- wise perceptual difference regarding after sales service as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.557 and probability value for testing our hypothesis is 0.191. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding loyalty programme as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.417 and probability value for testing our hypothesis is 0.796. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding parking space availability (amenities) as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.096 and probability value for testing our hypothesis is 0.362. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding previous interaction with the outlet as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.490 and probability value for testing our hypothesis is 0.210 . Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding knowledge of the staff as preference for a retail apparel store over other.

i) **Psychological attributes**

Table14: ANOVA for Psychological Attributes of family monthly income perception

		Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Layout (Psychological attributes)	Between Groups	1.941	4	0.485	0.523	0.719
	Within Groups	102.982	111	0.928		
	Total	104.922	115			
Architecture of the store	Between Groups	3.583	4	0.896	0.908	0.462
	Within Groups	109.555	111	0.987		
	Total	113.138	115			

Symbols	Between Groups	8.916	4	2.229	1.492	0.209
	Within Groups	165.842	111	1.494		
	Total	174.759	115			
Colours	Between Groups	4.628	4	1.157	0.649	0.629
	Within Groups	197.811	111	1.782		
	Total	202.44	115			
Advertising	Between Groups	6.222	4	1.555	1.219	0.307
	Within Groups	141.666	111	1.276		
	Total	147.888	115			
Store sales personnel	Between Groups	0.363	4	0.091	0.091	0.985
	Within Groups	110.672	111	0.997		
	Total	111.034	115			
Display	Between Groups	2.097	4	0.524	0.473	0.756
	Within Groups	123.075	111	1.109		
	Total	125.172	115			
Point of sales material	Between Groups	3.405	4	0.851	0.754	0.557
	Within Groups	125.285	111	1.129		
	Total	128.69	115			
Courteous staff	Between Groups	8.894	4	2.224	1.961	0.105
	Within Groups	125.89	111	1.134		
	Total	134.784	115			
Reference	Between Groups	8.074	4	2.019	1.508	0.205
	Within Groups	148.615	111	1.339		
	Total	156.69	115			

Inference

- Calculated Value of F statistics is 0.523 and probability value for testing our hypothesis is 0.719. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding layout as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.908 and probability value for testing our hypothesis is 0.462. Because this value is less than 0.05, our null hypothesis is rejected. That means there is Income- wise perceptual difference regarding architecture of the store as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.492 and probability value for testing our hypothesis is 0.209. Because this value is higher than 0.05, our null hypothesis is accepted. That means

there is no Income- wise perceptual difference regarding symbols as preference for a retail apparel store over other.

- Calculated Value of F statistics is 0.649 and probability value for testing our hypothesis is 0.629. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding colours as preference for a retail apparel store over other.
- Calculated Value of F statistics is 1.219 and probability value for testing our hypothesis is 0.307. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding advertising as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.091 and probability value for testing our hypothesis is 0.985. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding store sales personnel as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.473 and probability value for testing our hypothesis is 0.756. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding display as preference for a retail apparel store over other.
- Calculated Value of F statistics is 0.754 and probability value for testing our hypothesis is 0.557. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding points of sale material as preference for a retail apparel store over another.
- Calculated Value of F statistics is 1.961 and probability value for testing our hypothesis is 0.105. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income- wise perceptual difference regarding courteous staff as preference for a retail apparel store over another.
- Calculated Value of F statistics is 1.508 and probability value for testing our hypothesis is 0.205. Because this value is higher than 0.05, our null hypothesis is accepted. That means there is no Income -wise perceptual difference regarding references as preference for a retail apparel store over another.

FINDINGS

1. Most of the respondents (72.4 %) are wearing both types of apparel i.e. traditional and modern.
2. 61. 9 % respondents are visiting store once a month.
3. Mostly, all respondents are likely to go for shopping with friends or with family members.
4. 52 % of the respondent spends around 2 hours time on each visit to the store.
5. Mostly, all respondents are spending more than Rs. 2500 per year on apparel. Only 10

respondents (7.5 %) were spending less than Rs. 2500 a year.

6. The ratio of buying branded apparels is lower for the respondents holding diploma and school certificate as compared to respondents holding PG and graduate degrees.
7. Mostly, all professional are buying the apparel from branded outlets.
8. 103 respondents (76.87 %) are more concerned with the quality of the apparel. Quality is therefore a major factor influencing the buying decision of apparel.
9. Availability of the latest trend in Apparel and Design availability is an important functional attributes for the preferences of the retail apparel store because the mean 3.9310 & 3.9224 is higher compared to mean of other functional attributes.
10. In psychological attribute, the significant attribute for preference of retail store is pronounced display of apparel.
11. There is no age-wise perceptual difference in functional and psychological attribute as preference of retail outlet.
12. There is an education- wise perceptual difference regarding the price range as preference of a retail apparel store.
13. There is Occupation- wise perceptual difference regarding after sales service as a preference of retail apparel.
14. There is an Income- wise perceptual difference regarding credit facility as preference of a retail apparel store over another.
15. There is Education- wise perceptual difference regarding preference of a retail apparel store over another.

CONCLUSION

Females are always very conscious about selecting apparels. Female purchasing behavior is varying according to their lifestyle and culture. Both, functional and psychological attributes affect selection of apparel from the organized apparel retail store. In psychological attributes, the most important attribute for the preference of retail store is display of apparel. Mostly professional are buying the apparel from branded outlets. An investigation on the female consumer behavior for organized apparel store indeed helps marketers in understanding and enhancing the overall experience of shopping and apparel products in the store.

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Finance

MICROFINANCE: A TOOL FOR ECONOMIC EMPOWERMENT

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ABSTRACT

Women face discrimination in their family, social, economic and political life. An empirical study was conducted to measure the economic empowerment of women through microfinance. Economic empowerment was measured using criteria of income generation, mobilization of saving, change in expenditure pattern, participation in financial decision making, and access and control over the credit. The present study tried to link microfinance and economic empowerment. A total sample size of 180 respondents was drawn from Self Help Groups(SHGs) and Sakhi MandalYojana Self Help Group from DRDA, Mehsana district of Gujarat. Sign Test was applied to analyze the changes before and after joining SHG.

Keywords: Economic Empowerment, Microfinance, *Mission Manglam*, Self Help Group.

INTRODUCTION

Women all over the world are facing so many obstacles in the society. Women's economic position is weak both within and outside the family. Women are treated more as liabilities rather than assets. Women face significant obstacles to equal participation in economic development initiatives. Economic empowerment is perhaps one of the most important parameter of the overall empowerment which includes social, self or psychological and political empowerment and also considered to be prerequisite for other remaining empowerments. The basic idea of economic empowerment of women is to provide them financial assistance and allow them to earn an independent income, contribute financially to their households and generate self-employment. It leads to increased self-respect, self-esteem, self-confidence.

Microfinance programme is led by SHGs which are small, economically homogenous group of the poor people coming together to save some money regularly, which are kept in a common fund to meet emergency needs of members and to loan to members as decided by the group. It has been recognized as an effective tool for capacity building of the

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marginalized section of rural society and as an alternative process to meet the urgent needs of the poor (Rao, 2003). It provides an appropriate platform for initiating and sustaining income generating activities. SHGs enhance the qualitative equality among women in social life, decision-makers and participant in the democratic, economic cultural spheres of life (McKiernan, 2002).

Microfinance programs for women have positive impact on economic growth by improving women income generating activities (Kasynathan, 2002). Most experts argue that investing in women's capabilities empowers them to make choices which are a valuable goal in itself but it also contributes to greater economic growth and development. Malhotra, Schuler & Boender (2002) in their comprehensive paper,'*Measuring women's empowerment as a variable in international development*', identify the methodological approaches or indicators in measuring and analyzing the empowerment of women. These include, inter-alia, domestic decision-making, finance and resource allocation, social and domestic matters, child related issues, access to or control over resources, freedom of movement. Sharma P. (2007) surveyed 300 women clients of microloans in hill and terai of Nepal and in his study found that the credit program participation leads to women playing a greater role in household decision-making, having greater bargaining power compared with their husbands, more access to financial and economic resources, having greater social networks, and freedom of mobility. Anderson and Eswaran (2009) have demonstrated that the mere generation of income by women will not result in empowerment; the income also needs to remain in their control to yield higher bargaining power in the family setting power. Swain and Wallentin (2012) further advocate that the improved role of women as managerial decision-takers related to business planning, procurement of raw materials, as well as product pricing is crucial if they are to be empowered. To attain sustainable development outcomes, it really matters who decides the resource allocation (Kantor, 2005). Economic empowerment is embedded in women's role of independent decision-making in income-generating activities, as well as control over income from that activity. The study by Cristalbell (2009) assesses the role of microfinance in building up economic and democratic capacity of women and thereby enhancing their empowerment in India, with special reference to the state of Kerala. This is a study of a single microfinance organization, Samathha Vanitha Swayam Sahaya Sangham. A sample was selected for an in-depth study of their activities and performance and from each of the selected SHGs, an adequate number of the women were selected. It evaluates the performance of the of SHG. It tries to identify the factors that contribute to their successful performance and sustainability. Sahoo (2013) analyzes the role and performance of SHGs in promoting women's empowerment in Cuttack District of Odisha.

The economic progress of India depends on the productivity of both male and female workforce. In India, in early period, women were limited within the four walls of their houses and were dominated by males. Gujarat Government announced *'Mission Mangalam'* programme. *Mission Manglam* developed new approach to integrate Self-Help Groups/ Sakhi Mandal. Under the scheme, a corporate value chain is created with objective of win-win scheme for all stakeholders like Banks, Industry Partners, Micro Finance Institutes and Skill Imparting Institutions, etc. It is workable innovative model which involves activities, trainings

and equipped with the most appropriate and. effective strategy for poverty reduction in the post-liberalization era. It is a novel approach towards involving the corporate sector and the poor with an emphasis on skill development to transform the marginalized into successful entrepreneurs. Under the programme, the poor women are organized into Self Help Groups/ Sakhi Mandal. Other organizations link them with banks, build capacities in them and lead them towards sustainable livelihoods. Income-generating activities brings greater control over own lives and women's access to savings and credit gives them a greater economic role in decision-making through their decision about savings and credit. When women control decisions regarding credit and savings, they optimize their own and the household's welfare. Women's income in a family is very important in relation to their full identity and powers in all spheres of life. It is being increasingly realized that women's income brings landmark change in the nutritional, economic and educational upliftment of the family.

Through these Self Help Groups (SHGs) the women are now participating in all productive activities and. they can earn as much as they need for meeting their monthly expenditure. Women, through SHG movement have asserted a dignified position in the family as well as in the society. Their decision making power has greatly improved not only in their family but also in the society. This paper attempts to understand the conceptual theoretical analysis of economic empowerment of women. The paper will deliberate over whether *Mission Manglam* has been successful in achieving the goal of economic empowerment of women.

METHODOLOGY

The method used in this study is the evaluation and the descriptive survey method. The study is based on primary data as well as secondary data and information. The descriptive method is suitable because the research work involved data collection from rural community members of Microfinance Institutions (MFIs) with a view to determine whether or not microfinance contribute to poverty reduction by increasing their income and welfare. Primary data are those collected by the investigator for the first time. These are original in character. The primary data for this study was collected in the year 2014. The qualitative and quantitative information on SHG members and their households was obtained through interviews. Multistage random sampling has been used for the data collection. For this study, *Mission Mangalam* SHG has been selected. Three members from each SHG was selected and a total of 180 SHGs members were included for the study. For the data analysis, average and percentage analysis was carried out to draw meaningful interpretation of the results. Non- parametric "Sign Test" was used to find change in economic status of women before and after joining SHG. The data sources for secondary data has been Annual Reports of NABARD, *Gujarat Livelihood Promotion Company, District Rural Development Agency* (DRDA), articles and research papers.

In the present study, women economic empowerment has been measured through five variable. The framework shows the linkages between microfinance and women economic empowerment. Income leads to mobilization of saving, change in expenditure pattern, participation in financial decision making and access and control over the resources.

Conceptual Framework of Microfinance and Economic Empowerment

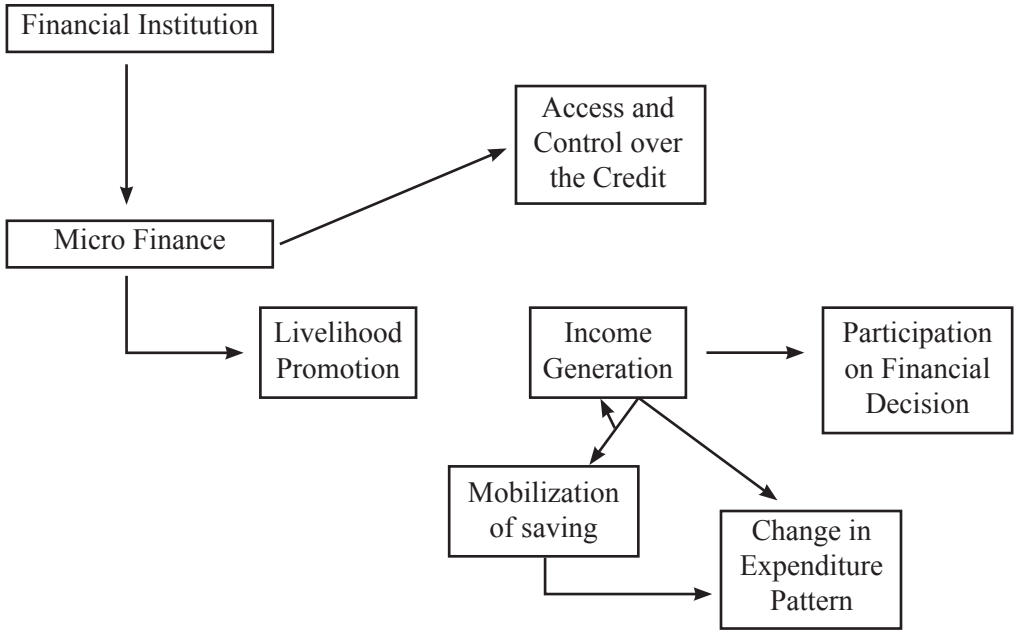

Figure 1

(*Source***:** Self)

NOVELTY OF "MISSION MANGLAM"

The state of Gujarat has made a long journey since 1960. But the State is still lagging in rural development**.** Governmental and non-governmental organizations have introduced microfinance programs providing financial services to low- income households. In Gujarat, there are a host of agencies that promote SHGs under various type of programs and schemes. Rural Development Department itself promotes SHGs under Sakhi Mandal Yojana, SGSY, Watershed Program, Shram Yogi Yojana and several Special SGSY Projects implemented through NGOs. Women and Child Development Department has its own SHG schemes. Urban Development Department implements SJSRY in urban areas through SHGs. Tribal Welfare Department has some programs implemented through SHGs. NABARD and Banks create their own SHGs through NGOs. In addition NGOs themselves directly gain donor funds from international agencies and create and nurture their own SHGs. Thus, there are various types of livelihood programs implemented through a number of agencies. As a result, there is much duplication of efforts, and very often leading to one agency breaking existing SHGs to create new SHGs, identifying the same group of beneficiaries etc. This affects other agencies' works. A convergence platform was required to bring all SHGs formed by several agencies under single umbrella frame-work.

In *Mission Mangalam*, there is provision to centrally track all SHGs, create an online computerized database and real-time MIS, give each of them a unique ID code, help in linking with banks and eventually linking them to livelihood programs to ensure effective efforts to bring rural poor out of poverty. It could coordinate between all stakeholders, including different Departments of Government, Government Agencies, Bankers, MFIs, NGOs, Insurance Companies.

SIGNIFICANCE OF THE STUDY

In India, the trickle down effects of macroeconomic policies have failed to resolve the problem of gender inequality. There are several reason for this. Among the poor, the poor women are most disadvantaged. They are characterized by lack of education and access of resources, both of which is required to help them work their way out of poverty and for upward economic status. In olden days, women were restricted to take part in any social activities and not given roles in decision making in her family. The situation was even more worsening in rural and remote areas. In Mehsana district, under the *Mission Mangalam* programme, microfinance programs offering financial services to low income households were introduced. This study is important because it will throw light on the reality of the problem.

SOCIO ECONOMIC PROFILE OF SHG MEMBERS

In Gujarat, total number of saving- linked SHGs was 2, 08,410 and credit- linked SHG was 72,671 in the year 2012-13. In the year 2014, total number of SHGs in Mehasana district was 9,491 and out of those 7,843 SHGs have received revolving fund and 4,611 have received bank loan.

From the primary survey data of Mehsana district, it has been found that women between the ages of 36-45 years are actively participating in SHG. Out of total, 40 percent women belong to this age group. In Mehsana district, 18.9 percent respondents were illiterate and 8.9 percent of the respondents could not put signature. Out of the total literate women, 27.2 percent women have received primary education, 30.6 percent women have received secondary education and 8.3 percent have received higher secondary education. Only 4.4 percent women are graduate and only one woman is post-graduate. 88.9 percent of beneficiaries are married, while unmarried women constitute 3.3 percent. Widow respondents in the SHGs stand at 7.8 percent in Mehsana district. 109 (60.6 %) respondents were from nuclear families and 71(29.1%) respondents had joint families. 52.8 percent respondents have their own land. 91.1 per cent respondents in Mehsana district live in their own houses and the remaining occupy rented houses. 53.3 percent respondents live in pucca house, 37.2 percent live in semi- pucca houses. 50 percent of the respondents received loan up to Rs.10001 -20000 and 25.6 percent of respondents received loan amount of Rs. 10001-to 20000. 51.7 percent SHG members were engaged in the agriculture and allied activities, 20 percent respondents were causal labor, 13.9 percent respondents were self- employed. They are doing motikam (handwork), making different types of product, stitch work, or run shop, beauty parlor, ice-cream parlor etc. Mere

7.8 percent respondents were employed in government sector and there too, they worked as Anganvadi sister, Asha worker or Teda Ghar worker . 12 member of SHG in the sample were unemployed.

Table 1: Growth of SHG in Mehsana District

Taluka	**As on 31st March 2013**		**As on 31st March 2014**			**As on 31st March 2014**	
	No. of	**No. of**	**No. of**	**No. of**	**% Growth**	**% Share in**	**% Share in**
	SHGs	**Members**	**SHGs**	**Members**	**SHGs**	**SHGs**	**Members**
Becharaji	649	7472	697	8108	7.40%	7.34%	6.68%
Kadi	1096	15685	1176	16449	7.30%	12.39%	13.55%
Kheralu	1126	11871	1313	13768	16.61%	13.83%	11.34%
Mehsana	689	10993	749	11715	8.71%	7.89%	9.65%
Vadnagar	600	7874	662	8638	10.33%	6.98%	7.11%
Vijapur	1880	24409	1931	25014	2.71%	20.35%	20.60%
Visnagar	699	8979	859	10646	22.89%	9.05%	8.77%
Satlasana	723	9216	783	9736	8.30%	8.25%	8.02%
Unjha	1186	15871	1321	17350	11.38%	13.92%	14.29%
Total	**8648**	**112370**	**9491**	**121424**	**9.75%**	**100.00%**	**100.00%**

(*Source*: District Rural Development Agency)

Table 1 shows that the Visnagar Taluka has the highest growth i.e 22.89 percent in proliferation of SHGs in the year 2014 compared to the year 2013 followed by Kheralu and Unjha block with figure of 16.61 percent and 11.38 percent, respectively. Vijapur Taluka is in top position in market share at 20.35 percent in number of SHGs followed by Unjha and Kheralu with 13.92 percent and 13.83 percent, respectively.

ECONOMIC STATUS

Microfinance through SHGs has linked rural poor women with formal credit delivery system, provided micro-loans and has encouraged them to livelihood promotion activity. This programme has helped in increasing income, saving expenditure, and participation in financial decision making, increased access and control over the credit.

Table 2 : Changes in Monthly Income of SHG Members Before and After Joining SHG

Individual Income (Monthly)	Before joining SHG		After joining SHG	
	No. of Person	%	No. of Person	%
Nil	15	8.3	12	6.7
Upto Rs.1,000	76	42.2	16	8.9
Rs.1,001-2,000	68	37.8	81	45
Rs.2,001-3,000	12	6.7	48	26.7
More than Rs.3,000	9	5	23	12.8
Total	180	100	180	100

(*Source*: Primary Survey**)**

Table 2 shows the monthly income of SHG's women. Before joining the SHG, 8.3 percent women were unemployed whereas after joining the SHG their number has gone down to 6.7 percent. Those who earned up to Rs.1,000 per month before joining SHG increased their income significantly after joining the SHG. After joining the SHGs their percentage has gone down from 42.2 percent to 8.9 percent. In the income group of Rs. 1,001-2,000 where earlier there were 37.8 percent respondents, post-SHG, the number has gone up to 45 percent. In the income group of Rs. 2,001-3,000, the growth has been phenomenal from 6.7 percent to 26.7 percent. Before joining the SHG, mere 5 percent women were earning more than Rs. 3,000 whereas after joining the SHG their number has gone up to 23 percent. This clearly indicate that after getting a loan, members utilized the amount for productive activities such as purchase of stitching machines, raw material for the handicraft, buying seeds and equipment for increased agricultural production and cattle. Thus, we can conclude that there has been progressive economic empowerment through microfinance in Mehsana district.

Table 3: Changes in Monthly Family Income of SHG Members Before and After Joining SHG in Mehsana

Monthly Family Income	**Before joining SHG**		**After joining SHG**	
	No of Person	**%**	**No of Person**	**%**
Upto Rs.2,000	27	15	4	2.2
Rs.2,001-4,000	95	52.8	45	25.0
Rs.4,001-6,000	27	15	69	38.3
Rs.6,001-8,000	15	8.3	30	16.7
Rs.8,001-10,000	7	3.9	17	9.4
More than Rs.10,000	9	5	15	8.3
Total	180	100	180	100

(*Source*: Primary Survey)

Table 3 shows the monthly family income of SHG members before and after joining SHG. The number of the families which earned up to Rs. 2,000 per month has decreased from 15 percent to 2.2 percent. Out of the total number of families, 46.1 percent families earned between Rs. 2,001 to 4,000 before joining the SHG. But after joining the SHG, this number has decreased to 25 percent. In the monthly income group of Rs. 4,001 to 6,000, the respective figure has increased from 15 percent to 38.3 percent families. In the monthly Income group of Rs. 6,001 to 8,000 and Rs. 8,000 to 10,000, we can see number of families have increased from 8.3 percent to 16.7 percent and 3.9 percent to 9.4 percent ,respectively. The numbers of the families who earn more than Rs. 10,000 have increased from 5 percent to 8.3percent. This clearly indicates that before joining SHG the income of the respondent was low because they did not have sufficient amount, no proper guidance, or no training for skill development for livelihood promotion. After joining SHG, the income of the families of women has gone up.

Table 4: Changes in Monthly Saving of SHG Women before and after Joining SHG in Mehsana

Saving of SHG women (per month)	**Before joining SHG**		**After joining SHG**	
	No. of Person	**%**	**No. of Person**	**%**
Nil Saving	121	67.2	0	0
Up to Rs.100	29	16.1	115	63.9
Between Rs.101-200	12	6.7	31	17.2
Between Rs.201-500	10	5.6	14	7.8
More than Rs.500	8	4.4	20	11.1
Total	180	100	180	100

(*Source*: Primary Survey**)**

Table 4 clearly shows that 67.2 percent respondents did not have any savings before joining the SHG. It means all women in the SHG started saving only after joining the SHG. Before joining SHG, 16.1 percent respondents used to save money in the bank or post office but now 63.9 percent respondents are saving due to the mandatory first principle of the SHG that members have to save continuously for six month. After saving, the SHG can help in getting loans or financial assistance from any financial institution. The interest accrued on savings is also a source of income for some women. The women who saved Rs.101-200 and Rs. 201-500 have increased from 6.7 percent to 17.2 percent and 5.6 percent to 7.8 percent, respectively. 4.4 percent respondents have saved more than Rs. 500 per month before joining the SHG. But after joining the SHG, 20 percent respondents have savings. One can infer that the after joining SHG, economic empowerment of women has positively changed.

Table 5: Changes in Monthly Family saving of SHG Members Before and After Joining SHG in Mehsana

Saving Family	Before joining SHG		After joining SHG	
	No of Person	%	No of Person	%
Nil Saving	77	42.8	0	0
Up to Rs.200	44	24.4	74	41.1
Between Rs.201-500	29	16.1	37	20.6
Between Rs.501-1000	17	9.4	36	20
More than Rs.1000	13	7.2	33	18.3
Total	180	100	180	100

(*Source*: Primary Survey**)**

Table 5 shows the saving pattern of the family changes considerably in Mehsana district. 42.8 percent respondents of the family did not have savings before joining the SHG. After joining SHG all are saving their money. 24.4 percent of respondent's family were saving up to Rs. 200 per month before joining the SHG which has increased to 41.1 percent after joining the SHG. In saving level of Rs. 201-500 and Rs. 501-1000, one can discern number of families increased from 16.1 percent to 20.6 percent and 9.4 percent to 20 percent, respectively. The members of the families who saved more than Rs. 10,000 have also increased from 7.2 percent to 18.3 percent.

Table 6: Changes in Monthly Family Expenditure of SHG Members Before and After Joining SHG in Mehsana

Expenditure	Before joining SHG		After joining SHG	
	No of Person	%	No of Person	%
Up to Rs.2,000	37	20.6	9	5.0
Rs.2,001-4,000	90	50	82	45.6
Rs.4,001-6,000	22	12.2	64	35.5
More than Rs.6,000	14	7.8	25	13.9
Total	180	100	180	100

(*Source*: Primary Survey **)**

Table 6 describes the level of expenditure of the SHG's family. Out of total, 20.6 percent of respondents families had monthly expenditure upto Rs. 2,000 before joining the SHG. The figure has dwindled to mere 5% now. We notice that 50 percent of the families had expenditure between Rs. 2,001-4,000 before joining SHG. The percentage of families in this group has

come down to 45.6 percent. The SHG members of the families whose monthly expenditure was in the level of Rs.4,001-6,000 have increased from 12.2 percent to 35.5 percent. Number of families incurring more than Rs.6,000 monthly family expenditure has grown from 7.8 percent to 13.9 percent after joining the SHG. One can infer that when income increases expenditure also increases concurrently .

Table 7: Changes in Monthly Family Food Expenditure of SHG Members Before and After Joining SHG in Mehsana

Food expenditure	**Before joining SHG**		**After joining SHG**	
	No of Person	**%**	**No of Person**	**%**
Up to 2,000	141	78.3	97	53.9
2,001-4,000	30	16.7	67	37.2
More than 4,000	9	5	16	8.9
Total	180	100	180	100

(*Source*: Primary Survey)

Table 7 displays the monthly expenditure of families on food before and after joining the SHG in Mehsana district. Out of the total number of families, 78.3 percent families used to spend upto Rs. 2,000 monthly before joining the SHG but after joining SHG, the number has decreased to 53.9 percent. Number of families which incurred monthly expenditure on food between Rs.2,000-4,000 has increased from 16.7 percent to 37.2 percent. Before joining SHG,only 5% families were spending more than Rs.4,000 per month on food. After joining SHGs, the figure is 8.9 percent. One can infer that food expenditure have increased after joining SHG due to positive change in income of the family, high level of food inflation etc.

Table 8: Changes in Monthly Education Expenditure of SHG Members before and After Joining SHG in Mehsana

Education Expenditure	**Before joining SHG**		**After joining SHG**	
	No of Person	**%**	**No of Person**	**%**
No expense	58	32.2	28	15.6
Up to 200	79	43.9	66	36.7
200-500	26	14.4	47	26.1
More than 500	17	9.4	39	21.7
Total	180	100	180	100.0

(*Source*: Primary Survey)

Table 8 displays the families' monthly expenditure on education before and after joining the SHG in Mehsana district. An increase in the expenditure on education has been noticed. In Mehsana district, there are number of good education institutions. From the Table 8, it is evident that after joining SHG, the level of education expenditure has changed. Percentage of families incurring monthly education expenditure between Rs. 201-500 and more than Rs. 500 , has increased from 14.4 percent to 26.1 percent and 9.4 percent to 21.7 percent, respectively.

Table 9 : Change in Participation in Financial Decision

Participation of Financial Decision	**Before joining SHG**		**After joining SHG**	
	No. of Person	**%**	**No. of Person**	**%**
Not At All	17	9.4	11	6.1
Some Extent	97	53.9	54	30
Large Extent	66	36.7	115	63.9
Total	180	100	180	100

(*Source***:** Primary Survey)

Table 9 shows the participation of women in the household financial decision before and after joining SHG in Mehsana. The participation in making financial decisions like, expenditure, budget allocation, saving, buying and selling of household durables etc has increased . One can discern from data that 53.9 percent of the women in the sample have participated in financial decision-making to some extent, the percentage of participation of the financial decision at some extent has come down to 30 percent, while the figure for participation to large extent has hiked from 36.7 % before joining SHG to 63.9% after joining SHG.The level of financial participation has seen positive change before and after joining SHG. It amply illustrates that microfinance programme helps the economic status of women and they feel more empowered within their family.

Sign Test

H0*: There is no significant difference in the economic status of respondents before and after joining the SHG in Mehsana District "*

H1: *There is significant difference in the economic status of respondents before and after joining the SHG in Mehsana District "*

Table 10: "**Sign Test"**

Variable	**Calculated value**	**Level of Significant**	**Tabulate value**
Individual income of the SHG member	10.68	.000	1.96
Family income of the SHG member	11.27	.000	1.96
Individual saving of the SHG member	12.61	.000	1.96
Family saving of the SHG member	12.25	.000	1.96
Expenditure of the SHG member's family	9.17	.000	1.96
Food expenditure of the SHG member's family	6.44	.000	1.96
education expenditure of the SHG member's family	8.71	.000	1.96
Participation on Financial Decision Making	7.28	.000	1.96

(*Source*: Primary Survey)

From Table 10, it is evident that the calculated values of 'Sign test' for all the variables are found to be more than the Table value. Therefore, Null Hypothesis (Ho) is rejected. It means alternative hypothesis is accepted. There is significant difference in the economic status of respondents before and after joining the SHG in Mehsana District. The value itself shows that there is a drastic change in saving (individual women and their family) of the SHG members. Education expenditure also changes significantly.

CONCLUSION

It is evident that several government and non-government organization in Gujarat has played their part in development movement of SHGs and generation of financial resources through livelihood development by linking the SHG to schemes and project which make these SHGs more sustainable. Primary work also reveals that microfinance has a positive impact on poverty alleviation. Empowerment of woman is a million dollar question but still there is a silver lining in the dark cloud, because of intervention through microfinance programme. Women through this SHG movement have asserted a dignified position in the family. The study concludes by delienating the positive impact of Self Help Groups on income generation, mobilzation of savings, changes in the expenditure (food expenditure, education expenditure), positive change in participation in financial decision-making and access and control over the credit. Microfinance is slowly but surely changing the economic status of women. It has inculcated banking and saving habit among them. This economic independence has also enabled them to improve their overall capacity building. There is a need for a state level as well as a national level organisation to coordinate the routing of financial resources towards the SHGs and capacity building of the promoting organisations. Microfinance through SHGs is a useful tool for creating livelihood opportunities. It leads to poverty reduction and empowerment of women.

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Media Studies

IMPACT OF TELEVISION CARTOON CHANNELS ON CHILDREN IN INDIA

Afsana Rashid*

ABSTRACT

The paper focuses on impact of Cartoon channels on Television viewing children. Children not only watch these cartoons with interest and enthusiasm, but even try to imitate these characters. Consequently, the impact of cartoon channels on children is immense. Some research has shown that children spend more time on watching cartoons and acquiring much information not only about the type of cartoon characters, but are also familiar with their dress, actions and name of almost all major cartoon characters. Other studies suggest that watching violent cartoon shows has tremendously increased the aggressive behavior among the children, especially boys. More researches have shown that children easily learn variety of things by watching educational cartoon films. Their imagination and creativity gets enhanced. Even infants and toddlers start learning different words and their meanings. Parents have a responsibility to know what kind of cartoons their children watch. Broadcasters need to be careful while creating content for children whereas marketing companies, who have a secure market, too ought to demonstrate their responsibility.

Keywords: Cartoon; television channels; children; India; imagination; creativity; aggressive behavior; broadcasters; marketing companies and psychological research.

INTRODUCTION

A cartoon is any of the several forms of art, with varied meanings that evolved from time to time. Being main source of entertainment, cartoons are on air round the clock. Over the years, children have been watching cartoons and gradually developing interest in them. Often they watch cartoons with keen interest and attention and start developing proximity towards them.

The entertainment space for the children has evolved over the years. Channels like Cartoon

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Network, Fox Kids, Animax, Hungama TV and others were set-up to grab the attention of children and provide them a platform for fun and pleasure. Cartoon Network started broadcast in the country in 1995 and Disney Channel in 2004.

Cartoons appeal children. Research has shown that children begin watching cartoons on Television at an early age of six months and by two or three years, the children become excited and enthusiastic about these animated shows. (Jain, 2011)

Extent of interest of cartoon among the children is not only confined to the actions and characters of the cartoons, but even the dresses used by the cartoon characters appeal them. Children even remember the names of almost all the major cartoon characters and that fascinates them.

The interest and enthusiasm of the children towards the cartoon shows provides an opportunity for advertisers and marketers to reach out to the parents and grab the market. The contemporary situation in the world stands witness to this. Huge rush of customers can be witnessed on almost every store for the children.

Popularity of cartoons and animation genre can be gauged from the fact that it accounted for 85 percent of Television Viewership Ratings in 2011. Children's programming comprised 12 percent of the market and feature films two percent of the total TVR in the same year. (Nath, 2014)

Interest to watch cartoon shows has increased among the children. Gone are the days when they had to watch cartoons on Television screens, today the same is available at their fingertips. Content of the animated shows, over the years, has drastically changed. The same is bound to have its impact on the development of the children. It has become a problem because too many children are watching too much cartoons and the shows that they are watching (even if they are cartoons) have become violent and addictive. (Jain, 2011)

Studies have shown that watching animated shows has subtle but consistent impact on the growth of children. Both positive and adverse impact of the animated shows on the children has been reported and the stress has been laid that such shows should be children-friendly.

Watching too much cartoon on Television is more likely to have mental, psychological and emotional problems and even the physical injuries on eye. But at the same time most of the cartoons today are educative like Noggin and Nick Jr. host an array of shows that are intended to teach the toddlers important lessons in life.(Pandit & Kulkarni, 2012)

DEFINITION OF CARTOON

The term "cartoon" originated in the middle-ages. It was referred to humorous illustration in magazines and newspapers in the 19th century whereas in the early 20th century, it referred to comic strips and animated films. (Pandit & Kulkarni, 2012)

It has originated from the Italian word "*Cartons*" and the Dutch word "*Karton*". It is a full size drawing made on strong paper as a study or model painting, stained glass or tapes ting. (Pandit & Kulkarni, 2012)

Though it is form of two dimensional illustrated visual arts, but the specific definition of cartoon has changed over the time. Modern usage refers to a spicily non-realistic drawing or painting intended for satire or humour. Walt Disney created the first sound cartoon, the first all-color cartoon and the first animated feature length motion picture. (Pandit & Kulkarni, 2012)

With the popularity of cartoons among the children, plethora of channels airing cartoons came to the fore. *Felix the Cat,* the first ever cartoon icon, started its journey in 1920s. Within the next decade, Donald Duck, Mickey Mouse and Pluto were the cartoon characters introduced by Disney Brothers' Cartoon Studios. (Hassan & Daniyal, 2013)

CARTOON NETWORK: A BRIEF BACKGROUND

Turner Broadcasting System (TBS), one of the world's leading media companies, first launched the Cartoon Network in the United States in October 1992. Over the next few years, it was launched in Europe, Latin America and Asia Pacific regions. Soon it gained wide popularity across the world. It came to India in 1995 and gained popularity, especially in the major metros of the country.

Cartoon Network has been watched in more than 80 million homes in the United States of America and in 145 countries across the world, since August 2002. Its 68 percent audience belongs to the children within the age-group two to 17 and the remaining 32 percent belongs to the age-group of above 18 and adults. The children from six to 11 years form the core-group of the audience of the channel. (Hassan & Daniyal, 2013)

In March 1998, the Cartoon Network launched CartoonNetwork.com, a website offering cartoons on the net. According to Nielsen Net Ratings, CartoonNetwork.com stood as one of the world's top 10 websites during March 1998. The Network had huge advertising and promotional agreements with the leading companies; Reebok, Disney, McDonald's and Nintendo. (ICM)

CARTOON CHANNELS IN INDIA: EVOLUTION AND DEVELOPMENT

Before the advent of Satellite channels in the country, Doordarshan used to telecast cartoon and the animated shows for the audience. Jungle Book, DuckTales, Chip and Dale and others were among the popular cartoon shows. Till 1995, Doordarshan was the only channel that telecast the cartoon shows.

Cartoon Network started broadcast in the country on May 1, 1995. Initially, it operated from 5:30 AM to 5:30 PM (and later up to 9 PM), with Turner Classic Movies (formerly Turner Network Television) taking up the remainder of the daily schedule. (Indianetzone.com, 2014)

On July 1, 2001 Cartoon Network India became a separate 24-hour channel, with exclusive local feeds for India, Nepal, Bhutan and Sri Lanka. In 2004 a separate feed of the channel was started for Pakistan and Bangladesh. Initially, the channel was a relay version of Cartoon Network India, which is not the case now. The channel primarily airs animated shows in the country in four different languages; English, Hindi, Tamil and Telugu. The channel has aired a

number of popular animated shows. (Indianetzone.com, 2014)

With passing time, number of entertainment programmes for the children have gone up. Hungama TV, the only local kids' Hindi entertainment channel has been in high demand across the country, since its inception and has now reached the second position in kids channel genre. Animax India has also gained lot of popularity among the children in India. A Japanese anime broadcasting television channel, Animax began its operations across India and the rest of South Asia from April 5, 2004. (Nath, 2014)

According to TV viewership data shared by TAM Media Research, only 15 percent of all children viewing Television watch kids' channels and the remaining 85 percent watch General Entertainment Channels. (Nath, 2014). School age particularly from six to 11 years are considered a very crucial period wherein the ability of children to understand the things is faster than adults.

EFFECT OF TELEVISION CARTOON CHANNELS ON CHILDREN

Watching cartoons has become popular among the children. But the content of the animated shows has a subtle, but consistent effect on them. The effect has both positive as well as adverse impact on children. Studies have found change in the behaviour of the children after they watch violent cartoon shows. Some research has also found that educative cartoon shows enhances imagination and creativity among the children. Language plays an important role. When children watch cartoons in an easy and comprehensible language, they not only enjoy it but get involved and the same reflects in their behaviour.

In one study, preschool children were observed both before and after watching television; some watched cartoons that had many aggressive and violent acts; others watched shows that didn't have any kind of violence. Children who watched the violent shows were more likely to strike out at playmates, argue, disobey authority and were less willing to wait for things than those children who watched non-violent programmes. (Mahsud, Rawan, & Normn, 2009)

Watching cartoons affects the physical and psychological activities of the children. The channel is responsible for barren playgrounds, sloppy attitude towards studies and lack of healthy activities. Cartoon watching affects the attitude and behavior of kids, their liking and disliking and behaving with other children. It also has a strong effect on their language and way of dressing and eating. (Mahsud, Rawan, & Normn, 2009)

Studies further show that violent cartoon shows are mindlessly absorbed by the children and they start acting like cartoon characters. Programmes based on violent temper, mood and passion ultimately sow the seeds of violence in the developing minds of children and as they grow, they resort to it as the quickest way to settle a dispute.

Even many psychologists agree that the more violence viewed, the more accepting children are of violence, the more it desensitizes them and the more likely they are to become violent. (Mahsud, Rawan, & Normn, 2009)

Children who watch too much cartoons on Television are more likely to have mental and

emotional problems, along with brain and eye injuries. From the time children start school to the time they graduate they are averaged to spend around 13,000 hours in a school. When it is compared to the time children spend watching Television, it comes out to nearly 18,000 hours (from the time school is started to the time of graduation). This comparison is an outrage because of the amount of Television that is watched by a child will have an effect on their brain, emotions and their sense to feel pain. (Choma *et al.,* 2004)

A U.S. Surgeon General David Satcher, in a 2000 report on adolescent violence, states that more aggressive behavior in a young child's life is caused by frequently watched entertainment that incorporates violence in it. This led American Psychological Association to pass a resolution in February 1985, informing broadcasters and the public about the dangers violence on Television has on the children.

The American Academic of Pediatrics and American Academy of Child and Adolescent Psychiatry observe that Television influences the behavior of children as group as one year old. Children who frequently watch shows in which violence is depicted are likely to imitate the same.

Cartoon shows depicting violence hamper the overall growth and development of children. Psychological research observes that children, who watch violence on Television, become less sensitive to pain and sufferings of others and they don't fear violence nor are they bothered by violence, in general. Such children are more likely to become aggressive and use harmful actions towards others. (Choma *et al.,* 2004)

Pertinently, a study released by *The New England Journal of Medicine* in July 2004 found that most children who suffered seizures from December 1997 episode of Japanese cartoon, *Pocket Monsters* (later renamed "Pokémon" for international distribution) had epilepsy or some other underlying condition that would have caused development of seizures, regardless of whether or not they saw that programme. The cartoon-episode drew worldwide attention after multiple cases of children suffering seizures, after watching the episode, were reported.

Cartoons don't have only negative impact on the children. They are the central focus of many children wherein parents manipulatively use cartoons to help keep the children occupied, while parents are busy with their office schedules or household chores. Many parents also express satisfaction with the educational benefits of Television.

They easily learn variety of things by watching educational cartoon films and their imagination and creativity gets enhanced. Cartoons also have a tremendous impact in improving the cognitive aspects among the young children. Infants and toddlers also start learning different words and their meanings. (Jain, 2011)

Thus, it can be said that watching cartoons isn't always wrong, but what matters is watching it for prolonged duration and without the guidance of parents. A healthy environment is important for the overall growth and development of children. Watching cartoons can entertain them and help them in developing certain skills but what matters is the kind of cartoons that the children watch. Besides, broadcasters, too, have a responsibility to develop the content of the cartoon shows with utmost care and caution.

VISUAL SUBLIMINAL MESSAGING

Subliminal messaging is known both in advertising and programming, since the time Television and radio came to the fore. It is being done with the children's programmes as well. American Heritage Dictionary describes the subliminal messaging as "*Below the threshold of conscious perception; inadequate to produce conscious awareness but able to evoke a response*."

It means advertisers and programmers are slipping in messages that you act upon and don't even realize that you are doing it. (Choma C., 2004)

MARKETING PRACTICES

The moment a child sees an item that they want, they will make their parents to purchase it and the parents usually leave no stone unturned to fulfill the wish of their children. Marketers are fully aware of this and they try every step to tap this trend.

Nancy Shalek, President of Shalek Agency, describes advertising as making people feel that without this product, they are a loser. In an effort to grab maximum share in the market, cartoon companies not only advertise their products in between the Television shows in the form of commercials, but they have designed goods say from toothpaste to school bags to lunch boxes to clothes to toys.

The children, after seeing these objects, want to have them. They often purchase these items under the influence of cartoon shows as they want to have their favourite characters with them. Marketing companies very well know how to cash such opportunities.

Nearly two billion dollars is roughly spent on advertising to young consumers in America alone. Nearly 30 billion dollars are racked in annually from children four to 12 years of age and the numbers get even higher with age. Animation industry in India is also blooming and many local and multinational companies have immense opportunities in this sector. Estimated to have been approximately Rs 11 billion in 2006, it is expected to grow at a rate of 22 percent to reach Rs 54 billion by the end of 2014. (Nelson, 2004)

Emerging as one of the largest viewership segment in the country after general entertainment channel sector, the cartoon shows have tremendous potential to earn the revenue. Advertising revenue generated by the children's genre shows a rise from Rs 2 billion in 2010 to Rs 2.4 billion in 2011. (Nath, 2014)

Cartoon Network Enterprises, the licensing and merchandising division for Cartoon Network and Pogo, too has reflected the growth of the industry. Not only are its products available in over 5300 retail counters across the country, but their profits grew by 70 percent in 2011. In April 2012, Disney entered a licensing agreement with the IPL franchise Mumbai Indians to launch co-branded merchandise products that are targeted at the under-14 kids segment. (Nath, 2014)

On the other hand, returns on investment for shows on the channels for children, is not proportional to the viewership. While this genre garners six percent share of the total viewership in Television industry in India, it only generates 1.6 percent of its total revenues. This can be

attributed to the fact that advertisers in non-children categories have not traditionally focused on this segment. (Nath, 2014)

Now, watching entertainment shows has become much easier. Over the past decade or so, there has been manifold growth in the access of children to computers and internet within their respective homes or in schools or in cyber cafes. This too has thrown a big challenge not only for the parents and teachers, but broadcasters and marketers as well.

Half of the kids are computer users and they have helped in the growth of internet usage to 18 percent, as quoted by Cartoon Network New Generations Research.

Broadcasters and marketers owe a corporate responsibility towards the society. They need to be extra careful while designing and creating the content for children's channels, particularly the language and style. This can be an effective and efficient medium to inculcate proper education and skills among the children. If used, negatively it can bring lot of devastation and misguidance for the forthcoming generations.

Parents often object to loud content and aggressive language in children's entertainment shows. 48 percent of parents exercise control over the programmes their children watch, says the 2011 Cartoon Network New Generations Research. Furthermore, channels need to broadcast content that engages children as well as their parents, since 66 percent of parents watch Television together with their children. (Nath, 2014)

SUMMARY & CONCLUSIONS

Children in the contemporary society, have wide choice of entertainment programmes and viewership opportunities. Over the last many years, cartoon shows have created a significant position in their lives. They not only remember the names of these animated shows, but want to have these characters to be with them, always and everywhere. Such is the influence of these shows that they get deeply attracted by various objects resembling the cartoon characters, particularly the merchandize goods.

Cartoon shows have assumed an important place in their lives. The moment they get remote control of the Television in their hands, they straightway jump to the cartoon channel. Now the things have become even easier; they can watch their favourite cartoons by just a click. Internet services have not only made it easier and cheaper but it lacks parental supervision, which worsens the situation.

Cartoon, in particular, grab the attention of the children and they watch it keenly and minutely. They prefer watching cartoons to doing any physical activity. Usually, they should have been spending their time in the playgrounds playing games and enjoying nature. But barren playgrounds provide a clue that children are too much occupied with their imaginary world of cartoons. This hampers even their social interactions within the society, which is vital for the overall development of the children.Animated content captures the attention of children by building an imaginary world for them. Children develop proximity and attachment with these cartoon shows and try to adopt the way their cartoon characters think, play, behave and react.

Various researches in the field suggest that cartoon shows definitely have their impact on the lives of children. There are researches, which prove that watching cartoons for longer duration of time has a potential to affect their eye-sights. Some studies bring forth the fact that after watching violence and aggression in the animated shows, children started behaving accordingly.There have also been researches that have attributed sluggish and lethargic attitude of the children towards their life, their behaviour towards others, their way of expressing their likes and dislikes and their attitude towards life to watching cartoons.

Some studies even say that the more accepting the children are to violence the less sensitive they are to pain. They even try to imitate the cartoon characters thinking they can step in their shoes and live accordingly.There is also the brighter side of the coin. Few researches have been quoted wherein it has been found that watching educative cartoon shows enhances imagination and creativity among the children and those who don't watch violence in these shows don't react the way the children who watch violence do.

Keeping in view the influence the cartoon shows have on the young minds of the children throw the market open for the advertisers and marketers. They are fully aware of the fact that children can make their parents to shop. As such they have designed their products, accordingly, keeping in consonance with the interests, tastes and preferences of the children.

In short, animated programmes and cartoons play a vital role in determining the market for various local and multinational companies, manufacturing toys, clothes and other accessories for the children. Cartoons act as a source of advertisement for them. Children prefer to purchase their items like lunch box, clothes, tooth paste, toys and others, resembling their favourite cartoon characters. As such it becomes mandatory for the broadcasters to play their part. Not only they have to act with responsibility, but they have to exhibit the same, while creating content for the cartoon shows.

Children get so occupied with the shows that they fail to understand the difference between the "real" and the "imaginary" or maybe they are too young to understand the same. The shows ought to be children-friendly. Besides, the content providers ought to assuage the fears of parents regarding loud content and the aggressive language depicted in the cartoon shows for children.

Though the cartoon shows have immense potential to lead to earn huge returns in the form of merchandize goods that resemble these characters, but the marketers and advertisers too need to exhibit their corporate responsibility. Apart from designing the products to make parents to spend for their children, they need to devise strategies to see that the product enhances the ability of children to express, interact and at the same time deliver for the good.

Parents have a bigger responsibility and they cannot be absolved from it. They should spend time with their children and participate in their activities. They should know what their children are watching. Besides, sports activities need to be included in the daily schedule of the children. Instead of empty playgrounds, these should be lively with the activities of children.

There has to be a positive association among all the players involved in the game. Apart from earning billions of dollars a year, there has to be a vision for healthy future generation. Physical development of the body is equally important as the mental development.

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Media Studies

IMPACT OF SOCIAL NETWORKING SITES ON BEHAVIOUR AND LIFESTYLE OF PEOPLE

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ABSTRACT

Social networking sites play a very important role in the life of people. People have been communicating with each other through post, telegraph, telephone and mobile since decades. Social networking came into existence through internet. Earlier people used to visit their relatives. Today people connect with their friends, relatives and acquaintances through social networking. The objective of the study is to find the perception of people towards social networking sites. The area covered under the study is Delhi and NCR. The data has been collected from primary and secondary sources. The primary data is collected with the help of a questionnaire. The results show the response of people towards these sites, level of attachment and whether they find them beneficial.

Keywords: Behaviour, Lifestyle, Perception,Social networking sites.

INTRODUCTION

Social networking sites allow users to connect through internet. Through these sites people not only find their old friend but make new friends also. They share photos, music, videos, chat and organize events. Whatsapp, facebook, Twitter, Linkedin and Google+ are famous social networking sites. The number of hours people spent on social networking sites are increasing day by day. Social networking helps people to come closer who are far away from them.

LinkedIn was started in 2003. This was the beginning of the social networking phenomenon. Today, LinkedIn boasts more than 297 million members. Facebook launched in 2004 as a Harvard-only exercise and remained a campus-oriented site for two full years before finally opening to the general public in 2006. The site currently boasts more than 1.3 billion active users. Google+ which is a social network of google was launched in 2007. It differed from Facebook and Twitter in that it wasn't necessarily a full-featured networking site, but rather a social "layer" of the overall Google experience.

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The term social network site broadly is used to refer to Web sites that enable users to articulate a network of connections of people with whom they wish to share access to profile information, news, status updates, comments, photos, or other forms of content. Social media is defined as "the relationships that exist between network of people" (Walter & Riviera, 2004). In the last ten years, the online world has changed dramatically. With the invention of social media, young men and women now exchange ideas, feelings, personal information, pictures and videos at a truly astonishing rate. Seventy-three percent of wired American teens now use social media websites (Oberst, 2010).

Kraut *et al.* (1998) and Nie (2001), who suggest that time spent interacting with people online replaces time spent in face to face interactions with local contacts. Growing evidence from analyses of online social network site use suggests that these sites have become important tools for managing relationships with a large and often heterogeneous network of people who provide social support and serve as conduits for useful information and other resources (Boyd & Ellison, 2007; Ellison *et al.*, 2007). Internet is not a substitute for other forms of interaction, but as a supplement, serving in an additive role when combined with other methods of communication (Quan Haase & Wellman, 2004; Uslaner, 2000).

RESEARCH METHODOLOGY

The objective of the study is to find the perception of customers towards social networking sites. To find the reason of popularity of different social networking sites, it also tries to identify the factors that drive users to these sites. The area covered under the study is Delhi and NCR. A sample of 100 respondents is taken for this purpose. The data has been collected from primary and secondary sources. The primary data is collected with the help of a questionnaire. For this purpose, the questionnaire was circulated among social site network users to collect information. The secondary data is collected from journals, books, magazines, and websites. A pilot study was conducted and final questionnaire was prepared. The reliability was tested and Cronbach's alpha value was calculated at $\alpha = .763$.

SAMPLE PROFILE

78% users of these social networking sites are 24 to 29 yrs old while 11% users are 30 to 35 years old. 9% users are between the age range of 36 to 41 years old but only 2% users are 18 to 23 years old. 69% users of social networking sites are male while 31% users are female. 81% users of these social sites are unmarried while 19% users of these social sites are married. 59% users are student while 33% users are working in Private Sector. While 4% users are business man and 2% users are house wife and another 2% users are in government job (Table 1).

Table 1: Sample profile

Age (Years)	18-23	2
	24-29	78
	30-35	11
	36-41	9
Gender	Male	69
	Female	31
Marital Status	Married	81
	Unmarried	19
Occupation	Housewife	2
	Govt. job	2
	Businessman	4
	Private sector	33
	Student	59

FINDINGS

The evaluation of perception by the respondent's on different attributes during the survey is presented below (Table 2).

Table 2: Evaluation of Perception

Preference for chatting with their friends	Mobile	47
	mobile and social networking site	43
	only social networking site	10
Notifications checked in an hour	0-15 times	48
	15-30 times	28
	30-45 times	20
	45-60 times	4
Is social site beneficial	Yes	97
	No	2
	To some extent	1
Level of attachment of users	feel upset in case they cannot use social sites	80
	Do not bother	20

Social Sites users in night	use social networking site in day and night both	84
	use social networking site in day only	16
Late night users	Upto 8 pm	17
	8-10 pm	37
	10-12 pm	33
	12-2 am	11
	After 2 am	2
Privacy level	social site keeps privacy of users	96
	users are opposite of them	2
	in partial favor	2
Talking with strange people	do not talk with strange people	33
	talk with strange people	67
Devices used for accessing	Mobile	39
	Mobile and Laptop	60
	Mobile, Laptop, desktop	1
Helpful in imparting general knowledge	Favour	69
	Opposite	31
Different Social Site User	facebook, Whatsapp & Linkedin	53
	facebook only	33
	facebook and Whatsapp	9
	Whatsapp and Linkedin	4
	Facebook, Whatsapp, Linkedin & Twitter	1
Apps User Of Social Networking Site	Use apps	32
	Don't use apps	68
How many years ago you started using social sites	upto 2 years	23
	2-4 years	20
	4-6 years	51
	6-8 years	6
Most appraisable social site	Whatsapp	56
	facebook	44

1. *Preference for chatting with their friends through mobile or social network.*

47% users prefer mobile to talk with their friends than that of social networking sites. But 43% users use mobile and social networking site both for chatting with their relatives or friends. 10% users use only social networking site for chatting.

2. *Social Networking Sites' notifications checked in an hour*.

In an hour, 48% users check zero to 15 times their social sites' notifications while 28% users check 15 to 30 times their social sites' notifications but 20% user check 30 to 45 times their social sites' notifications. Only 4 % users check 45 to 60 times their social networking sites' notifications in an hour.

3. *Is social site beneficial?*

97% users say that social site is beneficial for them but 2% users gave opposite response. Only 1% users say that social site is beneficial up to some extent only.

4. *Level of attachment of users with these social sites.*

80% users feel upset in case they cannot use these social sites because of some reason but 20% users do not bother if they are not able to use these social sites.

5. *Social Sites users in night*.

84% users use social networking site in day and night both but only 16% users use social networking site in day only.

6. *Late night users of social networking sites.*

37% users use these social sites up to 8pm to 10 pm in night while 33% users use these sites up to 10 pm to 12 am in night. 17% users use these sites up to 8 pm whereas 11% users use up to 12 am to 2 am in night but only 2% use these sites after 2 am in night.

7. *Privacy level in social networking site.*

96% users are in favor of these social site in keeping privacy of users while 2% users are opposite of them and another 2% are in partial favor.

8. *Talking with strange people*.

33% users do not talk with strange people on social sites but 67% users talk with strange people on these social networking sites.

9. *Different devices used for accessing social networking site*.

According to survey which was done, 39% users use their own mobile for accessing social networking site but 60% users use mobile and laptop both for accessing social networking site. While 1% users use their mobile, laptop and desktop all to access social networking site.

10. *Helpful in imparting general knowledge.*

69% users are in favor of this statement that social sites help in imparting general knowledge while 31% users are opposite of this statement.

11. *Different Social Site User.*

53% users use facebook, Whatsapp & Linkedin. But 33% users use facebook only. 9 % users use only facebook and Whatsapp both. 4 % users use Whatsapp and Linkedin both. But 1% users use Facebook, Whatsapp, Linkedin & Twitter all together.

12. *Apps User of Social Networking Site*.

32 % users use apps of social networking sites while 68% users don't use these apps.

13. *How many years ago you started using social sites?*

51% users started to use these social site 4 to 6 years ago while 23% users started using these sites zero to 2 years ago. 20% users started to use these sites 2 to 4 years ago but only 6% users began to use these social sites 6 to 8 years ago.

14. *Most appraisable social site.*

56% user prefer Whatsapp as their best social site while 44% user says facebook as their best choice of social networking site.

CONCLUSION

Social networking sites have become part and parcel of our busy life. The lifestyle of people is changing rapidly day by day. So it is required for social networking sites to have a look on these alterations regularly. Social networking company should focus more on youths because youths are major customer of their services. Social networking sites must focus on keeping the privacy of users because if any strange person sends friend request to others, sometimes it may trouble them and hinder their privacy. Social networking has become need of the hour. Some work on social networking sites has been carried out in other countries. Developing economy like India has to be explored more. This study is carried out in Delhi NCR. The study can be conducted in state capitals and other cities also to find out the difference in perception of people. India is an agro- based economy and seventy percent is rural population. It is important to explore the possibility of attracting these people to the social networking sites.

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Engineering

EXPERIMENTAL STUDIES ON THE EROSION RATE OF LOW CARBON STEEL BANK TUBES OF PROCESS BOILERS IN STRAIN-HARDENED AND SUB- CRITICAL ANNEALED CONDITION

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ABSTRACT

Erosion of bank tubes in bi-drum boilers is one of the critical factors leading to the shutdown of power plants. It has been found that more than 25% of all boiler tube failures worldwide are caused by fly ash erosion. Previous studies have established that the major factors influencing the fly ash erosion process are the velocity, impact angle, feed rate and particle size of fly ash. In the present study, the effect of heat treatment conforming to ASME code, during fabrication of bank assembly carbon steel tube conforming to specification ASME SA-192, on erosion rate is analyzed taking into account the factors of velocity, impingement angle, feed rate and particle size of fly ash. Considering the fabrication of the SA-192 tubes which involves cold bending of tubes which in turn leads to strain hardening, bent-tubes with sub- critical annealed condition and bent-tubes without sub- critical annealing condition have been studied. The experiments were conducted in the air jet erosion test rig at M/s. Bharat Heavy Electricals Limited, Tiruchirappalli, India. It has been found that during fabrication of the tubes, bent-tube with sub -critical annealing when compared to bent-tube without sub- critical annealing condition has less erosion rate for all velocities, impact angles, feed rates and different particle sizes of fly ash. This characteristics in bent-tube with sub -critical annealing emerges due to the higher ductility of these tubes compared to the tubes which were not sub- critically annealed.

Keywords: Bank tube, Fly ash; Strain hardening; Sub critical Annealing; tube erosion.

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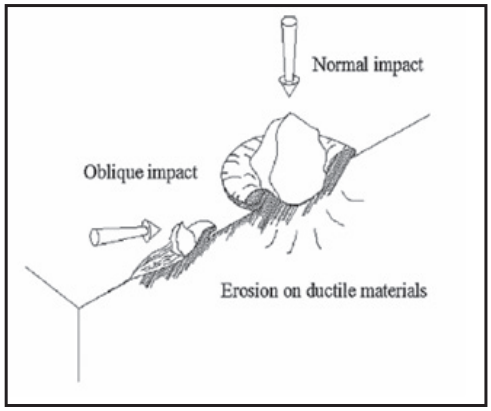
INTRODUCTION

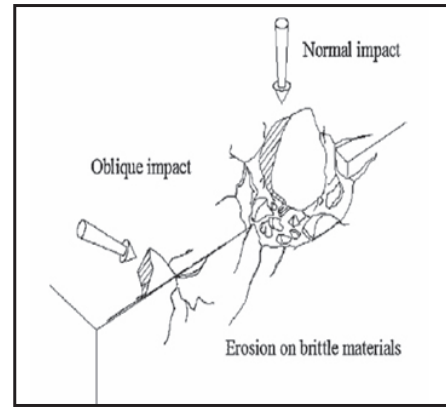
Solid particle erosion may be defined as the removal of material from the surface by the repeated impact of hard and angular particles travelling at considerable velocities. The erosion of metallic tubes in tube banks by particles suspended in gas flows is a serious problem in chemical plants, coal combustion equipment and process when operated in contaminated environments. The damaging effect of erosion substantially reduces the useful life of the tubes. Various ferrous and non-ferrous materials are extensively used in erosive wear situations. Hence, solid particle erosion of surface has received considerable attention in the past decades.

MATERIAL REMOVAL (EROSION) MODEL

The mechanical interaction is different for ductile and brittle materials. In the case of ductile materials the impacting particle cause severe, localised plastic strain which is more than the strain to failure of the deformed materials. For brittle materials, the force of erodent particles causes cracking and chipping off of micro-size pieces, known as micro cutting (Wang and Guoyang,2008). This difference is clearly shown in Figure 1 (a) & (b).



(a)



(b)

Fig. 1 (a) & (b): Erosion mechanisms in ductile and brittle material

For ductile material, the erosion mechanism involves sequential plastic deformation process of platelet formation and crater formation due to forging and extrusion. Platelets are initially extruded from shallow craters made by the impacting particle. Once formed, the platelets are forged into a strained condition, in which they are vulnerable to being knocked off the surface in one or several pieces. Owing to the high strain rates, adiabatic shear heating occurs in the surface region immediate to the impact site. Beneath the immediate surface region, a work hardened zone forms, as the kinetic energy of the impacting particles is enough to result in a considerably greater force being imparted to the metal than it is required to generate platelets at the surface. When the surface is completely converted to platelets and craters and the work-hardened zone reaches its stable hardness and thickness, steady state erosion begins. The reason why the steady state erosion rate is the highest is because the sub-surface cold-worked zone acts as an anvil, thereby increasing the efficiency of the impacting particles to extrude-forge platelets in the highly strained and most deformable surface region. This cross-section of material moves down through the metal as erosion loss occurs. In the platelet mechanism of erosion, there is a localised sequential extrusion and forging of metal in a ductile manner, leading to removal of the micro segments thus formed. During plastic deformation, the normal component of the particle's kinetic energy is used to extrude-forge the material.

Satyanathan (2001) showed that in M/s. Bharat Heavy Electricals Limited (BHEL) supplied boilers; the fly ash erosion is the major concern for almost one third of total tube failures. The major factors influencing the erosion process are the amount of ash particles, its velocity and the design conditions. Finnie *et al.* (1967) developed analytical model to find the erosion rate based on the assumption that the mechanism of erosion was due to micro-cutting. Later it was demonstrated by Levy (1981) that the micro-cutting was not the primary mechanism by which ductile structural metal erode. They conducted experiments and concluded that for ductile material the impacting particles cause severe localized plastic strain, which exceed the strain of material and cause the failure of deformed material, and for brittle materials the energy possessed by erodent particles cause cracking and removal as micro size pieces. Levy (1981) also demonstrated that in ductile materials, erosion rate is lower when its ductility is increased. Misra and Finnie (1981) explained that the number of particles actually striking the surface do not increase the erosion rate in the same way as the number of particles traveling towards the specimen due to the shielding effect provided by the rebounding particles. Levy (1982) tested the same material of specification with different micro structures like fine pearlite and coarse pearlite having different elongation percentage, and found that the erosion rate is less for the material having higher elongation percentage.

Liebhard and Levy (1991) had highlighted that the erosion rates for change in particle size are difficult to explain quantitatively because a number of factors like particle velocity and kinetic energy, number of particles striking the target, interference between the striking and rebounding particles, shape of the particles and the angle of impact of particles are involved. Mbabazi *et al.* (2004) had conducted erosion test on mild steel plate with three different fly ash samples from Lethabo, Matimba and Matla power plants in South Africa at different fly ash velocities and found that experimentally calibrated general model which yielded results that

differed by less than 15% from the values measured experimentally. Oka *et al.* (2005a) had stated that material removal is caused by indentation process. It was found that degree of load relaxation depends upon the ability of plastic flow for soft materials. It was concluded that a predictive equation containing material hardness and load relaxation ratio which could be related to find experimental erosion damage data. Oka *et al.* (2005b) had expressed that the mechanical properties of the material can be regarded as the main parameter for estimating erosion damage. Desale *et al.* (2006) had expressed that the surface morphology of the specimen showed deep craters and higher value of average surface roughness for angular particles. Harsha *et al.* (2008) had conducted experiments for ferrous and nonferrous materials to find the erosion rate against the cumulative weight of impinging particles. It was observed that the erosion rate initially increases with increasing cumulative weight of impinging particles and then reaches a steady state value. Wang and Guoyang (2008) had demonstrated that for ductile materials the erosion is caused by the micro cutting and micro ploughing of the erodent particles. For brittle materials like ceramics, the energy transfers from erodent material to the specimen. This process induces the material deformation, crack initiation and propagation, and causes removal of material from the specimen surface. Kain *et al.* (2007) studied the failure of low carbon steel tubes considering the SA-210GrA-1 material.

Hutchings and Winter (1974) studied the mechanism of metal removal by impacting the metal targets at an oblique angle by metal balls at velocities up to 250 m/s. They suggested that the initial stage of metal removal is the formation of lip at the exit end of the crater by shearing of the surface layers. Above critical velocity, this lip is detached from the surface by the propagation of ruptures at the base of the lip.

Das *et al.* (2006) investigated the effect of temperature on the basis of the observation that the erosion rate at acute impingement angle increases significantly with temperature, suggesting that steel tends to show behaviour more typical of a ductile material at elevated temperatures. The yield stress (N/mm^2) and temperature (K) functionality has been derived through a polynomial approximation for various grades of steel on the basis of the available tensile property data. This model has been implemented in a user-interactive computer code (EROSIM-1) which embodies the solid particle erosion mechanism due to cutting wear and repeated plastic deformation. The overall erosion is estimated from the contributions of both the mechanisms of wear. Erosion behaviour at elevated temperatures has been incorporated through the derived functionality of the tensile property (yield stress) with temperature using appropriate modification of yield strength.

Sundararajan and Shewmon (1983) had proposed a correlation between the erosion rate and the thermo-physical properties of the target, for the erosion of metals by particles at normal incidence. This model employed a criterion of critical plastic strain to determine when the material will be removed. Their erosion model (localized model) predicted very well the experimentally observed erosion rates rather than the fatigue-type model.

Jennings *et al.* (1976) have derived mathematical models based on target melting and kinetic energy transfer for predicting ductile target erosion. Dimensional analysis was employed in the development of a mathematical model for predicting the erosion of ductile

materials. The basis of the model was an identified erosion mechanism (target melting) and the model was verified in an erosion testing program using three stainless steels, two aluminium alloys, a beryllium copper alloy and a titanium alloy; the erosive agents were three dusts with hard angular particles and one dust with spherical particles.

Irma Hussainova *et al.* (1999) investigated the surface damage and material removal process during particle-wall collision of the solid particles and hard metal and cermets targets. Targets were impacted with particles over the range of impact velocities (7-50 m/s) at impact angle of 67°. The experimentally observed variations of the coefficient of velocity restitution as a function of the test material properties, impact velocity and hardness ratio were adequately explained by a theoretical model presented by them.

Levy and Foley (1983) studied the erosion behavior of different steel like a plain carbon steel (AISI-SAE 1020), an austenitic stainless steel (type 304) and a low alloy steel (AISI-SAE 4340). The testing was conducted at room temperature using aluminum oxide particles with an average size of 140 microns in an air stream. An attempt was made to characterize the erosion behavior as it relates to the mechanical properties obtainable in these alloys by conventional heat treatments. It was found that the ductility of the steels had a significant effect on their erosion resistance which increased with increasing ductility and that hardness, strength, fracture toughness and impact strength had little effect on erosion behavior.

Oflynn *et al.* (2001) created a model to predict the solid particle erosion rate of metals and its assessment using heat-treated steels. The model proposed that erosion rate is related to the product of toughness and uniform strain. Two steels (EN 24 and EN 42) were heat treated to form a total of 12 different microstructures, each having distinctly different mechanical behavior. Erosion tests were carried out at a combination of three impact velocities and three angles of particle impingement in a rotating disc accelerator erosion tester. Tensile tests were carried out on all the heat-treated steels over a range of temperatures from room temperature to 400°C. The model predictions were not satisfied by mechanical property measurements made at room temperature. However, for each given erosion test condition, a good linear relationship was found between room temperature erosion rate and high strain rate (toughness x uniform strain) when mechanical properties were measured at elevated temperatures. The elevated temperature chosen to give the best-fit was between 200° and 300°C depending on the impact velocity. It is believed that the significance of the elevated temperature property measurements is that they account for localized heating occurring at the impacting particle during the high strain/strain-rate deformation typical of erosion. Certain heat-treatments gave a poorer fit to the relationship and explanations for this are proffered.

EXPERIMENTAL SET-UP

The experimental set-up used for the present study is an air jet erosion test rig. The schematic diagram and the photographic view of air jet erosion test rig are shown in Figure 2. It is owned by Research and Development Lab of M/s. BHEL, Tiruchirappalli, India. The test rig is manufactured as per ASTM G76 standard.

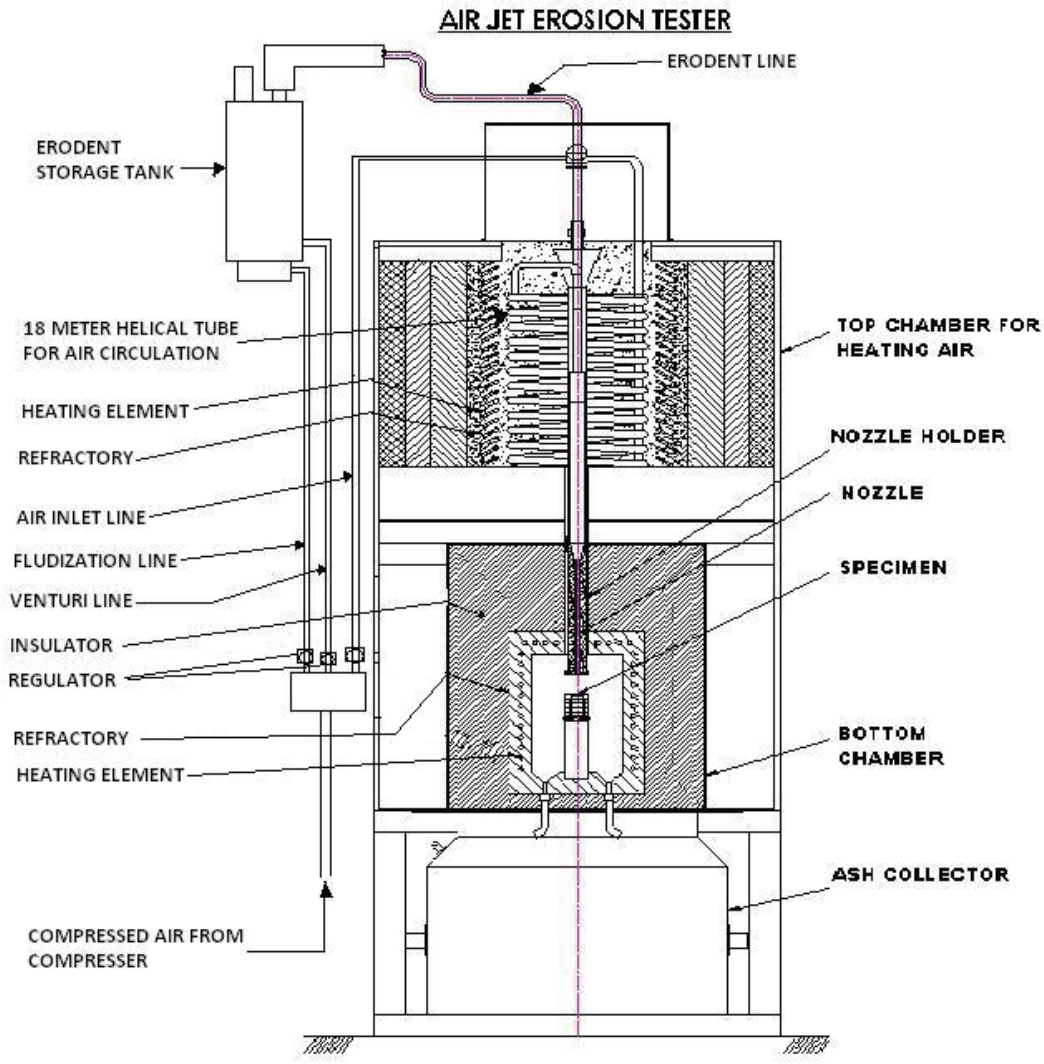


Figure 2: Schematic diagram of Air Jet Erosion Test Rig

EXPERIMENTAL PROCEDURE

In this study, tube samples of carbon steel tube material of SA-192 specification, currently in use for bank tubes in almost all power boilers are tested in required conditions at M/s. BHEL's laboratory (recognized by National Accreditation Board for testing and calibration of Laboratories). The tested mechanical properties of tubes of SA-192 materials are given in Tables. The test specimen was weighed initially and then it was fitted in the jet erosion test rig at a desired angle using specimen holders. The fly ash is taken in the chamber provided. The velocity and the concentration of fly ash particles are adjusted by controlling the flow

of air quantity through the fluidization chamber. A jet of air with the fly ash particles pass through a nozzle and hit the surface of the sample at an angle chosen to place the sample. After doing the experiment for a scheduled time, the sample is removed and it is cleaned and weighed to measure the weight loss. The amount of ash used is also measured. The erosion rate is computed as the ratio of loss of weight in grams of test specimen to kilogram of ash particles impinging on the test specimen surface. The erosive rate was evaluated at different impingement angles ranging from 15° to 90°, and at four different velocities of 32.5, 35, 37.5 and 40 m/s.

RESULTS AND DISCUSSION

Erosion Study On Bent-Tube With And Without Sub-Critical Annealing (Strain Hardened Tube)

The low carbon steel tubes having specification SA-192 has to be bent in cold condition during the fabrication of bank tubes. Ductility of tubes reduces during the bending operation. The thickness of the tube used is 4.5 mm. As per the ASME standard, Heat treatment is mandatory for low carbon steel tubes if thickness exceeds 19mm. The thickness limitation stipulated in the code is given by permitting the stresses produced to the level of the yield stress of the material and it does not take into account the erosion property. In current practice, heat treatment is not carried out for the fabricated bank tubes. By suitable heat treatment of the bent-tubes of the bank tubes, the lost ductility that occurs during the cold bending operation of the tube can be improved and thereby the erosion rate can be reduced. Erosion study is carried out for the bent -tube with sub- critical annealing SA-192 (SC) and for the bent-tube without sub-critical annealing SA- 192 (SH) (strain hardened tube).

Effect of Velocity, Impingement Angle, Feed Rate, Particles Size and Temperature of Fly Ash Particles on Tube Erosion

Figure 3 shows erosion rate at room temperature and at high temperature (400˚C) for bent-tube with sub- critical annealing SA-192 (SC) and without sub- critical annealing SA-192 (SH) (strain hardened tube) at different impingement velocities ranging from 32.5 m/s to 40 m/sec and at impingement angle of 30˚. The data for graphs are obtained after the steady state of the erosion rate is reached. Erosion rate for the bent- tube without sub- critical annealing (strain hardened tube) is higher than that of bent-tube with sub critical annealing for a given velocity attributing to ductility and percentage elongation of the materials.

In ductile materials, when fly ash particles impinge with a velocity, at the impact point the particle loses a fraction of its kinetic energy to the target material for deformation of the surface and shear strains are induced in the target material. When the shear strain exceeds the elastic limit of the target material, the fly ash particles penetrate the surface of the target material and form platelets, which are removed in the subsequent impingement of the particles. Fly ash particles have sufficient level of strength and integrity to cause erosion in the velocity range used in the experiment. It is the kinetic energy of the fly ash particle that has the greatest

effect on the erosion rate of the tubes. The kinetic energy of the fly ash particles is proportional to velocity, which causes increase in erosion rate when the velocity of the fly ash particles is increased. Being the ductility of the sub-critical annealed bent-tube is more, the plastic deformation is increased and hence the erosion rate is decreased. So the sub- critical annealed bent-tubes have less erosion rate.

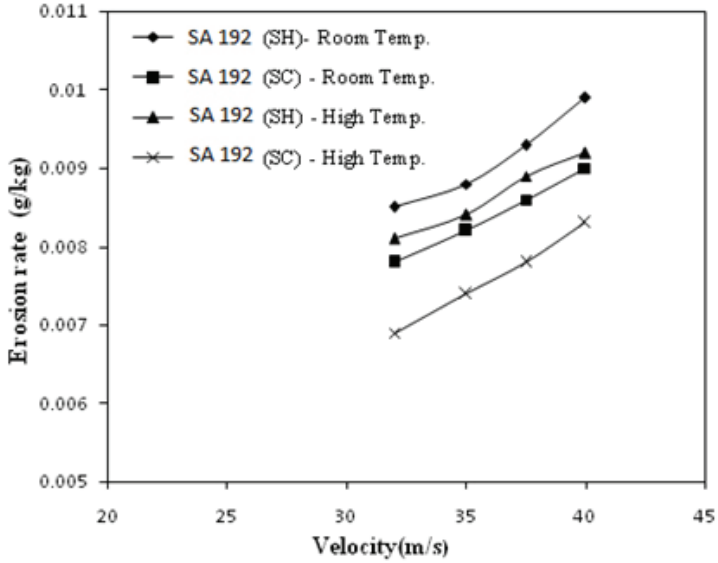


Figure 3: Effect of velocity of fly ash particles on tube erosion–SA-192 (SH&SC)

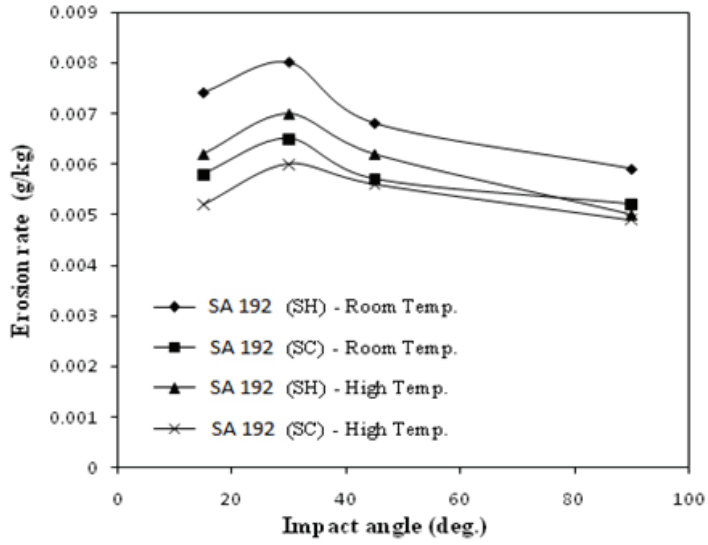


Figure 4: Effect of impingement angle on tube erosion SA-192(SH&SC)

Figure 4 shows the experimental results that are obtained by varying the impingement angles ranging from 15° to 90° at a velocity of 32.5 m/s at room temperature and at high temperature (400° C). The erosion rate increases with the increase in impingement angle initially then decreases with the increase in angle. At about an angle of 30°, the erosion rate is found to be maximum. This may be caused by the increase in depth of penetration of the fly ash particle in the target material when the impact angle is increased. When depth of penetration of the particle is increased, the plastic deformation in the target material is increased and thus the erosion rate is reduced. For the same fly ash particles and impingement angle, the erosion rate is mainly a function of target material properties.

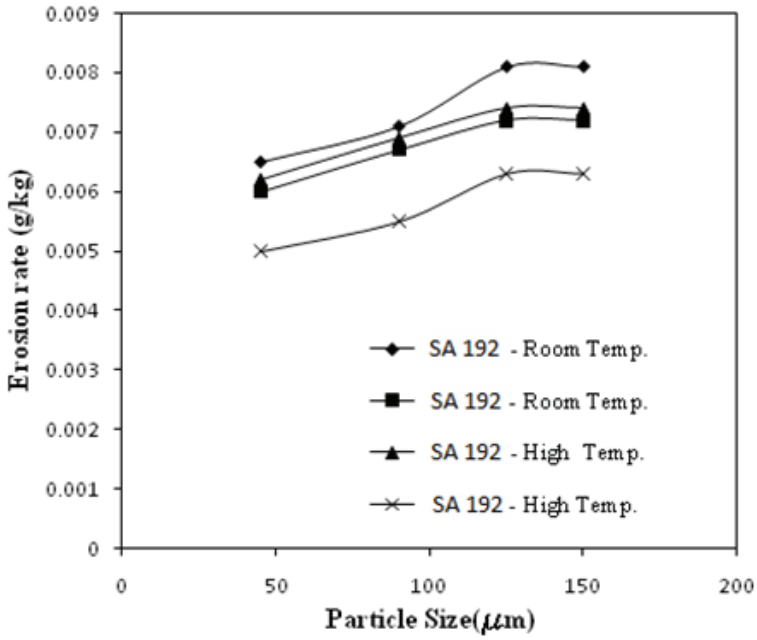


Figure 5: Effect of fly ash particles size on tube erosion SA-192 (SH&SC)

Figure 5 shows the erosion rate of the specimen for different particle size at room temperature and at high temperature (400° C) at a velocity of 32.5 m/s and at impingement angle of 30°. The erosion rate increases with the increase in particle size from 50 to 125 μm and beyond this size, there is no significant increase in erosion rate. More or less constant erosion rate with particle diameter above 125 μm is possible due to the combination of relation between the particle size, the number of particles striking the surface, its kinetic energy and the interference between incoming and rebounding particles. For particle sizes below 125 μm, the kinetic energy of the particles has to be low to be as effective in removing material as 125 μm size particles or more. When size of the particles are increased, the number of the particles actually striking the surface do not proportionally increase due to the shielding effect provided by the rebounding particles.

Figures 3, 4 and 5 also show that at high temperatures (400°C), the erosion rate is decreased for both the conditions of the tube SA-192. This is due to the increase in ductility of the tube material SA-192 when temperature is increased.

Experiments are also conducted with four different feed rates of fly ash particles (2, 4, 6, and 8 g/min) with the constant velocity of 32.5 m/s and impingement angle of 30°. The results are shown in Figure 6. In this experiment, the weight loss of the specimen is not calculated for per kg weight of fly ash particles as in previous experiments. Erosion rate decreases for the increase in feed rate of the fly ash particles. At higher feed rate of fly ash particles, there is particle-to-particle interference which reduces the effectiveness of the particle to erode the surface. Due to the particle-to-particle interference, the kinetic energy of the incoming particles gets reduced and there is a chance for some of the fly ash particles to get deflected by the rebounding particles from target. Figures 3, 4,5 and 6 shows that the erosion rate is less for the bent-tube with sub- critical annealing.

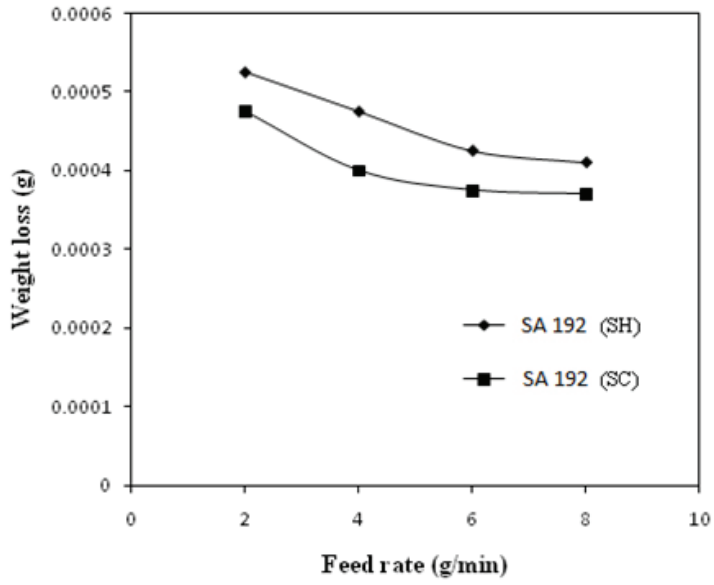
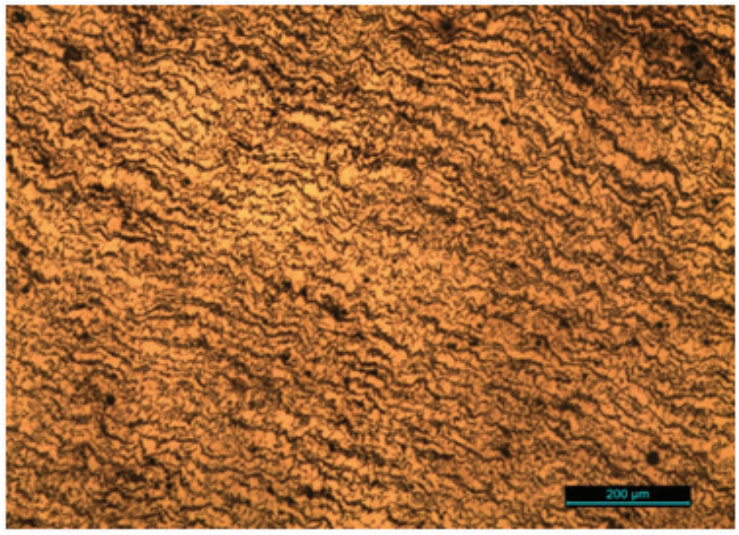


Figure 6: Effect of feed rate of fly ash particles on tube erosion SA-192 (SH&SC)

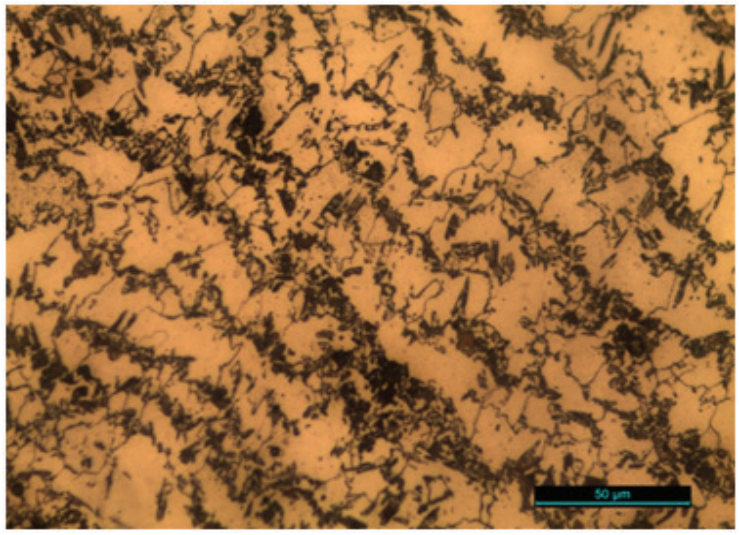
Microscopic Examination of Bent-tube with and without subcritical annealing

The samples of bent-tube without sub- critical annealing (strain hardened tube) and sub-critical annealed bent-tube are studied under microscope. The cross-sections of these samples are mounted, polished to diamond finish and etched in a 2% nital solution. The etched samples are examined under the microscope and the images are shown in Figures 7 & 8. Figure 7 shows the microscopic image of the bent-tube without sub- critical annealing (strain hardened tube). Cold working like bending results in strained and deformed crystal grains in bank tubes. The grains are elongated and hence deviate from the most stable equiaxial grains. On sub-critical

annealing of bent strain hardened tube, recrystallisation forces come into play and elongated grains become equiaxial grains and regain its lost ductility to some extent. Figure 8 shows the structure of the tube after recrystallisation.

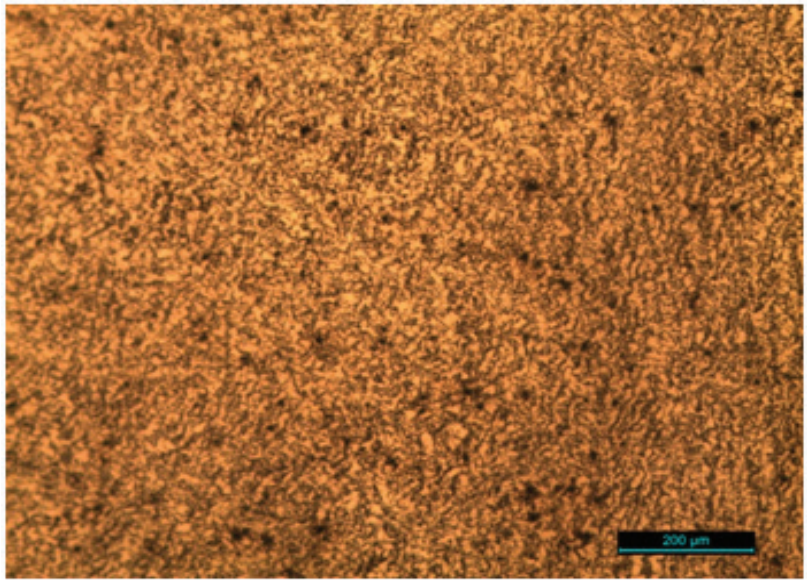


SA192 AT 100X ELONGATED GRAINS

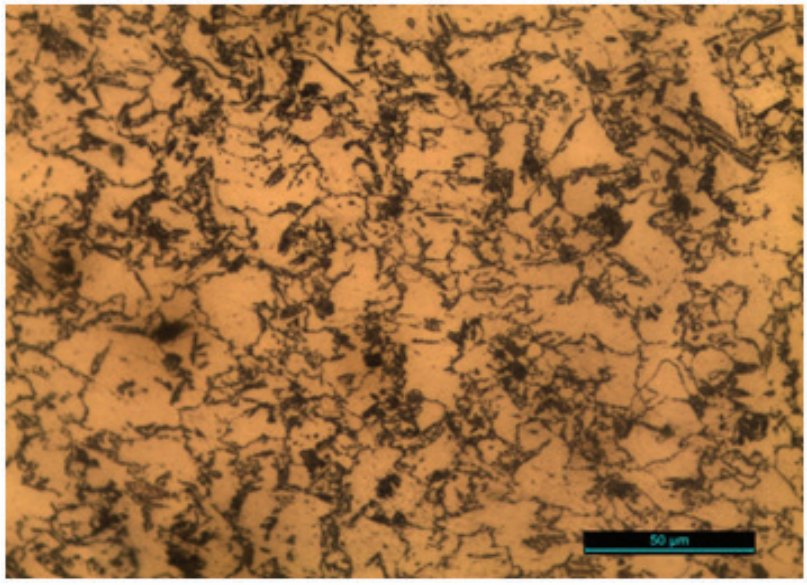


SA192 @ 500X ELONGATED GRAINS

Figure 7: Microscopic images of the bent-tube without sub- critical annealing (strain hardened tube)



SA192 AT 100X ELONGATED GRAINS



SA192 AT 500X EQUIAXED GRAINS

Figure 8: Microscopic images of the bent-tube with sub- critical annealing

Effect of Erosion Rate on Bent Tube with Sub-Critical Annealing

The erosion is greater in case of bent strain hardened tube. As the tube is bent, the ductility of the tube is lost due to the plastic deformation and the tube is strain hardened. Sub-critical annealing of the bent strain hardened tube (the tube is heated to 700° C i.e., just below its lower critical temperature and soaked there for half an hour and then cooled up to 400° C in furnace), allows work hardened grains in as-bent tube to re-crystallize and makes the tube to regain its lost ductility to some extent. As ductility is higher in sub-critical annealed bent- tube when compared to the bent-tube without sub-critical annealing (strain hardened tube), the erosion rate is less in sub-critical annealed bent-tube.

Scanning Electron Microscope Examination of Bent-tube

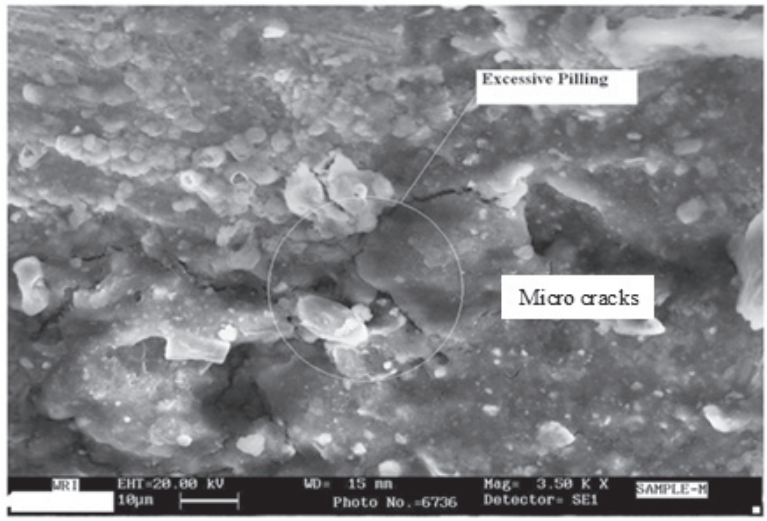


Fig.9: SEM images of the eroded specimen of the bent-tube

The sample is cut from the eroded area of the bent-tube. The sample is mounted, polished to diamond finish and etched in a 2% nital solution. The etched sample is examined under the Scanning electron microscope and the image is shown in Figure 9. The SEM image of the eroded area shows micro cracks which indicate the predominance of micro cutting wear mechanism in bent-tube as it become less ductile after the bending operation.

CONCLUSIONS

The following are the conclusions drawn from the present investigation:

- The selected low carbon steel tube conforming to ASME SA-192 is tested for mechanical properties like tensile strength, yield strength and percentage of elongation for all the selected heat treatment conditions in M/s. BHEL's Mechanical Test lab and found that the mechanical test results are in conformance with the values specified in ASME.

- The erosion rate of bent tube with sub- critical annealing is less compared to the bent tube without sub- critical annealing.
- The erosion rate of the tube decreases due to the predominance of platelet mechanism of erosion over micro cutting mechanism of erosion when ductility/percentage of elongation of the tube is increased.
- The study also confirmed that when the velocity of the fly ash particles is increased, the erosion rate also increases. When impingement angle of fly ash particles on the target is increased from 15° to 90°, the erosion rate is maximum at 30° and then decreases.
- The erosion rate increases with an increase in the fly ash particle size up to 125 μm and beyond that size there is no increase in erosion rate.
- The erosion rate is decreased at high temperature (400° C) due to the increase in ductility of the material at high temperature.

Thus, the paper indicates that by adopting heat treatment process mentioned above during fabrication, the ductility of SA-192 tube can be increased and thereby, the erosion rate can be decreased in bank tubes of bi-drum boilers.

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Chemistry

A POLY (VINYL CHLORIDE) BASED MEMBRANE ELECTRODE FOR THE SELECTIVE DETERMINATION OF ZR(IV)

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ABSTRACT

A new Schiff base chelating ligand 1-(1H-indol-1-yl)-N-(thiophen-2-ylmethyl) ethanimine have been synthesized and used as electroactive material for the selective determination of Zr(IV). The membrane electrode has a wide linear concentration range of 2.0 x 10^{-8} M to 1.0 x 10^{-1}M with a fast response time of about 5s and cloud be used in a pH range of 3.5 -7.6 without divergence in response characters. The membrane electrode was used for the determination of Zr(IV) in various samples and the values were also compared with those obtained by AAS and ICP-MS.

Keywords: Chelating ligand, ion-selective electrode , potentiometry, Schiff base, Zirconium.

INTRODUCTION

Ion-selective electrodes are the devices used for the selective determination of various ionic species in solutions. The sensing surface of these electrodes is comprised of a homogenous polymeric matrix containing an organic ion-exchanger selective to a particular ion. The organic ion-exchanger containing sufficient lipophilic groups acts as sensing material of the membrane. This sensing material exchanges only one type of ion between the two phases and generates a potential difference between the phases. Thus the use of highly sensitive ion-exchanger makes these devices a good analytical method for the determination of target ion in presence of other interfering ions [1-9].

Zirconium is used to make special parts of chemical apparatus, such as extrusion jets, nozzles, pumps, stirrers, pipes, evaporators and heat exchangers. It is also used in nuclear

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applications since it does not readily absorb neutrons [10, 11]. Due to these applications the selective determination of zirconium is important and is a matter of scientific significance. Therefore, the main objective of current research is to find and develop a suitable ion-selective electrode based on polymeric membrane for the determination of Zr(IV) ion on an industrial scale.

EXPERIMENTAL SECTION:

Material and apparatus used

The reagents *viz.,* N-acetylindol, 1-(thiophen-2-yl)methanamine and tetrahydrofuran (THF) were bought from Sigma-Aldrich and were used without further purification. Acetone, ethanol, dioctylphthalate (DOP), tris(2-ethylhexyl)phosphate (TEP), dioctylsebacate (DOS), oleic acid (OA), sodium tetraphenyl borate (NaTPB) and polyvinyl chloride (PVC) were obtained from SD-Fine Chem. Limited (Mumbai, India). All metal nitrates were bought from Sisco Research Lab (Mumbai, India) and the stock solution of metal nitrates was obtained by dissolving weighed amounts of corresponding salt in double distilled water. Double distilled water was used throughout the investigation.

All potentiometric measurements were made at 25±1º C with a digital potentiometer manufactured at ECIL, Hyderabad, India (Model pH 5662) using Zr(IV) selective membrane electrode in conjunction with double junction Ag/AgCl reference electrode.

Synthesis of chelating ligand

The chelating ligand 1-(1*H*-indol-1-yl)-*N*-(thiophen-2-ylmethyl)ethanimine(L) was synthesized by condensation reaction of N-acetylindole and 1-(thiophen-2yl) methanamine as follows (Scheme -1) [12].

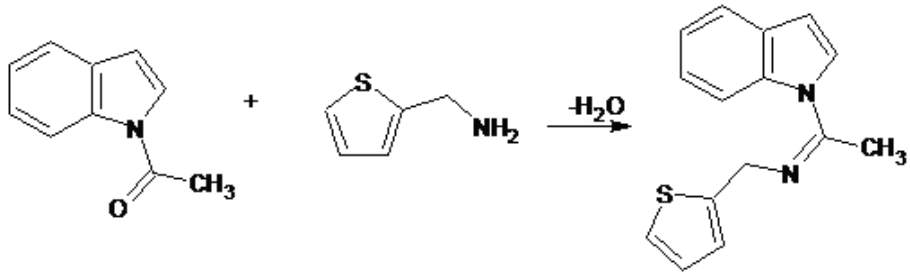
A solution of N-acetylindole (1.50 mmol in 20 mL THF) was vigorously stirred with 1-(thiophen-2yl)methanamine (1.75 mmol in 20 mL THF) at 30ºC to get a yellow crystalline solid. The solid was filtered off and washed with water to remove impurities or unused chemicals associated with the ligand. The crystalline substance then re-crystallized by absolute ethanol and acetone solution (2:1, v/v) in Erlenmeyer flask. The H-NMR and C-NMR studies of the compound were carried out to prove the structure of the compound.

The analytical and physical data of the ligand are given below:

Molecular formula: $C_{15}H_{14}N_2S$, Yield: 72%.

Analysis: **^{1}H-NMR** ($CDCl_3$, ppm): $\delta =$ 8.32 (d, 2H, ArH), 7.86 (d, 2H, ArH),7.68 (t, 1H, ArH), 7.43(d, 1H, , ArH), 7.36 (d, 1H, ArH), 7.21(d, 1H, OH), 7.14 (t, 1H, ArH), 4.62 (s, 2H, N-CH_2Ar),1.46 (s,4H, -CH_3).

^{13}C NMR (CD_3CN, ppm): δ = (12 C aromatic); 182.40, 182.32, 181.28, 181.13, 179.67, 179.14, 178.60, 178.46, 177.38, 177.12, 176.10, 175.65.(3 C aliphatic); 85.5, 36.68, 28.45.



1-(1H-indol-1-yl)-N-(thiophen-2-ylmethyl) ethanamine (L)

Scheme 1

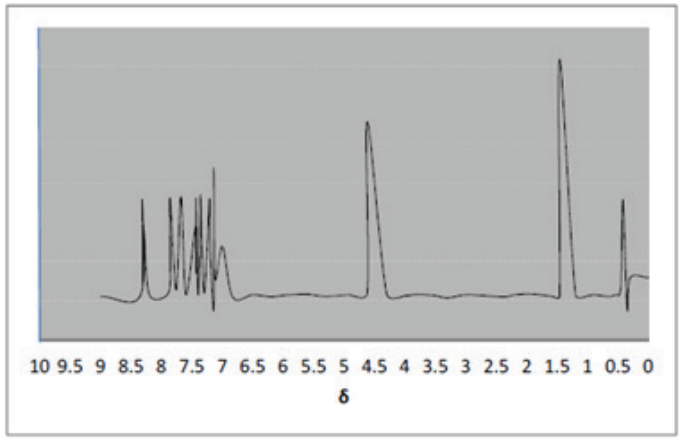


Figure 1: ^{1}H-NMR Spectra of ligand

Calculation of formation constant

The stability of complex of ligand with different metal ion was calculated with the help of formation constant (K_f) of complexation kinetics of ligand and metal ions, by using molar conductance ratio (Equation 1 and 2) in acetone solution at 25 ± 2^{0}C. The complex formation constants, K_f, and the molar conductance of complex, Λ_{obs}, were obtained by using a nonlinear least squares program KINFIT [13].

$$K_f = \frac{[M^+]}{[M^+]\ [L]} \times \frac{(\Lambda_M - \Lambda_{obs})}{(\Lambda_{obs} - \Lambda_M)\ [L]} \qquad (1)$$

where

$$[L] = C_L - \frac{C_M(\Lambda_M - \Lambda_{obs})}{(\Lambda_M - \Lambda_{M\,L})} \qquad (2)$$

where, Λ_M= the molar conductance of the cation before addition of ligand.

Λ_{ML}= the molar conductance of the complex.

Λ_{obs}= the molar conductance of the solution during titration

C_L= the analytical concentration of the ionophore added, and C_M the analytical concentration of the cation.

The data presented in the Table 1 indicates that the chelating ligand 1-(1*H*-indol-1-yl)-*N*-(thiophen-2-ylmethyl)ethanimine (L) forms most stable complex with Zr(IV) as compared to other tested cations. Therefore the said ligand could be used for the selective determination of Zr(IV) .

Table 1: Formation constants of Ligands (L) metal complexation

Metal ions	**Formation constants (log K_f)**
	(L_1)
Zr(IV)	4.20
Hf(IV)	3.42
La(III)	2.85
Ce(III)	2.68
Pr(III)	2.65
Nd(III)	2.62
Sm(III)	2.59
Eu(III)	2.59
Gd(III)	2.57
Tb(III)	2.56
Dy(III)	2.53
Y(III)	2.0
Nb(III)	2.3
Ti(III)	2.2
Al(III)	2.2
Li(I)	2.13
Na(I)	2.10

Fabrication of electrodes

The polymeric membrane of the chelating ligand has been fabricated as suggested by Craggs et. al. [14]. The PVC-based membranes of various compositions have been prepared by dissolving appropriate amounts of ligand (L), anionic additive NaTPB, plasticizers i.e. DOP, TEP, DOS, OA and PVC powder in 15 mL THF. The components were added in terms of weight percentage. The components were carefully stirred to obtain a homogenous mixture. The mixture then poured into a flat petri dish kept for 24 hours to evaporate the solvent (THF). The Membranes of 0.5 mm diameter were removed carefully from the glass plate and glued to the one end of the "Pyrex" glass tube with araldite. A saturated silver electrode was inserted in the tube for electrical contact and another saturated silver electrode was used as an external reference electrode.

The EMF measurements were carried out with the cell assembly given below:

Internal reference Silver electrode	**Internal reference solution (0.01 M Zr(IV))**	**Zr(IV) ion Selective Membrane**	**Test Solution**	**External Reference Silver electrode**

RESULTS AND DISCUSSION:

Optimization of membrane composition

The response mechanism of membrane electrode is highly dependent on nature and composition of additional membrane components [15]. To find the optimum composition of membrane, the membranes of different compositions were prepared and their response characters were investigated. The data presented in Table 2 indicated that the membrane with composition of L : NaTPB: Plasticizer: PVC of 4: 2: 57: 37 (w/w, %) gives the best possible response in terms of linear concentration range, detection limit, response time, and life time.

Table 2: Composition of the different membranes of Zr(IV) selective electrode

E. No.	Membrane Composition (%, w/w)				Linear working range (M)[a]	Slope (mV/dec. of activity)[a]	Response Time (sec)
	PVC	Additive	Plasticizer	Ionophore			
1	37	2, NaTPB	57, DOP	4, (L)	2×10^{-8} - 1×10^{-1}	59.40 ± 0.3	08
2	37	2, NaTPB	57, TEP	4, (L)	6×10^{-6} - 1×10^{-1}	48.80 ± 0.3	16
3	37	2, NaTPB	57, DOS	4, (L)	5×10^{-5} - 1×10^{-1}	54.28 ± 0.3	20
4	36	2, NaTPB	57, OA	4, (L)	3×10^{-5} - 1×10^{-1}	53.46 ± 0.3	18
5	37	6, NaTPB	57, DOS	0	2×10^{-2} - 1×10^{-1}	19.40 ± 0.3	26
6	37	2, NaTPB	57, DOS	5, (L)	3×10^{-8} - 1×10^{-1}	59.10 ± 0.3	08
7	35	2, NaTPB	59, DOS	4, (L)	2.5×10^{-8} - 1×10^{-1}	59.30 ± 0.3	08

The membrane without ionophore responds to a very small extent towards Zr(IV). This is probably due to reaction of either anionic additive or plasticizer with metal ion. However the membrane with composition of ionophore : NaTPB: DOS : PVC of 4: 2: 57: 37 (w/w, %) has a lower detection limit of 1.0×10^{-8} M in a linear concentration range of $2.0 \times 10^{-8} - 1.0 \times 10^{-1}$ M for Zr(IV) ion (Figure 2). The amount of ionophore with more than 4% (w/w) does not significantly affect the response characters of the membrane electrode. The anionic additive as membrane components significantly affects the response mechanism because it diminish the ohmic resistant at solution membrane interface. The 2% (w/w) anionic additive is sufficient for the best response of the membrane electrode. More than 2% of anionic additive is not suitable since anionic additive as membrane component may compete with the ionophore during the complexation reaction.

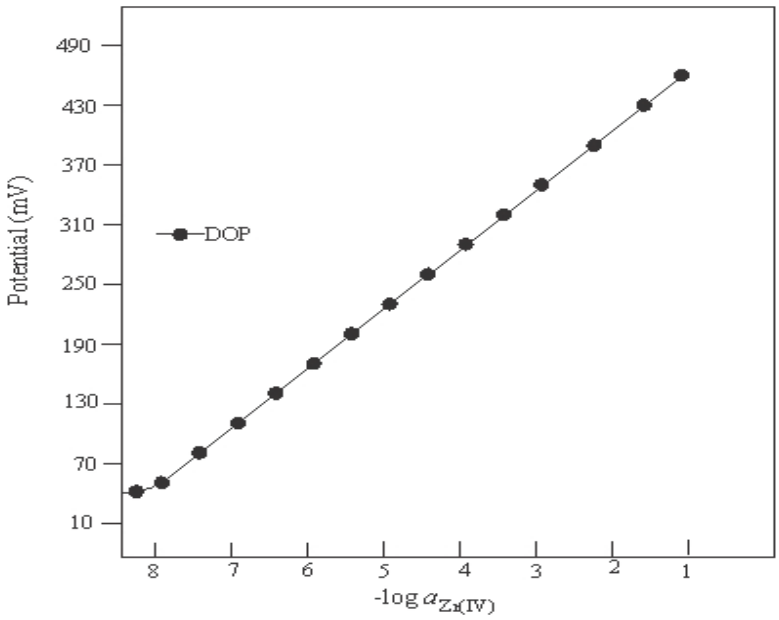


Figure 2: Calibration curve of Electrode No. 1

Potentiometric selectivity of Zr(IV) selective electrodes

The practical utility of membrane electrode was investigated in terms of selectivity coefficient (log $K^{POT}_{Zr^{4+},M^{n+}}$). The selectivity coefficients were calculated by fixed interference method by using modified Nikolsky equation (Eq. 3) [16, 17].

$$K^{POT}_{Zr^{4+},M^{n+}} = \frac{a_{Zr^{4+}}}{a^{z_{Zr^{4+}}/z_{M^{n+}}}_{M^{n+}}} \quad (3)$$

Where $a_{Zr}{}^{4+}$ is the activity of the primary ion and a $_{M}{}^{n+}$ is the activity of other metal ions $^{z}{}_{Zr}{}^{4+}$and $^{z}{}_{M}{}^{n+}$ are their respective charges.

The selectivity coefficients were calculated for fixed concentration of Zr(IV) (0.001 M) and varying concentration of interfering ions. The selectivity coefficient values presented in Table 3 indicates that the presence of interfering ions does not have any effect on response characters of membrane Electrode No. 1.

Table 3: Selectivity coefficient calculated by FIM method

Metal ions	**Selectivity Coefficient,** $\left[\log K^{Pot}_{Nd^{3+},M^{n+}}\right]$
	Electrode No. 1
Hf(IV)	2.21
La(III)	3.42
Ce(III)	3.41
Pr(III)	3.23
Nd(III)	3.40
Sm(III)	3.32
Eu(III)	3.62
Gd(III)	3.32
Tb(III)	3.30
Dy(III)	3.30
Y(III)	3.37
Nb(III)	3.12
Ti(III)	3.40
Al(III)	3.60
Li(I)	3.82
Na(I)	2.78

Effect of pH and static response time

The presence of hydrogen ion or hydroxide ion in the solution may affect the binding ability of the ligand as well as the solubility of metal ion. Thus the effect of pH on the response characters of the electrode assembly was investigated in the range of 0 – 9.0. It was observed that the potential response of membrane electrode remains same in the pH range of 1.5 – 7.6. Thus this pH range was taken as the optimum pH range of the electrode assembly. The significant potential drift was observed at pH less than 1.5 and at pH more than 7.6, due to interference caused by H^+ and OH^- respectively. The pH of the test solution was adjusted by adding HCl (0.01M) and NaOH solution (0.01M).

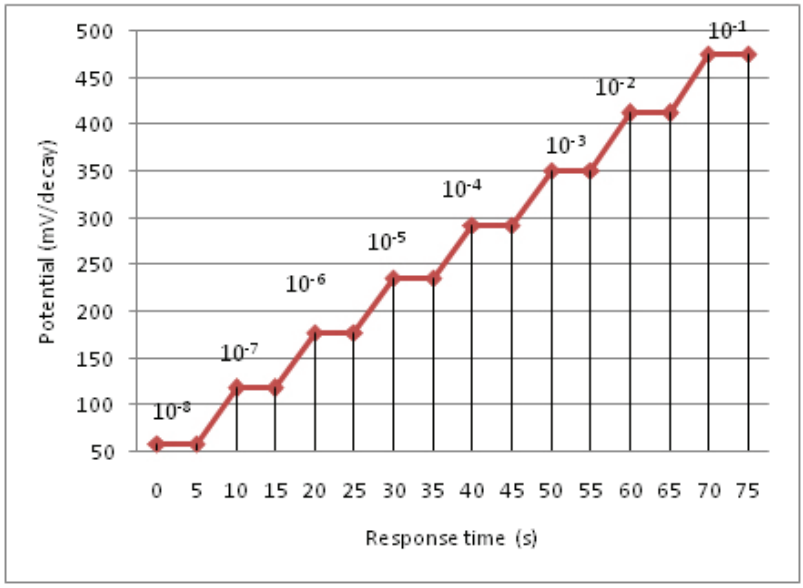


Figure 3: Response time of membrane Electrode No. 1

The time at which membrane electrode reached the optimum potential is called response time of the electrode assembly. In the present study, the response time of the electrode no. 1 was calculated for different concentration sequences i.e. from lower to higher and then higher to lower. It was observed that average response time for both the sequences was 5 second. However the response time for higher concentration is slightly more than lower concentration (Fig. 3).

Life time

The lipophilic nature of ionophore and plasticizer ensure a longer life time of membrane electrode. In present study, the life time of membrane electrode was calculated in terms of slope of calibration curve and lower detection limit. The data presented in Table 4 indicates that the slope and lower detection limit of membrane Electrode No. 1 remains almost same for a period of 8 weeks. After this time period, the ionophore and plasticizers leached out significantly from the membrane, thus the significant variation of slope and detection limit was observed. The response characters proposed electrode was also compared with the previously reported electrode and the data are summarized in Table 4.

Table 4: The lifetime of Zr(IV) membrane Electrode No. 1

S. No.	Week	Slope (mV/decade)	Detection Limit (mol/L)
1	First	59.40 ± 0.3	1.0×10^{-8}
2	Third	59.4 ± 0.3	1.0×10^{-8}
3	Fifth	59.32 ± 0.3	1.0×10^{-8}
4	Sixth	59.00 ± 0.3	1.1×10^{-8}
5	Seventh	58.85 ± 0.3	1.2×10^{-8}
6	Eighth	58.79 ± 0.3	1.2×10^{-8}
7	Ninth	47.08 ± 0.3	5.6×10^{-6}
8	Tenth	35.57 ± 0.3	1.3×10^{-5}

Table 5: Comparative analysis of proposed Electrode No. 1 with the reported Electrode

Ionophore	Working Conc. range (M)	Slope (mV/decade of activity)	pH range	Response time (sec)	Detection limit (M)	Ref
1-(1*H*-indol-1-yl)-*N*-(thiophen-2-ylmethyl)ethanimine	2×10^{-8}-1.0×10^{-2}	59.40 ± 0.3	3.5 – 7.4	5	1.0×10^{-8}	This work
bis (diphenylphosphino) ferrocene	$1.0 \times 1\ 0^{-7}$ -1.0×10^{-1}	59.70 ± 0.3	4.15-7.8	-	1.8×10^{-8}	11

ANALYTICAL APPLICATIONS

The practical utility of membrane Electrode No. 1 has been investigated by its use for the determination of Zr(IV) in some alloy, tap water and waste water samples. The obtained values are in good agreement with the values obtained by AAS and ICP-MS (Table 6). The test sample of metal alloy was prepared by dissolving metal alloy in concentrated nitric acid. All the measurements were carried at constant pH (4.8) of test solution. The pH of test solution was adjusted by adding nitric acid (0.01 M) solution.

Table 6: Comparision of Test Results

Sample	Proposed Electrode (ppm)	AAS (ppm)	ICP-MS (ppm)
Alloy sample	0.053	0.053	0.054
Tape water	0.018	0.017	0.017
Industrial waste water (Ghaziabad)	0.026	0.025	0.026

CONCLUSION

1-(1*H*-indol-1-yl)-*N*-(thiophen-2-ylmethyl)ethanimine was used as electroactive material for the selective determination of Zr(IV) in various samples. The electrode with the composition (w/w) of ionophore: NaTPB: DOS: PVC of 4%: 2%: 57%: 37% has a lower detection limit of 1.0×10^{-8} M in a linear concentration range of $2.0 \times 10^{-8} – 1.0 \times 10^{-1}$ M with slope of calibration curve of 59.40 mV/decay of activity. The proposed Electrode No. 1 has a fast response time of 5s and could be used in a pH range of 3.5 – 7.6 for a period of 8 weeks.

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Chemistry

A DYNAMIC NICKEL SELECTIVE POLY(VINYL CHLORIDE) MEMBRANE BASED ON N-(4-(2-THIENYL)-1,3-THIAZOL-2-YL) THIOUREA AS IONOPHORE

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D.S.Tyagi**

ABSTRACT

In the present study, N-(4-(2-thienyl)-1,3-thiazol-2-yl)thiourea (ionophore) has been used as an ionic carrier for the fabrication of Ni(II) selective poly(vinyl chloride) membrane electrode. The electrode based on bis-(2-ethylhexyl) sebacate(BEHS) used as plasticizer was found to be the best over other tested plasticizers. The electrode has a wide linear concentration range of 4.0 x 10^{-8} – 1.0 x 10^{-1} M, fast response time (5s) and wide pH range (2.7 – 8.8). The electrode was successfully used as an indicator electrode for the titration of Ni(II) ion solution with standard EDTA solution.

Keywords: Ion-selective electrode, ionophore, Nickel, potentiometry.

INTRODUCTION

Nickel is essential for human beings and many other organisms. It appears to be involved in carbohydrate metabolism. However, the higher concentration can be toxic for various organisms and plants. Nickel is found in coffee, meat, tea, nuts, even in Coca Cola. Nickel is also used as catalyst in various chemical processes. Therefore determination of nickel is very important particularly in the field of medical, environmental and food industry [1-5].

Ion-selective electrodes based on neutral ionophores are the good analytical tools for the selective determination of ions in various samples since they measure the activity instead of concentration [6,7]. There are few nickel selective electrodes available in the literature, most of them have narrow linear concentration range and higher detection limit or slow response

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mechanism. The main objective of this study is to construct the nickel selective electrode with better response characters. In this research, N-(4-(2-thienyl)-1,3-thiazol-2-yl) thiourea has been used as ionophore for selective determination of nickel. The selectivity of the electrode towards Ni(II) ion over other tested cations was calculated by matched potential method (MPM).

EXPERIMENTAL

Reagents

Reagent grade dimethyl phthalate (DMP), di-isobutyl phthalate (DBP), dioctyl phthalate (DOP), bis-(2-ethylhexyl) sebacate (BEHS) high-molecular weight polyvinylchloride (PVC), tetrahydrofuran (THF) and sodium tetraphenyl borate (NaTPB) were obtained from Sigma-Aldrich (Munich, Germany). The chloride and nitrate salts of cations used were purchased from Merck and Aldrich. All solutions were prepared using doubly distilled de-ionized water.

Ionophore

The heterocyclic compound N-(4-(2-thienyl)-1,3-thiazol-2-yl)thiourea contains strong electron donating atoms and is soluble in water. So, it may bind the metal ions in the solution to form chelates. N-(4-(2-thienyl)-1,3-thiazol-2-yl)thiourea was used as an ionophore for the construction of Ni(II) selective polymeric membrane electrode. The ionophore (Figure 1) was bought from Sigma-Aldrich and used without further purification.

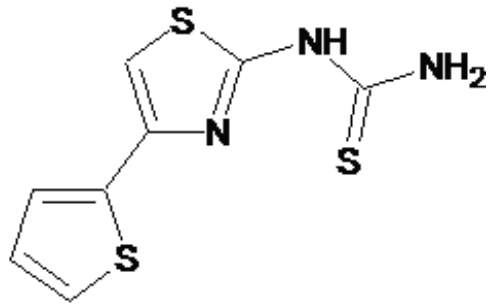

Figure 1: N-(4-(2-thienyl)-1, 3-thiazol-2-yl)thiourea (ionophore)

Preparation of membrane.

The polymeric membrane of ionophore with other membrane components was prepared by reported method [8, 9].The membrane components i.e. ionophore, anionic additive (NaTPB), plasticizers (i.e. DMP, DBP, DOS and BEHS) and PVC powder were dissolved in 5 ml tetrahydrofuran (THF). The solution was mixed well. The resulting mixture was transferred into a glass dish of 5 cm diameter, and the solvent was evaporated slowly until the concentrated mixture was left. A Pyrex glass tube was then dipped into the mixture for about 10s, in order to

achieve a transparent membrane. In the end, the tube was removed from the solution and kept at room temperature for 12h.Later,it was filled with an internal filling solution (1.0×10^{-3} M). The electrode was conditioned for 24h by soaking it in a 1.0×10^{-3} M Ni(II) solution.

All EMF measurements were carried out with the following assembly:

Ag–AgCl 1.0×10^{-3} M Ni(II) | PVC membrane: test solution| Ag - AgCl, KCl (satd).

RESULTS AND DISCUSSION

The composition of membrane electrode is very important to get the optimum response characters. Therefore membranes of various compositions and plasticizers were prepared and their response characters were investigated [10, 11].After several experiments it was observed that the membrane electrode based on N-(4-(2-thienyl)-1,3-thiazol-2-yl)thiourea as ionophore shows the best sensitive response for Ni(II) over other tested cations. This is likely due to quick exchange kinetics between ionophore and Ni(II) ion.

The plasticizer as membrane component plays a significant role in influencing the selectivity and sensitivity of membrane electrode. Therefore the effects of various plasticizers were investigated and the results are summarized in Table 1.

Table 1: Optimization of the membrane ingredients

Sensor No.	Composition (wt %)					Slope (mV/ decade)
	PVC	Plasticizer	NaTPB	Iono-phore	Concentration range (M)	
1	31	DMP, 66	1	2	6.0×10^{-5}-1.0×10^{-1}	24.3 ± 0.3
2	31	DBP, 66	1	2	2.0×10^{-5}-1.0×10^{-1}	24.4 ± 0.5
3	31	DOP, 66	1	2	1.0×10^{-6}-1.0×10^{-1}	25.6 ± 0.3
4	31	BEHS, 66	1	2	4.0×10^{-8}-1.0×10^{-1}	30.2 ± 0.4
5	30	BEHS, 68	0	2	8.0×10^{-8}-1.0×10^{-1}	15.6 ± 0.2
6	30.5	BEHS, 67	0.5	2	6.2×10^{-8}-1.0×10^{-1}	29.8 ± 0.5
7	31	BEHS, 65	2	2	1.0×10^{-7}-1.0×10^{-1}	28.7 ± 0.4
8	30	BEHS, 67	1	2	4.0×10^{-8}-1.0×10^{-1}	30.2 ± 0.4

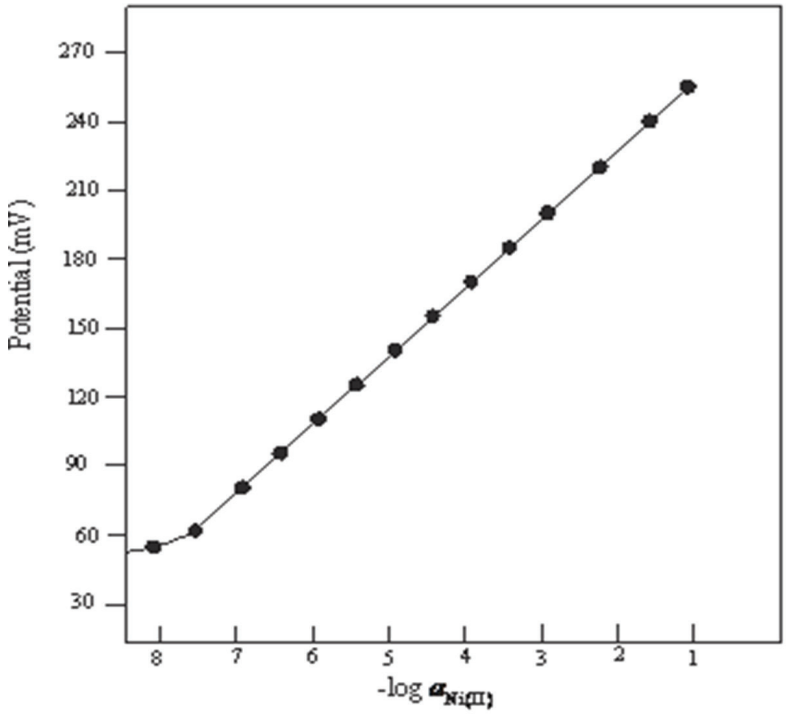

Figure 2: Calibration curve for Electrode No. 4

The background potential of membrane electrode was investigated in terms of potential response of membrane without ionophore. The electrode without ionophore (No. 5) does not have significant response towards tested ion. The presence of plasticizer provides the suitable environment for the complexation of ligand with metal ions. The Electrodes (No. 1 and 2) based on DMP and DBP as plasticizer have a linear concentration range of the order of 1.0 x 10^{-5} – 1.0 x 10^{-1}M, while Electrode No. 3 based on DOP as plasticizer was found to work satisfactorily in the concentration range of 1.0 x 10^{-6} – 1.0 x 10^{-1} M. However, the membranes with the composition of 31% PVC, 2% ionophore, 1% NaTPB and 66% BEHS exhibit a Nernstian potential response in the linear concentration range of 4.0 x 10^{-8} – 1.0 x 10^{-1}M for Ni(II) ion. The Electrode No. 4 has a lower detection limit of 1.0 x 10^{-8} M for Ni(II) ion. The presence of 1% anionic additive (NaTPB) was found suitable for the smooth functioning of the membrane electrode. The lipohilic anionic additive was used to decrease the interference caused by anions. The amount of anionic additive more than 1% interferes in the functioning of membrane electrode due to competition kinetics of additive and ionophore.

The effect of pH on response characters was investigated in the range of 0 – 12. It was observed that the potential of membrane electrode remains same in a pH range of 2.7 – 8.8. Thus, the presence of hydrogen ion or hydroxyl ion does not interfere in the complexation kinetics of ionophore with Ni(II) ion within this range(Figure 3). However significant potential drift was observed beyond this pH range. Thus the Electrode No. 4 can be successfully used for the determination of Ni(II) ion in a pH range of 2.7 – 8.8.

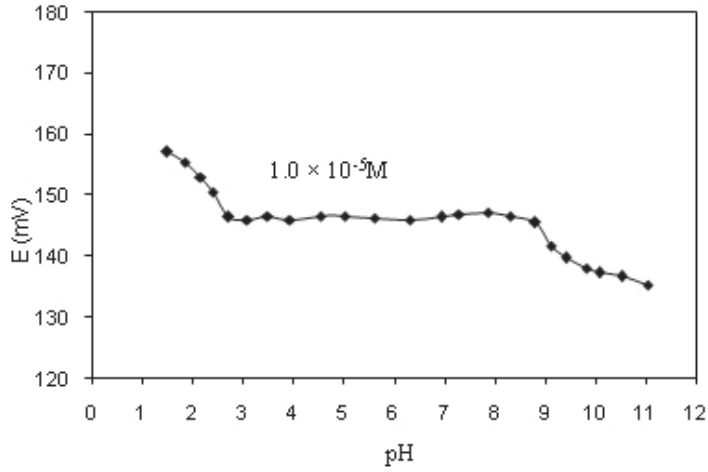

Figure 3: pH effect of the test solution on Electrode No. 4

The static response time of the membrane was measured at 0.001 M concentration (Figure 4.). It was observed that the Electrode No. 4 reached the equilibrium value of potential response in a very short time of about 5s. To investigate the reversibility and reproducibility of membrane electrode, the response time was also calculated by changing the concentration of test solution for lower to higher and then from higher to lower. The average response time for lower to higher concentration was about 5 seconds and for higher to lower concentration it was about 8 seconds.

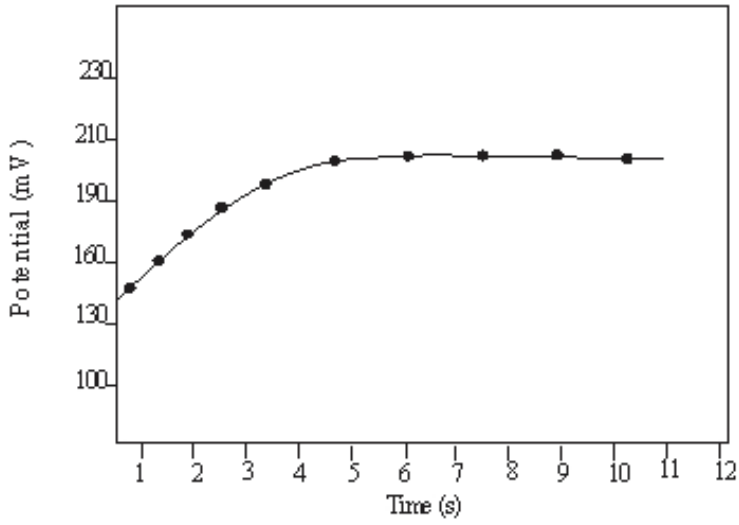

Figure 4: Response time for Electrode No. 4

The selectivity of membrane Electrode No. 4 towards Ni(II) ion over other interfering ions was investigated by matched potential method (MPM) [12-13]. According to this method, a specified activity of the primary ion (A) was added to a reference solution and the potential is measured. In a separate experiment, an interfering ion (B) was successively added to an identical reference solution (containing the primary ion), until the measured potential matches the one obtained with the primary ions. The matched potential method selectivity coefficient, K^{MPM}, is then given by the resulting primary ion to the interfering ion activity (concentration) ratio, $K^{MPM} = a_A/a_B$. The results are listed in Table 2. The selectivity coefficients for the all mono, divalent and trivalent ions are smaller than 4.3×10^{-3} and they cannot disturb the function of Ni(II) selective Electrode No. 1.

The response characters of the membrane electrode were also compared with the previously reported Ni(II) selective electrodes (Table 3). The data presented in the Table 3 shows that the proposed electrode is superior to previously reported electrodes.

Table 2: Selectivity coefficient value for Ni (II) selective Electrode No. 4

Interfering ion (B)	$K^{MPM}_{Ni^{2+},M^{n+}}$
Al^{3+}	3.5×10^{-3}
Zn^{2+}	4.1×10^{-3}
Mn^{2+}	4.3×10^{-3}
Co^{2+}	2.6×10^{-3}
Cu^{+}	2.0×10^{-3}
Cr^{3+}	3.2×10^{-4}
Fe^{3+}	8.3×10^{-4}
Na^{+}	3.7×10^{-4}
K^{+}	3.6×10^{-4}
Ca^{2+}	1.4×10^{-4}
Cu^{2+}	2.2×10^{-4}
Cd^{2+}	2.4×10^{-4}
Ba^{2+}	1.7×10^{-4}
Pb^{2+}	1.8×10^{-4}

Table 3: Comparative analysis of proposed electrode (No. 1) with the reported Electrode

Ionophore	Working Conc. range (M)	Slope (mV/ decade of activity)	pH range	Response time (sec)	Detection limit (M)	Ref
1-(1*H*-indol-1-yl)-*N*-(thiophen-2-ylmethyl) ethanimine	4×10^{-8} -1.0×10^{-1}	30.40 ± 0.3	2.7 – 8.8	5	1.0×10^{-8}	This work
1,5-diphenyl thiocarbazone	$5.0 \times 1\ 0^{-6}$ -1.0×10^{-2}	29.50 ± 1	4.15-7.8	-	2.8×10^{-6}	[14]
benzylbis (thiosemicarbazone)	$1.0 \times 1\ 0^{-7}$ -1.0×10^{-2}	-	-	15	4.0×10^{-8}	[15]
N-[2-thienyl methilidene]-2-aminoethanol (TN)	$1.0 \times 1\ 0^{-6}$ -1.0×10^{-1}	29.0 ± 1	4.2-8.3	-	1.0×10^{-6}	[17]
N,N -bis-(4-dimethylaminobenzylidene)-benzene-1,2-diamine	$2.0 \times 1\ 0^{-7}$ -1.0×10^{-2}	30.0 ± 1	4.5-9.0	<10	8.0×10^{-8}	[18]

ANALYTICAL APPLICATIONS:

The electrode was found to work well under the laboratory conditions and the proposed Ni(II) selective electrode was used as an indicator electrode in the titration of a 1.0×10^{-2}M Ni(II) ion solution with a standard 1.0×10^{-2}M EDTA. The resulting titration curve is shown in Figure 5. The figure has sharp inflation point which indicates that the proposed electrode can be used as an indicator electrode for the determination of Ni(II) ion.

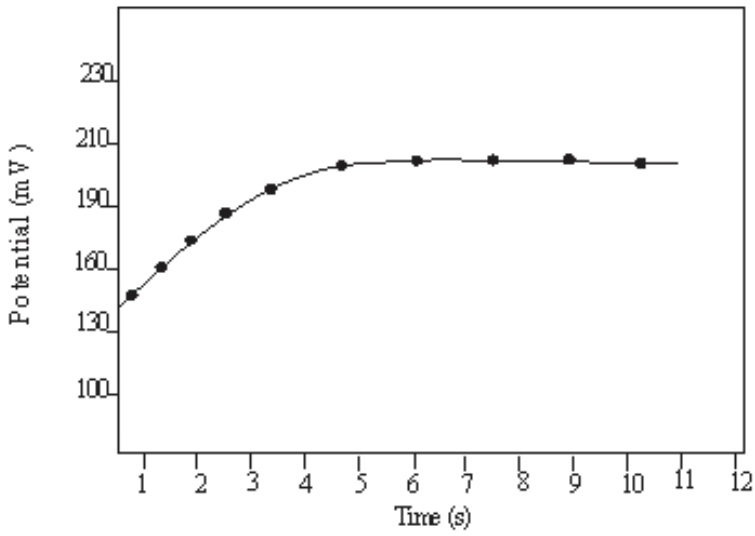

Figure 5: Titration Curve

The proposed Electrode No. 4 was also used for the determination of Ni(II)ions in tap water and river water samples. The results of triplicate measurements are summarized in Table 3. As can be seen from Table 3, the amounts of the Ni(II) ions, which were added to the water sample solutions (0.15-0.5 mg/ml), could be determined by the electrode with relatively good accuracy (Table 4.)

Table 4. Determination of Ni(II) spiked in tap and river water samples by use of the proposed electrode

Sample	Ni(II) added (mg/ml)	Found (mg/ml)	Recovery (%)
River water	0.20 0.45	($0.21^{a} \pm 0.03$) (0.48 ± 0.02)	105 107
Tap water	0.15 0.50	(0.16 ± 0.02) (0.54 ± 0.04)	107 108

Results are based on three measurements

CONCLUSION

A highly selective and sensitive poly(vinyl chloride) membrane electrode has been fabricated for the selective determination of Ni(II) ion. The Electrode No. 4 has a wide linear concentration range of $4.0 \times 10^{-8} - 1.0 \times 10^{-1}$ M with Nernstian slope of 30.2 ± 0.4 (mV/decay of activity). The electrode could be used in a pH range of 2.7 to 8.8 and has a fast response time of about 5 second. The electrode was also used as an indicator electrode for the titration

of Ni (II) ion with standard EDTA solution and for the determination of Ni (II) ion various water samples.

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Botany

EVALUATION OF PHYLLOPLANE MYCOFLORA IN CINNAMOMUM ZEYLANICUM (DALCHINI) AT DHAMDHA, DURG

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Dr. Arunima Karkun**
Dr Deepak Karkun****

ABSTRACT

The mycoflora of any habitat varies with host type, environmental condition and relation among them. The present study deals with the isolation of fungal species from leaf surface mycoflora of Cinnamomum zeylanicum (Dalchini). Cinnamon is a spice obtained from the inner bark of several trees from the genus Cinnamomum that is used in both sweet and savoury foods. A total of 24 species were isolated among which Deuteromycotina were dominant (16 species), followed by Ascomycotina (2 species), Zygomycotina (4 species) and mycelia sterilia (2 species). Aspergillus species, Penicillium species, Rhizopus species, Fusarium species were common in the season. The growth of fungi was dominant during rainy and winter season and less in summer season.

Keywords: Aspergillus, Mycoflora, Penicillium**.**

INTRODUCTION

The phylloplane, the surface of plant leaves, is a complex terrestrial habitat that is characterized by a variety of microorganisms including bacteria, filamentous fungi and yeast. Pathogens, saprobes and epiphytes occur in this habitat and numerous studies have described the phylloplane populations from various plant species (Breeze and Dix, 1981; Jager *et al*.,

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2001; Andrews *et al.*, 2002). Leaf surface is a natural habitat which supports heterogeneous fungal population comprising both pathogens and non- pathogens. It can act as good stage for spores. They depend on nutrients exuded from the leaf or those deposited from the atmosphere.

The present study deals with the study of leaf surface fungi of *Cinnamomum zeylanicum.* The common name of *Cinnamomum zeylanicum* is Dalchini. It is widely found in Srilanka and widely cultivated in India, Brazil, Mauritius and other countries. The part which is used is bark. Cinnamom is an evergreen tree which grows to 20 to 30 feet. The plant has strong branches and thick bark. It can be used as a spice. It is used as a flavouring material. It is astringent, antiseptic in nature. Oil of Dalchini is potential antibacterial. It can be used to stop vomiting, and also useful in diarrhea.

METHODOLOGY

For the study of leaf surface mycoflora, leaves were sampled randomly throughout several months. The sample was kept in sterilized polythene bags. Then collected leaves were brought in laboratory for the isolation of leaf surface fungi. The sampled leaves were placed in 75 ml conical flask in sterilized distilled water and were shaked for 25 – 30 minutes for homogeneous suspension of microorganisms attached to leaf surface. 1 ml suspension was poured into the petriplates that contained PDA media. The plates were incubated at 28°C. After incubation period, fungal colonies were counted and identified by the help of literature and was maintained in pure culture.

% Frequency = *(No. of observations in which a species appeared/ Total no. of observations)* x 100
% Contribution = *Total no. Of colonies of species in all the observations taken together /Total no. Of colonies in all the species* x 100

RESULTS AND DISCUSSION

The leaf surface microorganisms were isolated in potato dextrose media. The screening was performed during winter season on three month that is on October, November and December.

The isolated fungal species were purely cultured.

A total of 24 species were isolated among which Deuteromycotina were dominant (16 species and 65 colonies), followed by Ascomycotina (6 species and 4 colonies), Zygomycotina (4 species and 5 colonies) and Mycelia sterilia (2 species and 7 colonies) (Table 1, Figure 1). *Aspergillus* species, *Penicillium* species, *Rhizopus* species, *Fusarium* species were common in the season. The growth of following fungi was dominant during rainy and winter season and less in summer season**:** *Alternaria alternata, Aspergillus flavus, Aspergillus niger, Penicillium brevicompactum, Penicillium citrinum. Fusarium Oxysporium & F. moniliform*

During the month of October, *Mucor hemalis* was isolated from Zygomycotina family followed by *Alternaria alternata, Aspergillus flavus, Aspergillus fumigatus, Aspergillis Japoniocus, Aspergillus niger, Fusarium oxysporium, F. moniliform, F. caucassum, Penicillium*

brevicompactum, P. citrinum, P.oryzae and P.rubrum from Deteuromycotina family.

During month of November, *Choenophora cucurbitarum* was extracted from Zygomycotina followed by *Emericilla nidulans* and *Talaromyces flavus* from Ascomycotina family. From Deuteromycotina family, *Alternaria alternata, Aspergillus flavus, Aspergillus niger, Curvularia lunata, Fusarium oxysporium, F.moniliform, Penicillium brevicompactum, Penicillium citrinum. Penicillium digitatum* and Mycelia sterilia (peach) were isolated.

During the month of December, from Zygomycotina family, *Rhizopus oryzae and R.stolonifer* was extracted followed by *Emericilla nidulans* from Ascomycotina family. From Deuteromycotina family, *Alternaria alternata, Aspergillus flavus, Aspergillus niger, Aspergillus fumigatus, Curvularia lunata, Fusarium oxysporium, F.moniliform, Penicillium brevicompactum, Penicillium citrinum, Penicillium crysogenum, P. oryzae* and Mycelia sterilia (white) were extracted.

Emericella nidulans, Alternaria alternata, Aspergillus flavus, A.fumigatus, A.niger, Curvularia lunata, Fusarium oxysporium, F. moniliform, Penicillium brevicompactum, P.citrinum has shown 100% contribution during investigation (Figure-3).

Diem (1974) had estimated the mycoflora of the Barley phyllosphere. According to him, *Cladosporium* species was found to be common. *Cladosporium* is one of the most common inhabitants of the phyllosphere. Many authors have accounted for this observation by the abundance of the spores of this genus in the atmosphere. Similarly Levetin and Dorsey (2005) also studied the leaf surface microorganisms from leaf surface of two trees of University of Tulsa campus.

Ten fungal taxa were identified on both leaf surface cultures and the air samples; these included *Cladosporium, Alternaria, Epicoccum, Curvularia, Pithomyces, Drechslera, Fusarium, Nigrospora, Penicillium*, and *Aspergillus.* The presence of these fungi supports the idea that the air spora constitutes the source of many fungi that can potentially colonize the leaf surface (Pedgley 1991, Kinkel, 1997; Aylor 2002). Tiwari and Saluja (2010) also isolated leaf surface microorganism from *Catharanthus roseus*. They isolated 36 species with the help of gravity petriplate method.

CONCLUSION

Results revealed that mostly Deuteromycotina group were dominant. *Aspergillus* and *Penicillium* group mostly occurred during investigation. The present study indicate that fungi prefers phylloplane for their habitat.

Table 1: Fungal isolates from winter season.

Name Of Fungi	Oct.	Nov.	Dec.	Total	% frequency	% Contribution
Zygomycotina	**Colony No.**	**Colony No.**	**Colony No.**			
Choanephora Cucurbitarum		1		1	33.3	1.20
Mucor hemalis	2			2	33.3	2.4
Rhizopus oryzae			1	1	33.3	1.2
Rhizopus stolonifer			1	1	33.3	1.2
Ascomycotina						
Emericella nidulans		1	1	2	100	2.4
Talaromyces flavus		2		2	33.3	2.4
Deuteromycotina						
Alternaria alternata	2	1	4	7	100	8.43
Aspergillus flavus	1	1	1	3	100	3.6
Aspergillus fumigatus	2		2	4	100	4.8
Aspergillus japonicus	3			3	33.3	3.6
Aspergillus niger	2	4	2	8	100	9.6
Curvularia lunata		1	1	2	100	2.4
Fusarium oxysporum	2	1	2	5	100	
Fusarium moniliform	1	2	1	4	100	6.02
Fusarium caucasicum	2			2	33.3	2.4
Penicillium brevicompactum	2	4	1	7	100	8.4
Penicillium citrinum	5	2	3	10	100	12.04
Penicillium crysogenum			2	2	33.3	2.4
Penicillium digitatum		2		2	33.3	2.4
Penicillium oryzae	2		2	4	66.6	6.02
Penicillium rubrum	3			3	33.3	3.6
Phanerochaete chrysosporium			1	1	33.3	1.2
Mycelia sterilia						
Mycelia sterilia (White)			4	4	33.3	6.02
Mycelia sterilia (Peach)		3		3	33.3	3.6

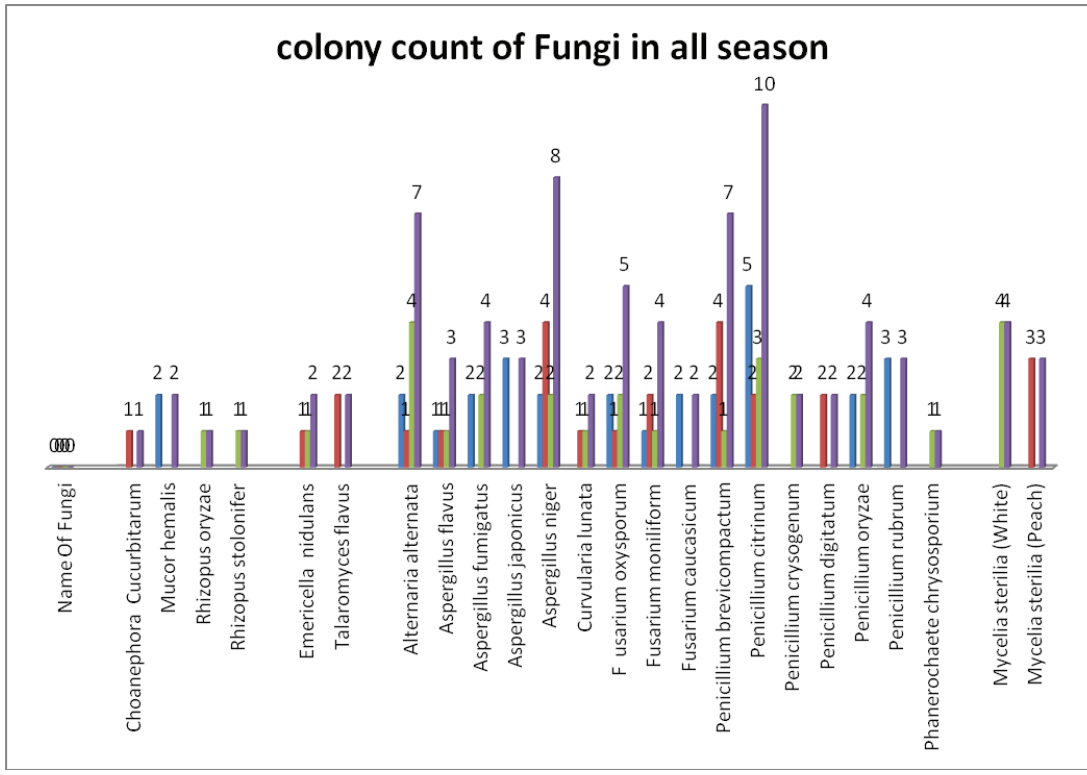

Figure 1: Colony count of fungi in all three seasons

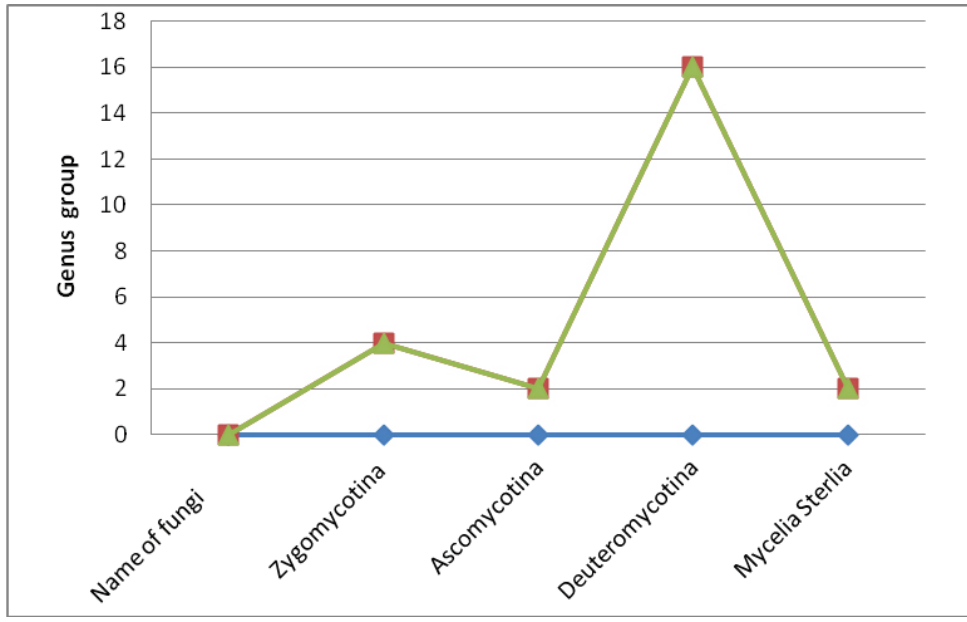

Figure 2: Dominant genus group

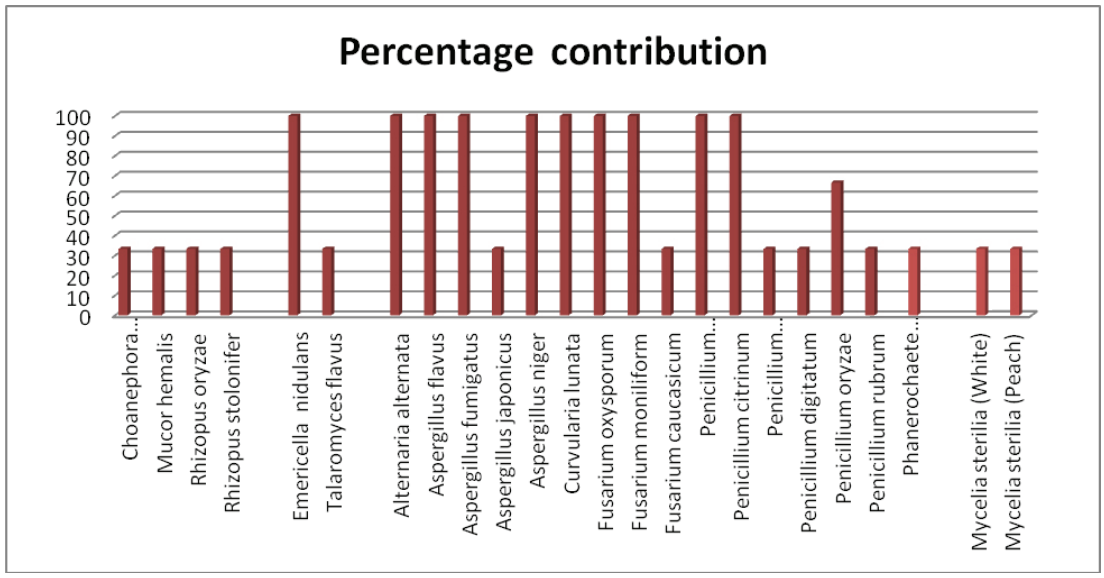

Figure 3: Percentage contribution of Fungi in all season.

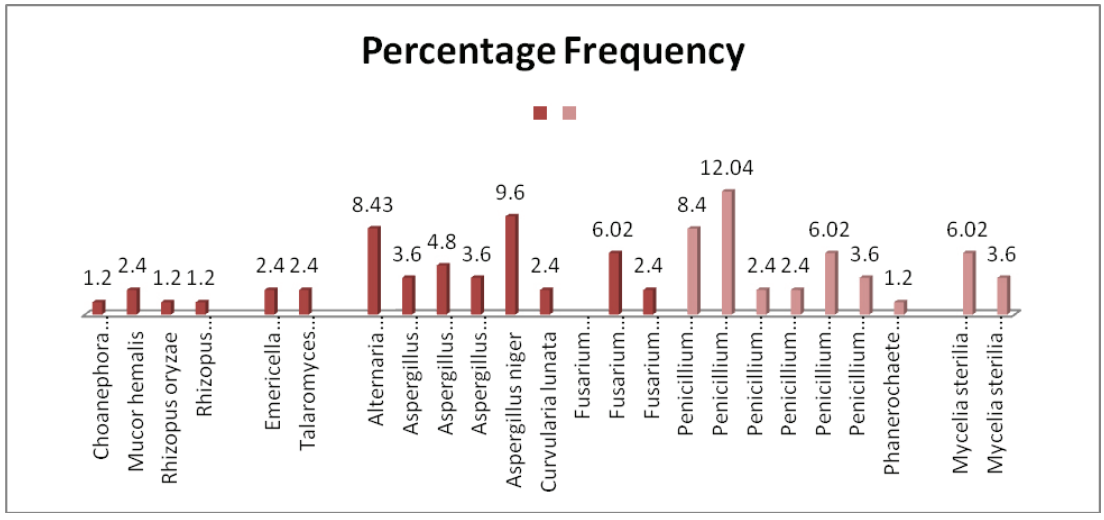

Figure 4: Percentage frequency of fungi in all season

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Development Economics

POVERTY AND RIGHT TO FOOD IN INDIA

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ABSTRACT

Article 21 of the Constitution of India provides the Right to Life to all the citizens of India that includes the Right to Food. Still, India is struggling at 55th position out of 76 selected countries in Global Hunger Index, 2014. In a bid to ward off criticism, the governments keep on changing the criteria of poverty estimation. The official poverty lines give command over time to a lower and lower standard of living. With a steadily lowered standard, the poverty figures will always show apparent improvement even when actual deprivation is worsening. The importance of arriving at realistic poverty line and estimating poverty ratios using realistic lines is obvious. The paper is an attempt to encapsulate the debate around the estimation of poverty lines and their insufficiency in identifying the destitute families. The country requires right-based approach and universal entitlements insofar as basic rights – food, education and health – are concerned, to come out of the current morass.

Keywords: Global Hunger Index (GHI), right to life, National Food Security Act, 2013, poverty measurement , Headcount Ratios (HCR), Tendulkar Committee Report, Rangarajan Committee Report, 2009.

INTRODUCTION

Article 21 of the Constitution of India provides the Right to Life to all the citizens of India including the Right to Food[1]. Further, Article 47 of the Constitution, inter alia, provides that the State shall regard raising the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties. The Universal Declaration of Human Rights and International Covenant on Economic, Social and Cultural Rights, to which India is a signatory, also cast responsibilities on all State parties to recognize the right of everyone to adequate food. Eradicating extreme poverty and hunger is one of the goals under the Millennium Development Goals of the United Nations. In pursuance of the constitutional obligations and obligations under the international conventions, providing food security is imperative to Government's planning and policy[2].

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India stands at the 65th spot among 79 nations listed by the International Food Policy Research Institute (IFPRI) in Global Hunger Index (GHI) report 2012[3].In 2013, it was at 63rd position. In the year 2014, India climbed up fast to 55th position. GHI is calculated by considering two factors apart from child malnourishment: child mortality rate and the proportion of the population considered calorie-deficient. IFPRI reports that the low socioeconomic and health status of women has been pushing the child malnourishment figure up. In India, 43.5 percent of children under five are underweight. According to the latest data on child under-nutrition, from 2005–10, India ranked second to last on child underweight out of 129 countries.[4] Although India is seen as a rising economic power and it is hoped that a trickle down will benefit the poor and marginalized; in reality the gap between the rich and the poor is growing. In her book "*The Republic of Hunger*"(2008), Utsa Patnaik concluded that on an average, a family of 5 consume 100 kilograms of grain less per year as compared to the consumption during the Second World War[5]. This is the spectre of starving India. Over half the children in India are malnourished and about one-quarter are so severely malnourished that they have shrunken brains and stunted bodies. A new generation of millions of Indians will grow to adulthood disabled. More than half of all women are anaemic with pregnant and lactating women suffering severe anaemia and malnutrition. About 3000 starvation deaths every year are documented by NGOs. The vast majority of those dying by starvation are scheduled caste and scheduled tribes.[6]

The Right to Food is about freedom from hunger. In a narrow sense, hunger refers to the pangs of an empty stomach. Correspondingly, the right to food can be understood, roughly speaking, as the right to have two square meals a day throughout the year. In a broader sense, hunger refers to undernutrition which then links with a wide range of entitlements, not only to food itself but also to other requirements of good nutrition such as clean water, health care, and even elementary education. However, the right to food in the narrow sense also deserves close attention, given the availability of enormous food stocks in the country[7]. These food stocks present a unique opportunity to ensure that nobody goes to bed hungry[8]. Ensuring food security, however, has always been a challenge and *The Right to Food* case[9] began with the plight of drought-affected people and mass starvation deaths when the food coffers of the Govt were overflowing[10]. The highest court agreed that the State was indeed responsible for providing nutrition and public health. The most persuasive argument to the court was that the Right to Food is directly related to the constitutional guarantee of Right to Life.

The National Food Security Act, 2013 attempts to shift the debate from starvation and subsistence to dignity and justice. It marks a paradigm shift in addressing the problem of food security – *from the current welfare approach to a right based approach.* The objective of the act is to **"***provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity and for matters connected therewith or incidental thereto*". About two-third of the population are entitled to receive subsidized food grains so that nutritional status of the population, and especially of women and children, can be improved to enhance the quality of human resource of the country.

Another important aspect of removing hunger is how to identify the hungry. Poverty is a multi-dimensional[11] phenomenon and hunger is undoubtedly the most crucial of its compo-

nents. Hence, in order to identify the hungry, we need to identify the poor, the beneficiaries under the Act. Therefore, analyzing and understanding the way poverty is measured in India becomes imperative.

MEASURING POVERTY IN INDIA

The official Indian poverty measures, released by the Planning Commission, are based on consumer expenditure surveys conducted by the National Sample Survey Organization (NSSO) and are measured as Headcount Ratios (HCR) i.e. the ratio of the number of poor to the total population. A poor household is defined as a household with an expenditure level below a specific poverty line. The Planning Commission has periodically estimated poverty lines and poverty ratios for each of the years for which Large Sample Surveys on Household Consumer Expenditure have been conducted by the National Sample Survey Office (NSSO) of the Ministry of Statistics and Programme Implementation. These surveys are normally conducted on quinquennial basis.

Since the poverty line in India is based on consumption, not income, it obfuscates dependence on debt, use of common property resources, and informal social security. The poverty line, quantified as a number is reductionist. It does not capture important aspects of poverty — ill health, low educational attainments, geographical isolation, ineffective access to law, powerlessness in civil society, caste and/or gender based disadvantages, etc. In spite of the diversity of opinion among experts on the methodology of measuring poverty and its criticism, the importance of quantifying it has been well recognised, especially since poverty alleviation and reduction is a national goal. Defining a poverty line is the first step in estimating poverty. A poverty line dividing the poor from the non-poor is used by putting a price on the minimum required consumption levels of food, clothing, shelter, fuel and health care, etc.

Working Group, 1962

The definition of poverty line in the Indian context was attempted for the first time in 1962 by a Working Group of eminent Economists and social thinkers after taking into account the recommendations of the Nutrition Advisory Committee of the Indian Council of Medical Research (ICMR, 1958) regarding balanced diet. The Working Group recommended (in 1962) that the national minimum for each household of 5 persons should be not less than Rs. 100 per month in terms of 1960-61 prices or Rs.20 per capita. For urban areas it was Rs.125 per month per household or Rs.25 per capita. This national minimum excluded expenditure on health and education, both of which are expected to be provided by the state.

Dandekar and Rath, 1973[12]

In their seminal work on poverty, the two economists used an average calorie norm of 2,250 calories per capita per day for both rural and urban areas, as a criterion to define the poverty line. On the basis of National Sample Survey data on consumer expenditure, the study

revealed that, in rural area, the households with an annual per capita expenditure of Rs. 180 or Rs. 15 per month at the 1960-61 prices consumed on an average food with calorie equivalent of 2,250 per capita per day together with such non- food items as they chose. The corresponding figures in the urban area were Rs.270 per annum or Rs.22.50 per month at 1960-61 prices.

Task Force on Projections of Minimum Needs and Effective Consumption Demand, 1979

The methodology as formulated by the Task Force' was used till 1993 in estimating the incidence of poverty in Planning Commission. The Task Force (1979) defined the poverty line as the per-capita expenditure level at which the average per-capita, per day calorie intake was 2400 calories in rural areas and 2100 calories for urban areas. The Task Force used the age, sex, activity specific calorie allowances recommended by the Nutrition Expert Group (1968) to estimate the average daily per capita requirements for rural and urban areas. Based on the observed consumer behaviour in 1973-74 it was estimated that, on an average, consumer expenditure of Rs.49.09 per capita per month was sufficient for a calorie intake of 2400 calories per capita per day in rural areas and Rs.56.64 per capita per month for a calorie intake of 2100 per day in urban areas. Thus, the concept of poverty line used here was partly normative and partly behavioural. This way of deriving the poverty line, does not seek to measure the nutritional status, and more specifically the incidence of malnourishment or under-nourishment in the population. It focuses rather on the purchasing power needed to meet the specific calorie intake standard with some margin for non-food consumption needs.

Lakdawala Committee, 1993

In September 1989, the Planning Commission again constituted an Expert Group to consider methodological and computational aspects of estimation of proportion and number of poor in India and "to look into the methodology for estimation of poverty at national and state level and also to go into the question of re-defining poverty line, if necessary." They advised that the poverty line approach anchored in a calorie norm and associated with a fixed consumption basket should be continued. The commodity basket was standardised at the national level and applied to all States. 1973-74 was continued as the base year for estimating the poverty line. They relied on disaggregated commodity indices from Consumer Price Index for Agricultural Labourers (CPI-AL) to update the rural poverty line and a simple average of suitably weighted commodity indices of Consumer Price Index for Industrial Workers (CPI-IW) and Cconsumer Price Index of Non-manual Employees (CPI-NM) for updating the urban poverty line.

Tendulkar Committee Report, 2009

The current methodology for poverty estimation is based on the recommendations of Tendulkar Committee which submitted its report in 2009 and was accepted by the Planning Commission in 2010. The estimation of poverty continues to be based on private household consumer expenditure of Indian households as collected by the NSSO. The expert group decided

to move away from anchoring the poverty lines to a calorie *intake* as calorie consumption were not found to be well correlated with the *nutritional outcome.* They decided to adopt the MRP-based[13] estimates of consumption expenditure as the basis for future poverty lines as against the previous practice of using Uniform reference period estimates of consumption expenditure.[14] Even while moving away from the calorie norms, they revised minimum calorie intake to 1776 calories per capita for urban population and 1999 calories per capita for rural population. Separate allowance for private expenditure on transport and conveyance was also recommended. The new poverty lines enable rural as well as urban population in all the states to afford the recommended *all-India urban PLB* after taking due account of within-state and inter-state differentials incorporating observed consumer behaviour both at the all-India and state levels.

Major departures from 1993 Expert Group are

- Moved away from calorie anchor but test for the adequacy of actual food expenditure near the poverty line to ensure certain aggregate nutritional outcomes.
- Uniform PLB based in the latest available observed household consumption data to both the rural and the urban populations.
- Inclusion of provision in price indices for private expenditure on health and education in rural and urban PLB.

NSSO did the large scale survey in 2011-12 (NSS 68th round). The summary results of this survey were released on 20th June 2013. The percentage of persons below the Poverty Line in 2011-12 has been estimated as 25.7% in rural areas, 13.7% in urban areas and 21.9% for the country as a whole. The respective ratios for the rural and urban areas were 41.8% and 25.7% and 37.2% for the country as a whole in 2004-05. It was 50.1% in rural areas, 31.8% in urban areas and 45.3% for the country as a whole in 1993-94. In 2011-12, India had 270 million persons below the Tendulkar Poverty Line as compared to 407 million in 2004-05, that is a reduction of 137 million persons over the seven year period[15].

Table 1: National poverty estimates (% below poverty line) (1993 – 2012)

Year	Rural	Urban	Total
1993 – 94	50.1	31.8	45.3
2004 – 05	41.8	25.7	37.2
2009 – 10	33.8	20.9	29.8
2011 – 12	25.7	13.7	21.9

In India, if street children and homeless people earn about Rs 100 a day, this makes them five times above the poverty line, even though many of them do not have shelter and live in dismal conditions. This is because in India, according to Tendulkar Report, a poor is one who earns below Rs. 32.16 per day in urban areas and Rs.26.03 in rural areas(Rs.4,824 for a family of five in urban areas and about Rs.3,905 for a family of five in rural areas.)[16]. The current official poverty line seems more like the destitution line. Reaching the poverty line is not a guarantee of being well nourished (since good nutrition requires much more than calorie

adequacy), let alone healthy or well educated. The Tendulkar Committee Report further complicated matters by claiming, for the first time, that the poverty line ensures '*adequacy of actual private expenditure… on food, education and health*'. That the Tendulkar poverty line is wholly insufficient for this purpose is self-evident from a common sense point of view. Moreover the calorie norms relate to an average for the reference group and not the minimum required for biological existence, given that there is a considerable variation in calorie requirement of individuals depending on their workload, age, sex and activity status.

The NCEUS (Arjun Sengupta) report had stated that nearly 77% of India's people, totalling 836 million people, with an income roughly below $2 in PPP terms were living in a highly vulnerable condition, spending less than Rs 20 a day[17]. The World Bank's PPP estimate of Indian poverty was higher than 40% in 2005, while the Asian Development Bank arrived at almost 50%. The UNDP's Multidimensional Poverty Index finds the proportion of the poor in India at a staggering 53% and concludes that the poorest region in South Asia is Bihar followed by Southern parts of Afghanistan. [18]

According to the 15th ILC[19], the following criteria were considered in calculating the minimum wage which is an euphemism for *'living wage'*:

- Standard working class family is assumed to include two adults and two children;
- Minimum food requirement to be taken as a balanced diet of 2,700 calories per day per consumption unit;
- Clothing requirement to be based on per capita consumption of 18 yards per annum, which gives 72 yards per annum for the average worker's family;
- For housing, the rent corresponding to the minimum area provided for under the government's industrial housing schemes should be taken;
- Fuel, lighting and other items of expenditure should constitute 20 per cent of the total minimum wage.

While the government did not accept these recommendations, the Supreme Court approved these norms through its judgment in the case of *U Unichoyi vs State of Kerala*[20], and in *Reptakos Brett Vs Workmen*[21] added another norm: 25% of the total minimum wage, to cover children's education, medical treatment, recreation, festivals and ceremonies. These 'minimum' wages and poverty benchmarks are to be seen in the context of the soaring inflation and rise in prices of food and other essentials. A "living wage", at current wage rates declared under the Minimum Wages Act, comes to Rs 247 per day for unskilled labour. The poverty line is seven times less than the minimum wage which itself is a "subsistence wage"[22]. On the rural side a "Below the Poverty Line" (BPL) Census is being conducted by the Ministry of Rural Development every five years, beginning in 1992. The criterion for identifying rural poor, however, has varied from Census to Census. With a view to evolving a standard methodology, the Ministry of Rural Development constituted an Expert Group under the Chairmanship of N.C. Saxena in 2009. With the objective of putting in place a uniform criteria to identify the

BPL households in urban areas so that objectivity and transparency is ensured in delivery of benefits to the target groups, the Planning Commission constituted an Expert Group[23] under the Chairmanship of S.R. Hashim in 2012.

Under attack for its poverty lines, the Planning Commission admitted that the benchmark was "very low," but "factual". In a joint statement issued by Montek Singh Ahluwalia, Deputy Chairman, Planning Commission and Jairam Ramesh in 2011, they said,

"*The present State-wise poverty estimates using the Planning Commission's methodology will not be used to impose any ceiling on the number of households to be included in different government programmes. The new methodology for determining poor households in rural areas would be based on the socio-economic caste census that is expected to be completed by January 2012. The census would take into account deprivations based on seven indicators worked out by the Rural Development Ministry. A similar census in urban areas would be undertaken later."*[24]

On 3rd October, 2011, Montek Singh Ahluwalia said in a Press Conference :

"*It needs to be emphasised that the Tendulkar poverty line is not meant to be an acceptable level of living for the aam aadmi. It is actually the standard of living of those at the poverty line in 1973-74. This is clearly a level below which families are under severe stress, which is the basis of giving them exceptional support as embedded in various poverty amelioration policies including subsidised food and other facilities. The level is low and therefore families slightly above the poverty line are also vulnerable. Recognising this reality, it is certainly not the view of the present Planning Commission that subsidised food should be limited only to those below the poverty line. Eligibility for subsidised food and other benefits will be widened to a much larger population, delinked from the poverty line*. [25]

Therefore, we see an indirect admission by the Government that their poverty figures are not actually reflective of the reality in our country when it comes to covering basic human needs.

Under attack from the media, civil society and many individuals, the Government constituted another Committee under C. Rangarajan (former Chairperson of the Prime Minister's Economic Advisory Council) to reassess poverty estimation.

Rangarajan Committee Report, 2014

The Committee deliberated upon the following matters:

(i) To provide an alternate method to estimate poverty levels and examine whether poverty lines should be fixed solely in terms of a consumption basket or if other criteria are also relevant;

(ii) To examine divergence between the consumption estimates based on the NSSO methodology and those emerging from the National Accounts aggregates;

(iii) To review international poverty estimation methods and indicate whether based on

these, a particular method for empirical poverty estimation can be developed in India, and;

(iv) To recommend how estimates of poverty can be linked to eligibility and entitlements under the various schemes of the Government of India.[26]

Dr. Rangarajan and the Expert Group under him dismissed the methodology adopted by the Tendulkar Committee and put the number of poor in India in 2011-12 at 29.5%(21.9% according to Tendulkar Committee's estimates) of the total population. That means 3 people out of every 10 in India are poor. As per Rangarajan Committee, a person spending less than Rs 1,407 a month (Rs 47/day, earlier Rs 33/day) would be considered poor in urban areas. In villages, those spending less than Rs 972 a month (Rs 32/day, earlier Rs 27/day) would be considered poor. Defending his poverty estimates he said, "*The World Bank also talks about: purchasing power parity terms. The minimum expenditure per day. They are talking about USD 2 per day whereas our estimate comes to USD 2.4. Therefore it (our poverty estimates) is in keeping with the international standards*". He said that instead of isolating the number at which poverty is pegged people should see the expenditure as one which is made by a household together in a month which is estimated at Rs 4,860 in villages and Rs 7,035 for cities for a family of five people.[27]

Drawbacks of the recommendations can be delineated as follow:

1. It is still anchored in the consumption expenditure method and fails to acknowledge the multi-dimensional nature of poverty.
2. It has lowered the minimum calorie intake requirement which might lead to poverty being underestimated.
3. It doesn't take into account the varied food and dietary habits of the people and links poverty to consumption of only on three basic nutrients (calories, proteins, fats).

But, even though beneficiaries under the NFSA were delinked from poverty lines, yet, their identification under the Act still suffers from many incongruities and due to lack of a better alternative fall back again upon arbitrary and unscientific determination.

Identification of Beneficiaries under National Food Security Act, 2013

The National Food Security Act under Section 2(3) talks of '*eligible households'* divided into 'priority households' and the 'households covered under Antyodaya Anna Yojana'[28]. Further, Section 3(2**)** ensures food security to the eligible households at subsidised prices up to seventy-five per cent of the rural population and up to fifty per cent of the urban population. Chapter 6 mentions about Identification of beneficiaries. Section 9 stipulates that the percentage coverage under the TPDS in rural and urban areas for each State shall be determined by the Central Government and the total number of persons to be covered in such rural and urban areas of the State shall be calculated on the basis of the population census. Section 10 mentions that the State Government shall, within the number of persons determined under Section 9 for the rural and urban areas, identify—

a. The households to be covered under the Antyodaya Anna Yojna;

b. The remaining households as priority households to be covered under the Targeted Public Distribution System, in accordance with such guidelines as the State Government may specify.

In other words the central government will indicate the percentage of the entitled population, while the actual identification of the beneficiaries will be the responsibility of the states. The entire focus of the operational part of the proposed Act is on TPDS, which will provide food grains to households identified as living Below the Poverty Line (BPL) on the basis of the latest available poverty estimates notified by the Planning Commission. The Act does not prescribe any scientific or established mechanism for identification of beneficiaries and the multiplicity of categories is bound to lead to several identification errors.

These weaknesses in identifying beneficiaries by way of BPL census are sought to be corrected by determining eligibility for the priority category in a more scientific way by a Socio-Economic and Caste Economic Census (SECC) conducted by the States on the basis of parameters of deprivation determined by Ministry of Rural Development. However, the SECC is far from complete, so far only about 68 per cent survey is completed and there is no time frame within which the survey will be completed[29] and in the absence of any obvious alternative, it is effectively falling back on the Below Poverty Line census to identify priority groups.

The distinction between 'priority' and 'general' households in the Act is wholly unnecessary and counter-productive. As it is, 25 per cent of rural households are entirely excluded from the public distribution system and it is unnecessary to split the rest into two groups. The Act seems to create a justiciable entitlement but doesn't guarantee a person that he or she is eligible for it. Until now, the main beneficiaries of the PDS were '*below poverty lin*e' families. A census was conducted every few years to identify BPL families, based on some sort of scoring system. The cut-off scores were supposed to be set state-wise in such a manner that the proportion of families with a score below the cut-off (i.e. BPL families) matches the proportion of families *below the poverty line* according to the Planning Commission's poverty estimates. 'Priority groups' are not fundamentally different from BPL households, and the Socio-Economic and Caste Census, which seems to be expected to identify priority households, is much the same as earlier BPL censuses.

SOCIO-ECONOMIC AND CASTE CENSUS, 2011

The last *below poverty line* census was conducted in 2002. The Planning Commission provides estimates of the percentage of the rural and urban population living below the poverty line in different States/UTs. That is, it estimates the "how much" of poverty. The SECC, 2011 on the other hand, provides information on the "who" of the population living below the poverty line. Thus, for example, the Planning Commission estimate for a State could be that say 55% of the rural population and say 30% of the urban population living below the poverty line. SECC, 2011 will enable that particular State to identify the households who comprise this 55% and 30% respectively.

Rural areas: The methodology for rural areas has been using the recommendations of the Saxena Expert Group as the reference point[30].

Urban areas: The Planning Commission appointed the Hashim Committee Expert Group to identify the methodology to conduct the SECC in urban areas. The 61st Round of the NSSO shows that urban poverty has registered a decline in percentage terms; however, it has increased in absolute terms by 4.4 million persons. The fact is that the number of urban poor is rising continuously since 1973–74 as per the uniform recall period.[31]

Rural Households will be ranked through a three-step process. A household with any of the following will be excluded automatically:

- Motorized two/three/four wheeler/ fishing boat;
- Mechanized three/four wheeler agricultural equipment;
- Kisan Credit Card with credit limit of Rs. 50,000 and above;
- Household with any member as a Government employee;
- Households with non-agricultural enterprises registered with the Government;
- Any member of the family earning more than Rs. 10,000 per month;
- Paying income tax;
- Paying professional tax;
- Three or more rooms with all rooms having pucca walls and roof;
- Own a refrigerator;
- Own Landline phone;
- Own 2.5 acres or more of irrigated land with at least 1 irrigation equipment;
- 5 acres or more of irrigated land for two or more crop seasons;
- Owning at least 7.5 acres of land or more with at least one irrigation equipment.

A household with any of the following will be included automatically:

- Households without shelter;
- Destitute/ living on alms;
- Manual scavengers;
- Primitive tribal groups;
- Legally released bonded labourers.

The remaining households will be ranked using 7 Deprivation Indicators. Households with the highest deprivation score will have the highest priority for inclusion in the list of households below the poverty level. The following are the deprivation indicators:

- Households with only one room, kucha walls and kucha roof;

- No adult member between the ages of 16 and 59;
- Female headed households with no adult male member between 16 and 59;
- Households with disabled member and no able bodied adult member;
- SC/ST households;
- Households with no literate adult above 25 years;
- Landless households deriving a major part of their income from manual casual labour.[32]

After ranking households in this manner, a cut-off is supposed to be applied to identify 'priority' households – the main beneficiaries of the public distribution system under the NFSA. For instance, if the cut-off is two, then priority households will consist of all households with a score of two or more. The cut-off is supposed to be specified so that the share of priority households in the population is around 46 per cent i.e the proportion of the rural population below the 'Tendulkar poverty line' with a small margin for targeting errors.

Let us consider the following 3 examples for clear delineation of criteria :

Meena, aged 50, lives in a two-room *kaccha* hut with her disabled husband who studied up to class 2. They own half an acre of unirrigated land and a goat. Meena is unable to take up any remunerative work as her husband needs constant care. Without any specific means of subsistence, they live on one meal a day. **Zafar**, aged 35, never went to school but he learnt to read and write in a night school. Aside from harvesting the odd sack of grain from his small patch of land, he earns a pittance as a weaver. The family is struggling to make ends meet and two of his five children work as child labourers. **Jeetu**, aged 45, lives on his own – his family earning more than 10 thousand per month deserted him as he suffers from HIV/AIDS. He has been left to his own devices, in a one-room brick shed on the outskirts of the village. He is too weak to work. Compassionate villagers give him rice from time to time, with some vegetables on festivals.

What do these people have in common? Each of them belongs to a '*zero score*' household – a household that will get a score of zero in the Socio-Economic and Caste Census (SECC), if the census reaches them at all. Since Meena, Zafar and Jeetu have a score of zero, they are *certain to be left out* from the priority list, even before the census begins. Even though they are fictional characters but it would be easy to find real-life examples of such situations, or of other stark cases of poor – even destitute – households being left out of the priority list because they have a zero score. In fact, even households with a score of one are almost bound to be left out, since the cut-off is unlikely to be less than two.

The odd nature of this scoring system can be appreciated in more general terms by considering Adivasi (tribal) households – the most disadvantaged section of the rural population. Since most Adivasi households possess a little bit of land, however unproductive, and a house (often a mud house) with at least two rooms, the first and last 'deprivations' in the list will not apply to them (note that even land possessed as a matter of traditional rights, without legal title, is to be counted as 'owned' by the SECC). Further, since a large majority are likely to

have at least one able-bodied male adult aged between 16 and 59 years, the second, third and fourth criteria will not apply to them either. It follows that most Adivasi households will have a score of only *one*, unless they are 'lucky' enough to have no literate adult, in which case their score will shoot up to two. But even a score of two may not catapult them into the priority club. And if it does, Adivasi communities will be oddly split down the middle, between 'score one' and 'score two' families – a very divisive situation. [33]

CONCLUSION

The fact is that official poverty lines give command over time to a lower and lower standard of living. With a steadily lowered standard, the poverty figures will always show apparent improvement even when actual deprivation is worsening. The importance of arriving at realistic poverty lines and estimating poverty ratios using realistic lines is obvious. All current official welfare schemes, whether they give access to affordable food through the PDS or access to affordable medical insurance through the Rashtriya Swasthya Bima Yojana (RSBY), rely on identifying beneficiaries using the official poverty estimates. Given that these are gross underestimates of the true extent of poverty, a much larger number of deserving families are excluded than are included at present[34].

While academic debates can continue on the appropriate measure of poverty in India, its extent and whether it is decreasing over time, it is unacceptable and counterproductive to link the official poverty estimates to basic entitlements of the people, especially access to food. Food security should be provided to all citizens, not a particular group that can vary according to administrative decisions because a rights-based approach cannot assign a basic human right to only a subset of the population, however defined. Irrespective of the methodology we adopt to measure poverty, the number of poor and hungry people in the country remains large.

Since several representations were made suggesting that the Tendulkar Poverty Line was too low, the Planning Commission, in June 2012, constituted an Expert Group under the Chairmanship of Dr. C. Rangarajan to once again review the methodology for the measurement of poverty which has submitted its report on 30th June 2014[35]. With the 12th Plan, the government has taken the first steps in acknowledging that poverty is a multi-dimensional concept that cannot be reduced to consumption expenditure alone.[36]

The way forward is not to 'fix the poverty numbers' but to find a way out of this bankrupt approach of BPL targeting. What is needed to widen universal entitlement programmes such as Mid-Day Meals, the Integrated Child Development Services (ICDS), and the National Rural Employment Guarantee Act. Beyond this, there is a need for informed debate on the future of social support in India. The country cannot afford divisive, unreliable and exclusionary system of targeted transfers that self-liquidates over time. It is necessary to build a comprehensive social security system inspired by constitutional principles, fundamental rights, and ideals of solidarity and universalism. The whole experience of the last twenty years is that over-reliance on economic growth for social progress is a recipe for disappointment. The recent discussion has made it clear that a consensus is emerging in favour of universal entitlements insofar as basic rights – food, education and health – are concerned.

ENDNOTES AND REFERENCES

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8. Jean Dreze, *Right To Food: From The Courts To The Streets,* http://www.righttofoodindia.org/data/dreze-courts.pdf
9. PUCL v. UOI W.P(C)No. 196 of 2001
10. In 2001, there was a scandal as the country was bursting at the seams with 60m tonnes of stored food grains and yet starvation, death and migration afflicted six states. The People's Union for Civil Liberties sued the government, arguing that it must open its grain reserves to feed the hungry.
11. The Global Multidimensional Poverty Index (MPI) measures poverty in a multi-dimensional way faced by each poor person at the same time. It measures levels of deprivation in education, health and other aspects of living standards. It reflects both incidence of MPI and intensity of poverty. It measures poverty across 100 developing countries. There are ten indicators of poverty-Nutrition, Child Mortality, Years of schooling, School attendance, Cooking fuel, Sanitation, Water, Electricity, Floor, and Assets. If someone is deprived in a third or more of ten (weighted) indicators, he/she is poor and the number of deprivations they experience measures the intensity of poverty. The new MPI was developed and applied by Oxford Poverty and Human Development Index with support from United Nations Development Program. It supplants the Human Poverty Index introduced in 1997.
12. V.M. Dandekar, Nilkanth Rath(1973). *Poverty in India.* Pune: Indian School of Political Economy.

13. Under Mixed Recall Period (MRP), information on five broad item groups of household consumer expenditure with low frequency of purchase (low frequency items for short) namely, clothing, footwear, education, institutional medical care and durables is collected on a year-long recall basis while information on consumption expenditure on all other items is collected on the basis of a month-long recall period. In the case of URP, all information on consumption expenditure is collected on a month-long recall period basis.
14. NSSO was advised to shift to Mixed Reference Period (MRP) for all its consumption surveys in future, namely, 365 days for low frequency items (clothing, footwear, durables, education and institutional health expenditure) and 30 days for all the remaining items. This change captures the household consumption expenditure of the poor households on low-frequency items of purchase more satisfactorily than the earlier 30 day recall period.
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22. Letters, *Economic & Political Weekly,* October 1, 2011 Vol.xlvI(40). http://www.epw.in/letters/delink-entitlements.html
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24. Gargi Parsai(2011). *No poverty line cap for social schemes, food entitlement: Montek, The Hindu*, Updated: October 4. Available at http://www.thehindu.com/news/national/no-poverty-line-cap-for-social-schemes-food-entitlement-montek/article2509066.ece
25. Statement of Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, 3rd October, 2011. http://planningcommission.nic.in/aboutus/speech/spemsa/pr_dch0309.pdf

26. *Government Announces New Expert Panel on Poverty Estimates,* Press Information Bureau,Planning Commission, 24 May 2012, http://pib.nic.in/newsite/erelease.aspx?relid=84452

27. Rangarajan Defends Poverty Estimates (July 7, 2014) in *The Hindu*, http://www.thehindu.com/business/Economy/rangarajan-defends-poverty-estimates/article6186614.ece

28. AAY is a step in the direction of making TPDS aim at reducing hunger among the poorest segments of the BPL population. A National Sample Survey Exercise points towards the fact that about 5% of the total population in the country sleeps without two square meals a day. This section of the population can be called as "hungry". In order to make TPDS more focused and targeted towards this category of population, the "Antyodaya Anna Yojana" (AAY) was launched in December, 2000 for one crore poorest of the poor families. In order to identify these households, the guidelines stipulate the following criteria: Landless agriculture labourers, marginal farmers, rural artisans/craftsmen, such as potters, tanners, weavers, blacksmiths, carpenters, slum dwellers, and persons earning their livelihood on daily basis in the informal sector like porters, coolies, rickshaw pullers, hand cart pullers, fruit and flower sellers, snake charmers, rag pickers, cobblers, destitute and other similar categories irrespective of rural or urban areas, Households headed by widows or terminally ill persons/disabled persons/persons aged 60 years or more with no assured means of subsistence or societal support, Widows or terminally ill persons or disabled persons or persons aged 60 years or more or single women or single men with no family or societal support or assured means of subsistence, All primitive tribal households. *Source*: *Introduction to TDPS*, Dept. Of Food and Public Distribution http://dfpd.nic.in/?q=node/101

29. 27th Report of Standing Committee On Food, Consumer Affairs And Public Distribution (2012-13) on The National Food Security Bill, 2011 released on 17.01.2013, Ministry Of Consumer Affairs, Food And Public Distribution Distributionhttp://164.100.47.134/lsscommittee/Food,%20Consumer%20Affairs%20&%20Public%20Distribution/Final%20Report%20on%20NFSB.pdf

30. Information collected at the level of the individual and household, including Occupation, Education, Disability, Religion, SC/ST Status, Name of Caste/Tribe, Employment, Income and source of income, Assets, Housing, Consumer Durables and Non-Durables, Land.

31. Comparison Of Poverty Estimates Based On Uniform Recall Period http://data.gov.in/dataset/comparison-poverty-estimates-based-uniform-recall-period-eleventh-plan-period

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