RESEARCHER Volume XIV Number 1 2018

RESEARCHER

A Multidisciplinary Journal

Vol. XIV No.1, 2018
ISSN 2278-9022

The Journal of University of Jammu

Editorial Board

RESEARCHER

A Multidisciplinary Journal

Vol. XIV No. 1, 2018
ISSN 2278-9022

CONTENTS

SCIENCE AND TECHNOLOGY

SOCIAL SCIENCES

BUSINESS STUDIES

ARTS AND HUMANITIES

SCIENCE AND TECHNOLOGY

Evaluation of Phytotoxicity of Distillery Wastewater on Seed Germination, Seedling Growth and Pigment Content of *Pisum sativum* L. var. FPP41

Kirti Pandita* and Piyush Malaviya**

ABSTRACT

The aim of current study was to determine the impacts of untreated, primary treated and secondary treated distillery effluent on different seed germination parameters, growth attributes and pigments of Pisum sativum L. var. FPP41. The results showed that treated effluent was not inhibitory for germination and growth; however, in untreated distillery effluent (also known as spentwash) very few seeds germinated but could not survive for longer periods. Maximum values of the positive germination parameters viz., peak value (33.33), germination index (41.34), percent germination (100), vigour index (480) were observed in the treatment receiving secondary treated effluent after control. The minimum values of negative germination parameters viz. phytotoxicity index (0.59) and percent inhibition (0) also showed the similar pattern. The highest values of chlorophyll-a and chlorophyll-b was 0.036 mg g^{-1} fresh weight (fw) and 0.011 mg g^{-1} fw, respectively. The values of total chlorophyll and carotenoid content were 0.063 mg g^{-1} fw and 0.012 mg g^{-1} fw, respectively, found after control treatment in the set receiving secondary treated effluent. Overall, secondary treated effluent showed better results than the other two effluents

Keywords : Chlorophyll, distillery, germination, plant, wastewater

Introduction

The distillery industry is agro-based which is attaining significance in agricultural sector. At present, in India there are 319 distillery industries with an installed capacity of 3.29 billion litres of alcohol (Pandita and Malaviya, 2016). In the distillery industry, for each litre of alcohol produced, about 15 litres of spentwash is released as wastewater (Pandita and Malaviya, 2016). The spentwash is dark brown in colour which is characterized by high Biochemical oxygen demand (5,000-8000 mgl^{-1}) and Chemical oxygen demand (25,000-30,000 mgl^{-1}) having an disagreeable odour of burnt or caramelized sugar. The brown colour of the spentwash might be ascribed to the occurrence of melanoidin, the reaction produce of sugar-amine condensation. The extremely coloured water, in addition to being aesthetically unsuitable, hinders light penetration, reduces production of phytoplankton and by association, zooplankton, fish and dissolved oxygen supply.

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The repulsive smell due to the presence of skatole, indole and other sulphur compounds is also a matter of public concern (Narain et al., 2012). The disposal of wastewater is a major difficulty faced by industries, due to generation of enormous volume of effluent and with limited space for land based handling and disposal. The wastewater which is generated from industries could be recycled and reused in such environmental friendly way, it may resolve water insufficiency and pollution nuisance (Salian et al., 2018). On the other hand, wastewater is also a resource which can be applied for industrial uses, since it contains nutrients which can be used for the cultivation of agricultural crops (Hati et al., 2007; Chandra et al., 2009; Rath et al., 2011).

In the past two decades, there has been an outstanding increase in the utilization of wastewater for crop irrigation, particularly in arid and seasonally arid areas of both industrialised and developing countries. This may be due to the high cost of chemical fertilizers and growing scarcity of alternative water for irrigation (Kumar and Chopra, 2013). It has been reported that the distillery effluent has a positive effect on crop yields as it contains several organic and inorganic nutrients. However, the distillery effluent has high salt load which may cause a severe inhibitory impact on germination of seeds. Nevertheless, different crop species may have differential tolerance or sensitivity to the salinity (Ramana et al., 2002). The distillery wastewater contains high-salt load (Ramana et al., 2002), that's why the plants might not be able to regulate ion concentration and there may have been severe physiological dysfunctions which leads to decrease in the growth rates and eventually cell death leading to death of complete plant. Various investigations have been carried out by a number of workers to find the effects of different types of wastewater on germination and growth of multiple crops (Malaviya and Sharma, 2011a; 2011b; Narain et al., 2012; Malaviya et al., 2012; Pandita and Malaviya, 2016). Field pea (*Pisum sativum* L.) is a very popular pulse crop of our country and India is the second largest producer of pea in the world after Russia. It is rich in protein, carbohydrates, vitamin A and C, calcium and phosphorus (Bhat et al., 2013). In view of all the above facts, the current experiment investigates relative impacts of untreated, primary treated and secondary treated distillery wastewater on seed germination, growth characteristics and pigment content of *Pisum sativum* L. variety FPP41.

Materials and Methodology

Seeds of *Pisum sativum* L. variety FPP41 used in the current experimentation were obtained from Sher-e-Kashmir University of Agricultural Sciences and Technology-Jammu (SKUAST-J). Untreated, primary treated and secondary treated distillery effluents used in the present study were procured on periodical basis from M/S Dewans Breweries Ltd. (Brewers and Distillers) located at Talab Tillo, Jammu. The distillery effluent samples were analyzed for their different

physiochemical characteristics using standard methods (APHA, 1998). Examination for sodium and chloride ions in the effluent samples were carried out using 850 Professional Ion Chromatograph system supplied from Metrohm, Switzerland.

Experimental Set-up and Experiment Process

For the experiment, four different treatment sets were prepared, Set-1 was kept as control in which tap water was used while for Set 2, 3 and 4, untreated, primary treated and secondary treated distillery effluents were used for germination of seeds. Labelled petri plates were arranged by placing sterilized absorbent cotton layer in it. The cotton was moistened with 40 ml of tap water for control and with the same quantity of untreated, primary treated and secondary treated distillery effluent. Pea seeds before using for experiment were treated with an antifungal solution (Bavistine) and washed thoroughly with double distilled water.

Ten uniform seeds of *Pisum sativum* L. variety FPP41 were placed in the petri plates on the absorbent cotton layer. The whole experiment was performed in triplicate and the results were averaged. The BOD incubator was used for carrying out the experiment and the temperature was maintained at 25 ± 1^{0}C. Germination was recorded daily at a fixed hour and criterion of germination was emergence of the radical. Total numbers of seeds germinated per day were counted until the germination of seeds became invariable. Germination percentage (G%) is an estimate of the viability of a population of seeds, which was calculated by dividing the number of germinated seeds on the total number of seeds sown (Ellis and Roberts 1980). Germination Index (GI) was calculated by the formula given by Zucconi et al. (1981) and Vigour Index by Abdul Baki and Anderson (1973).

Different germination indices i.e. germination value, peak value and percent inhibition were also calculated using formulae adopted from Rao et al. (1993) and Czabator (1962). Phytotoxicity index was calculated according to the formula given by Mekki et al. (2007). After the experiment was terminated, the root and shoot length of seedlings were measured by using a meter scale. The fresh root weight and fresh shoot weight was taken using Metler-Toledo digital balance. After taking the fresh weights, the roots and stems along with leaves were dried at 65^{0}C in a hot-air oven for 48 h for recording their dry weights. Root/Shoot ratio was calculated in terms of biomass (dry weight). The methodology described by Arnon (1949) was used to measure and calculate the values of the pigment content like Chlorophyll a, Chlorophyll b and Total Chlorophyll and Carotenoid content was calculated by the equation given by Duxbury and Yentsch (1956). The experiment was performed in triplicate. The SPSS Inc. (v. 17.0) software was used to statistically analyse the data obtained for the mean and standard error. Duncan's multiple range test at 5% was used to evaluate the quantitative changes due to effluent application.

RESULTS

Physicochemical parameters of effluent

The distillery effluents were analysed for their various physicochemical characteristics. It was observed that the untreated effluent was dark brown in colour, whereas primary treated effluent was light brown and secondary treated effluent was almost colourless. The pH of the effluent was measured using digital pH meter and it was observed that the untreated effluent was acidic (4.73) while it was slightly alkaline (7.77 and 8.18) in primary and secondary treated distillery effluent. The turbidity of effluent was measured using a standardized digital turbidity meter and for untreated distillery effluent it was found to be 2887 NTU, for primary treated it was 706 NTU and for treated effluent it was 009 NTU. Sodium content was 1774.452 ppm, 498.002 ppm and 308.465 ppm whereas, chloride content was 558.1 ppm, 330.688 ppm and 250.582 ppm in untreated, primary treated and secondary treated distillery effluent, respectively.

Germination parameters

In Table-1 impact of the different types of distillery effluent on various germination parameters *Pisum sativum* L. variety FPP41 are shown. The following trend was observed in all the positive germination parameters i.e. control treatment set (set 1) performed better than the secondary treated effluent i.e. set 2 which was followed by the primary treated effluent (set 3) and untreated effluent (set 4). In the various parameters like cumulative percent germination (100), peak value (33.33), germination index (41.34), germination value (3333) and vigour index (480) the maximum values after control treatment were found in the secondary treated distillery effluent followed by primary treated effluent. The minimum values for all the positive germination parameters were observed in untreated effluent like percent germination (13.33), peak value (4.44), germination index (0), germination value (59.18) and vigour index (0). It was also depicted in the results that minimum value for percent inhibition (0) was found in control and secondary treated distillery effluent while the maximum value (86.67) was found in untreated effluent. In untreated distillery effluent some seeds germinated but the seedlings could not survive beyond four days. The values of the Phytotoxicity Index (PI) range between zero and one, in which a higher value means a negative (i.e., toxic) effect and a lower value means a positive (i.e., stimulatory) effect. In the present study, PI of control was found to be 0 whereas it was 1.0, 0.81 and 0.59 in case of untreated, primary treated and secondary treated effluent, respectively.

Effect of distillery effluents on growth parameters

The impact of different distillery effluents on various growth parameters of *Pisum sativum* L. variety FPP41 are shown in Table-2. The results depict that the seedlings of the control set which were receiving tap water showed the highest values in all the parameters (root length and shoot length, fresh root and shoot weight, dry root and shoot weight and root shoot ratio), which was

followed by secondary treated and primary treated effluent treatment set. As it has been mentioned earlier that in the set receiving untreated distillery effluent, some seeds germinated but couldn't survive for more than four days hence no seedling growth was observed in that. It was observed that the maximum values of all the growth parameters like seedling length (5.5 cm), fresh shoot weight (0.131 g), dry shoot weight (0.013 g), fresh root weight (0.062 g) and dry root weight (0.005g) were found in secondary treated effluent treatment set after the control set. The minimum values of all these parameters were observed in the seedlings irrigated with primary treated effluent as there was no seedling growth in untreated effluent.

Pigment characteristics

Figure 1 shows the impact of different distillery effluents on pigment content of *Pisum sativum* L. variety FPP41. The maximum values for chlorophyll a (0.071 mg g^{-1} fw), chlorophyll b (0.019 mg g^{-1} fw), total chlorophyll (0.085 mg g^{-1} fw) and carotenoid (0.015 mg g^{-1} fw) were observed in control set however, the maximum values of chlorophyll a (0.036 mg g^{-1} fw), chlorophyll b (0.010 mg g^{-1} fw), total chlorophyll (0.063 mg g^{-1} fw) and carotenoid (0.012 mg g^{-1} fw) among different distillery effluents were seen in secondary treated effluent, whereas the minimum values were observed in primary treated effluent. No seedling growth was found in untreated effluent thus no pigment was developed. The maximum value for chlorophyll a/b ratio (4.60) was found in primary treated effluent, followed by secondary treated (3.43) and minimum value was observed in control treatment (3.63) (data not shown).

Discussion

Germination is supposed to be the most susceptible and vulnerable to water accessibility and to the salinity and toxic compounds present in the growth medium (Khan et al., 2002). In order to hydrolyse the stored food material and to stimulate their enzymatic systems the seeds imbibe the water during germination. As absorption in the seed takes place by osmosis, the content of the salt which may act as a restrictive factor might be responsible for the hindrance in germination (Garg and Kaushik, 2006). Ramana et al. (2002) found that inhibition in the germination may be due to higher concentrations of inorganic salts and higher electrical conductivity values of the distillery effluent. The current finding is supported by Bharagava et al. (2008). They observed that germination in *Brassica nigra* L. (mustard) decreased at 100% post-methanated distillery effluent. Comparable trends were observed by Sharma and Malaviya (2016) while studying the impact on germination behaviour of marigold (*Tagetes erecta* L. var. Pusa Basanti) while applying untreated and treated brewery-distillery effluent as treatment for plants. They found that minimum values for all the positive germination parameters like germination percentage, peak value, germination index and vigour index were observed in the

plants receiving 100% untreated effluent as irrigant. This may be attributed to the fact that greater osmotic pressure along with anaerobic condition is caused by high salt concentration in the effluent. This may alter the different biochemical processes such as respiration process of seeds, movement of solute and enzymatic steps of seed germination (Bhargava and Chandra, 2010). Similar observation was seen in the seeds receiving untreated wastewater as treatment in the present study. They germinated but couldn't survive longer may be because of decrease in the respiration rate. The synthesis of abscisic acid which causes the closure of stomata when transported to guard cells is induced by salt stress. As a result of stomatal closure, the rate of photosynthesis decreases and photoinhibition as well as oxidative stress occur (Zhu, 2007), which might be the reason of degradation of chlorophyll a, chlorophyll b, total chlorophyll and carotenoids in the distillery effluent treated seedlings.

Conclusion

The present study showed that the untreated and primary treated distillery effluent had toxic effects on germination of seeds, growth of seedling and content of pigment of *Pisum sativum* L. var. FPP41. The secondary treated distillery effluent showed relatively beneficial effect but less than the control. Hence, it can be concluded that concentration of nutrients in the effluent is not enough as a criterion for use as irrigation material. A holistic look at the nutrient concentrations and other desirable factors has to be considered before recommending effluents for irrigation. The sustainability of environment and related health issues should also be taken into consideration.

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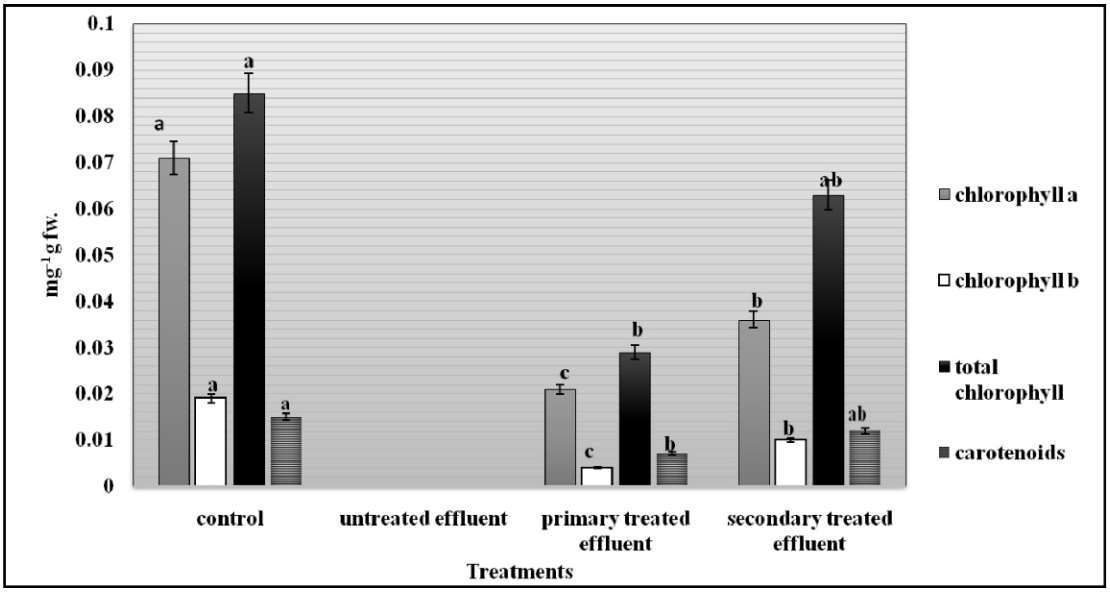

Fig 1: Variations in pigment content of *Pisum sativum* L. var. FPP41 treated with untreated, primary treated and secondary treated distillery effluent (Values are means of three replicates ± S.E.; Values not followed by the same letters are significantly different at $p < 0.05$).

Table 1. Variations in germination parameters of *Pisum sativum* L. var. FPP41 irrigated with untreated, primary treated and secondary treated distillery effluent

Treatment	Germination percentage	Germination index	Peak value	Germination value	Germination period	Percent inhibition	Vigour index	Phytotoxicity index
Control	100	100	33.33	3333	1.5	0	3633	0
Untreated effluent	13.33	0	4.44	59.18	1.5	86.67	0	1
Primary treated effluent	66.67	12.61	13.33	888.71	1.7	33.33	173	0.81
Secondary treated effluent	100	41.34	33.33	3333	3	0	480	0.59

Table 2: Effects of distillery effluents on growth parameters[1] (shoot and root length, fresh and dry shoot and root weight and root-shoot ratio) of *Pisum sativum* L.var. FPP41.

Treatment	Shoot length	Root length	Seedling length	Fresh shoot weight	Fresh root weight	Dry shoot weight	Dry root weight	Root shoot ratio
Control	10.833^{a} ±0.726	7.333^{a} ±0.166	18.166^{a}±0.726	0.691^{a} ±0.324	0.088^{a} ±0.016	0.065^{a} ±0.006	0.007^{a} ±0.006	0.119^{b} ±0.016
Untreated effluent	-	-	-	-	-	-	-	-
Primary treated effluent	2.566^{b} ±0.066	1.400^{c} ± 0.057	3.966^{b} ±0.088	0.033^{c} ±0.002	0.003^{b} ±0.000	0.010^{b} ±0.000	0.001^{c} ±0.000	0.096^{b} ±0.003
Secondary treated effluent	2.466^{b} ±0.033	3.033^{b} ±0.290	5.500^{b} ±0.264	0.131^{b} ±0.004	0.062^{a} ±0.004	0.013^{b} ±0.001	0.005^{b} ±0.000	0.425^{a} ±0.059

[1]Values are means of three replicates ± S.E.; within each column values not followed by the same letters are significantly different at $p< 0.05$.

Geotechnical Investigation of Slopes along Bhaderwah-Bani National Highway, Jammu and Kashmir

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ABSTRACT

This investigation has been carried out on the slopes along the road segment between Bhaderwah-Bani National Highway in the Jammu and Kashmir state which is subjected to frequent failures. The geotechnical analysis of these slopes has been performed to understand the behaviour of the slope materials in relation to inherent geotechnical properties. The grain size of the soil material is classified as clayey silt, silty clay and sandy silt. The higher fraction of fine grained materials in the study area suggests that these soils are higher in retaining capacity of water and create water barrier in the sediments which in turn helps in promoting the failures. The micro-morphological analysis of rocks in thin sections reveals deformation from foliation to grain level suggesting that rocks have undergone through compressive stress. The study also inferred that grains as well as minerals in the matrix are affected by elongation, flattening and rotation. Inter-granular primary porosity between the detrital framework grains and more diverse and complex secondary porosity is also observed in the rocks of the area. The study also reveales that intensity of fracture porosity is higher around the shear zones and localized faults. The different rock types in the area show different scales of permeability, foliated rocks showing L and S tectonites exhibit high permeability whereas, the non- foliated rocks show less permeability.

Keywords : Geotechnical Investigation, Bhaderwah-Bani, National Highway, Jammu and Kashmir

Introduction

The slope instability problem all over the world is alarming specifically along the hilly road networks and has become focus of the geo-scientific researches (Siddique et al., 2017; Anbazhagan et al., 2017; Sangra et al., 2017). The increasing slope failure incidents along these hilly road networks owing to the unplanned excavation and negligence or poor understanding of geotechnical properties of slope material leads to disruption of normal public life, loss of life and properties and above all environmental degradation (Sangra et al., 2017; Hussain et al., 2015; Siddique et al., 2015; Aleotti and Chowdhury, 1999). Indian Himalaya, in last few decades, experienced numerous landslide hazardous events throughout its extension, utterly due to complex geological and geotechnical settings.

Soil mechanics encompasses kinematics, dynamics, fluid mechanics, and mechanics of

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materials which determine the mechanical behaviour of soils on the slopes. The mechanical properties of soils are directly dependent on their three phases of occurrence, i.e. solid, liquid and fluid (Roy and Bhalla, 2017). The interactions of these three phases with each other and their applied potential e.g., stresses, hydraulic head, electrical potential, and temperature difference determine their mechanical properties (Schofield and Wroth, 1968). The solid soils are comprised of variable amounts of crystalline and non-crystalline clays, minerals, organic matter and insitu salts. The presence of clay minerals forms the main component in soils which characterize their influence in the slope stability (Al-Ani, and Sarapaa, 2008). The size, shape, physical and chemical properties of soil particles are controlled by the type of minerals present in the soils which bear their load-carrying ability and compressibility (Brady and Well, 1999). The soil particle association, their geometrical arrangement, particle groups, pore spaces, composition, and inter-particle forces determine soil structure which is very important aspect in slope stability by predicting future behaviour of slope mass. In the northwestern part of Indian Himalayan region various landslide studies has been carried out by various workers (e.g., Bhat et al., 2002, Singh et al., 2006, 2010, 2014; Hussain et al., 2015, Sangra et al., 2017) and they are of the opinion that slope instability in the region is influenced either by the dynamics of Lesser Himalaya or cumulative effect of various parameters such as geology, geomorphology, precipitation and geotechnical properties of rocks and soils. The present study is an approach in this direction to establish relationship of various parameters in slope instability on the road stretch of national highway connecting Bhaderwah and Bani in Jammu and Kashmir State.

Study Area

The Bhaderwah-Bani highway is situated between the Lat. N32°60' & N32°40' and Long. E75°40' & E75°60' in Survey of India toposheets at 1:50,000 scale. The characteristic features of the area are raised terraces, deep gorges and rocky cliffs, rugged and deep defiles and snow covered mountain peaks. The mountain slopes have very high gradient and at places reaches an angle of 80-83°. The study area (Fig. 1) generally receives significant rainfall in the months of July to September and average annual rainfall for the last five years (20122017) is 1284.58 mm (IMD, GOI). In accordance with the seismotectonic setup of the country study area falls in seismic zone IV and V.

Geological Setup

The regional geological setup of the study area (Fig. 1) falls under Lesser Himalayan division. The study area lies north of Main Boundary Thrust (MBT) and south of Main Central Thrust (MCT) which is locally known as Panjal Thrust (PT) in this region (Fuchs, 1975; Gansser, 1981; Thakur, 1981). The other thrust in this area includes Shali Thrust (ST) which is the footwall imbricate of PT and Murree Thrust (MT). The regional tectonostratigraphic setup of the study area is given in Table 1. The recognized lithounits exposed along the road comprise mainly slate,

quartzites, volcanics, phyllite, gneiss, schist, shale and limestone strata (Table 1).

Table 1: Tectonostratigraphic setup of the study area (after Choudhary, 2010)

Group/Formation	Lithology	Age
Bhadarwah Group	Phyllite, schist and slate	Precambrian
Dalhousie	Augen gneiss and granite (granodiorite to quartz diorite)	Precambrian
---------- Panjal Thrust (= Jutogh Thrust) ----------		
Sincha	Sandy dolomite occasionally phosphatic, pinkish, grey limestone having zebra type banding	Precambrian
Ramban	Grey to dark grey shale/slate with bands of grey quartzite, bluish grey phyllitic slate	Precambrian
Baila	Calcareous shale, nodular and lenticles of limestone, black to carbonaceous slate.	?Neoproterozoic
---------- Shali Thrust (= Sudh Mahadev Thrust) ----------		
Gamir	Quartzite, bands of conglomerate and cherty shale and bands of limestone and purple shale	Mesoproterozoic
Souni Volcanics	Greenish and greyish-green basalts	Palaeoproterozoic
---------- Murree Thrust----------		
Murree	Sandstone, mudstone and shale	Miocene
---------- Main Boundary thrust ----------		
Upper Siwalik	Sandstone and conglomerate	M. Pleistocene

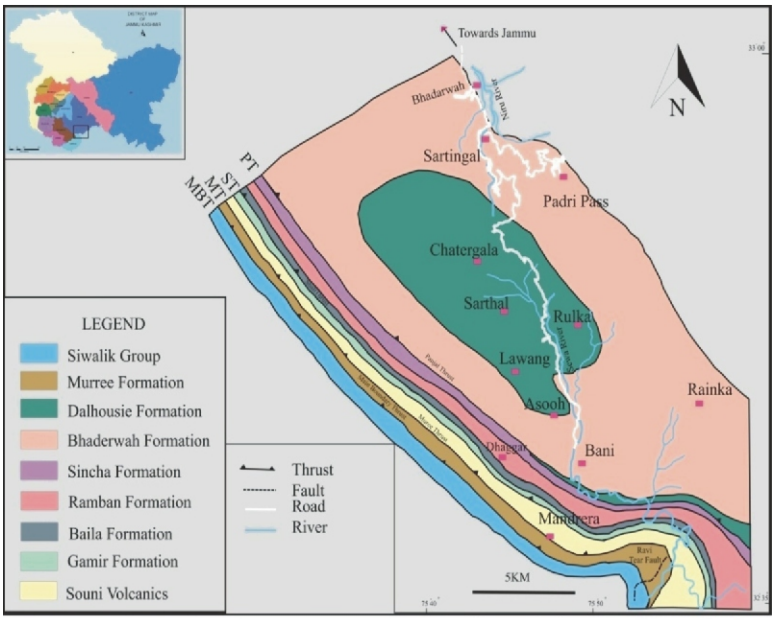

Fig. 1: Geological and structural map of the study area (modified after Choudhary, 2010)

Engineering Characteristics of Soil

In order to obtain the most appropriate relationship among various soil parameters 15 soil samples (Ls1 - Ls15) were collected from different spots (Fig. 2) at a depth of 20cm and were subjected to various tests such as grain size analysis, field moisture content, absorption value, bulk and dry density, void ratio and porosity, co-efficient of permeability and Atterberg's limit and the results are presented in Tables 2 and 3.

The grain size study reveals that samples collected from the Bhadarwah to Chattergala area (Ls1-Ls10) are dominated by silt and clay fractions except for Ls4 and Ls10 where fraction of sand and silt is more. The percentage of silt and clay ranges from 24.3 39.85% and 23.3 40.04% respectively. Therefore, these sediments are classified as silty clays and clayey silts (Table 2). In these samples gravel content ranges from 10.18 to 23.5% and sand content ranges from 12.00 to 29.6%. On the other hand, samples (Ls11 to Ls 15) taken from Bani area are clay dominated with clay ranging from 38.7 to 46.3% and the silt content ranges from 21.8 to 31.2 %. The third dominant component in these samples is the sand content which ranges from 20.5 to 22.7 % followed by gravel content which ranges from 8.5 to 16.2%. The clay dominated samples followed by silt content are classified as silty clay. The moisture content value is obtained from the field using rapid moisture meter and is expressed in percentage. The absorption value in these samples ranges from 8.12 23.32%. The absorption values indicate that these samples have medium to high absorption capacity but high shear strength due to the dominance of clay fraction present in these samples. The specific gravity of the soil samples vary from 2.05 to 2.79. The bulk and dry density has been performed to assess the degree of compaction in the soil and is an indicator of compactness of solid soil particles. The bulk and dry density of the study area ranges between 1310-1560 (kg/m3) and 1240-1510(kg/m3) respectively.

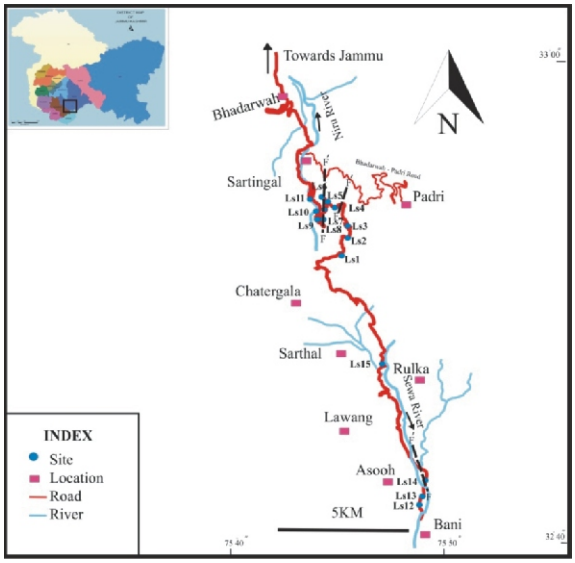

Fig. 2: Map displaying sample locations along Bhaderwah- Bani road

Table 2: Grain size analysis, moisture content, absorption value, bulk density and dry density results from the study area

S. No.	Sample No.	Grain Size				Soil Type	Moisture Content (%)	Absorption Value (%)	Bulk density (ρ) (kg/m^3)	Dry Density (ρd) (kg/m^3)
		Gravel	Sand	Silt	Clay					
1	Ls_1	10.18	19.40	39.85	30.57	Clayey silt	3.35	8.12	1470	1410
2	Ls_2	22	20.5	26	31.5	Silty Clay	5.07	17.89	1480	1400
3	Ls_3	23.5	19.5	26	31.0	Silty Clay	4.64	15.34	1570	1510
4	Ls_4	11.8	29.4	35.2	23.6	Sandy silt	4.37	13.42	1520	1430
5	Ls_5	22.0	12	25.8	40.4	Silty clay	2.25	9.35	1460	1380
6	Ls_6	11.0	12.8	46.3	29.9	Clayey silt	2.81	10.43	1340	1300
7	Ls_7	17.2	20.8	24.3	37.7	Silty clay	5.76	9.23	1400	1340
8	Ls_8	21.3	18.4	30.4	29.4	Clayey Silt	5.65	9.97	1530	1450
9	Ls_9	20.2	17.7	30.6	31.5	Silty clay	3.19	10.23	1560	1490
10	Ls_{10}	16.3	29.6	30.8	23.3	Sandy Silt	6.42	12.34	1310	1240
11	Ls_{11}	9.8	22.5	28.5	39.2	Silty clay	7.29	11.13	1450	1390
12	Ls_{12}	9.2	21.8	22.7	46.3	Silty clay	8.94	11.65	1540	1490
13	Ls_{13}	16.2	20.5	21.0	42.3	Silty clay	9.03	14.43	1480	1410
14	Ls_{14}	8.5	21.2	31.2	39.1	Silty clay	6.65	23.32	1430	1360
15	Ls_{15}	10.4	20.5	30.4	38.7	Silty clay	8.32	19.14	1440	1350

The void ratio and porosity values in the study area range from 5.497- 6.911 and 0.773 0.999 respectively. The permeability ranges between 0.00012 to 0.00857. The medium values of void ratio, porosity and permeability of these samples can also cause the slope failures depending upon the amount and timing of precipitation. Due to medium permeability water percolates downwards even up to the bedrock. The downward movement of water increases the pore pressure within the sediments and results in the slope failure (Anbalagan et al., 1996).

The liquid limit (LL) of the samples in the study area ranges from 17.0 to 29.3. The higher liquid limit value (27.0 - 29.3) obtained from the samples (Ls11- Ls15) indicate the dominance of clay with particles of colloidal size with high shear strength. The low liquid limit value (17.0) recorded at the Ls3 site indicates that the soil is of low shear strength. The plastic limit (PL) and

plasticity index (PI) value for the samples ranges from 15.1 to 22 and 2.8 to 11. The high plastic limit and plasticity index value is recorded at Ls11 and Ls14, respectively.

Table 3: Atterberg's limit values of the samples obtained for the study area

S. No	Sample No				Atterberg's Limit			
		Void Ratio ($G\ \rho_\omega / \rho_d$) - 1	Porosity % n = e/(1 + e)	Specific Gravity (G)	Co-efficient of Permeability (K) mm/sec	Liquid Limit (LL)	Plastic Limit (PL)	Plasticity Index (IP)
1	Ls_1	5.957	0.856	2.42	0.00345	23.0	18.0	5.0
2	Ls_2	6.007	0.857	2.79	0.00315	23.5	15.1	8.4
3	Ls_3	5.497	0.789	2.60	0.00324	17.0	15.8	1.2
4	Ls_4	5.860	0.773	2.49	0.00857	20.0	17.2	2.8
5	Ls_5	6.109	0.877	2.35	0.00421	24.5	17.1	7.4
6	Ls_6	6.546	0.883	2.44	0.00234	23.0	16.0	7.0
7	Ls_7	6.321	0.880	2.54	0.00435	19.5	15.0	4.5
8	Ls_8	5.766	0.871	2.69	0.00526	22.8	16.4	6.4
9	Ls_9	5.584	0.999	2.63	0.00512	22.0	17.0	5.0
10	Ls_{10}	6.911	0.888	2.41	0.00023	23.5	17.5	6.0
11	Ls_{11}	6.058	0.876	2.42	0.00042	27.0	22.0	
12	Ls_{12}	5.584	0.868	2.35	0.00012	26.5	18.7	7.8
13	Ls_{13}	5.957	0.874	2.22	0.00125	27.0	18.0	9.0
14	Ls_{14}	6.213	0.878	2.05	0.00541	26.0	15.0	11.0
15	Ls_{15}	6.267	0.879	2.16	0.00341	29.3	19.8	9.5

Petrographic Study

The petrographic analysis of the selected representative samples of the Bhaderwah - Bani area was done for detailed description of mineral content, nature and fabric of the rocks. The samples were used for thin section preparation and studied under high resolution petrological microscope under plane polarized and cross polarized light. The important characteristics studied include colour variation, refractive index, fracture pattern of the minerals, texture, tectonites type, etc. Point-counting was carried out to calculate percentage of individual grains using the Gazzi-Dickinson method (Dickinson, 1970; Ingersoll et al., 1984). Framework grains varying from 300 to 350 per thin section were counted. The photomicrographs were taken by using Leica microscope fitted with software.

The micro-morphological analysis of rocks in thin sections within the Bhaderwah - Bani area reveals deformation from foliation to grain level. The presence of deformed grains in thin sections suggests that both metamorphic and granitic rocks have undergone through compressive stress (Fig.3 a-b). The study shows both the grains as well as minerals in the matrix are affected by elongation, flattening and rotation. The undeformed grains observed in various thin sections represent the stress distribution within the matrix dominated by flaky and platy minerals. The study leads to identification of different types of pores, which include both the primary porosity and secondary porosity. The primary porosity fabric includes intergranular porosity, which occurs between the detrital framework grains of the rock (Fig. 3 a-b). The secondary porosity, which is more diverse and complex than the primary porosity is also observed in the rocks of the area (Fig.3a-b). The majority of sections show closed pores in the patches not connected to grains (Fig.4a-b). This type of porosity is very important and is present in the rocks of study area. The fluid in this case is not able to transmit because of the isolated patches of pores are disconnected. The water in such pores leads to generate pore water pressure and result into the breakdown of rocks. The secondary intercrystalline porosity is observed in metamorphic rocks in the area and fracture porosity has developed due to breaking of mineral grains forming small channels for fluid movement (Fig. 5 a-d). In the plasticity range of the grains, fractures are found generally filled, whereas, in the brittle stages these are open and, in some cases are filled with secondary minerals. The fractures range from hairline cracks to a few mm in size. In the present study the intensity of fracture porosity is higher around the shear zones and localized faults. The different rock types in the area shows different scales of permeability e.g, foliated rocks in the area showing L and S tectonites exhibit permeability whereas, the non- foliated rocks show less permeability. Two main modes of packing i.e., assemblage of crystal aggregate and chain or honeycomb arrangements were observed. Here basic unit of the packing system is an ordered packet of platy crystals and at places a bundle of lath shaped ones but the first one is more common. The crystal bundles are arranged edge-to-face in combination with edge-to-edge manner. The rocks of study area show rhombohedra to cubic arrangement of grains with theoretical porosity ranges from of 26% to 48% respectively.

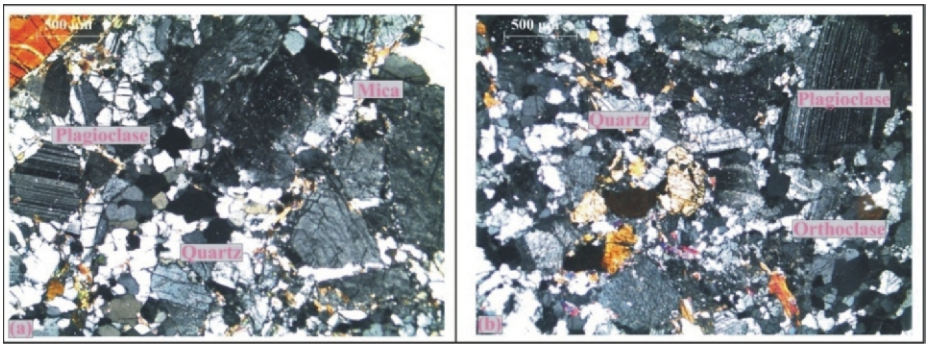

Fig.3. (a) Photomicrograph of thin section along XZ plane showing Quartz, plagioclase, mica and fractured porosity; (b) Section along YZ plane showing rotation of the minerals.

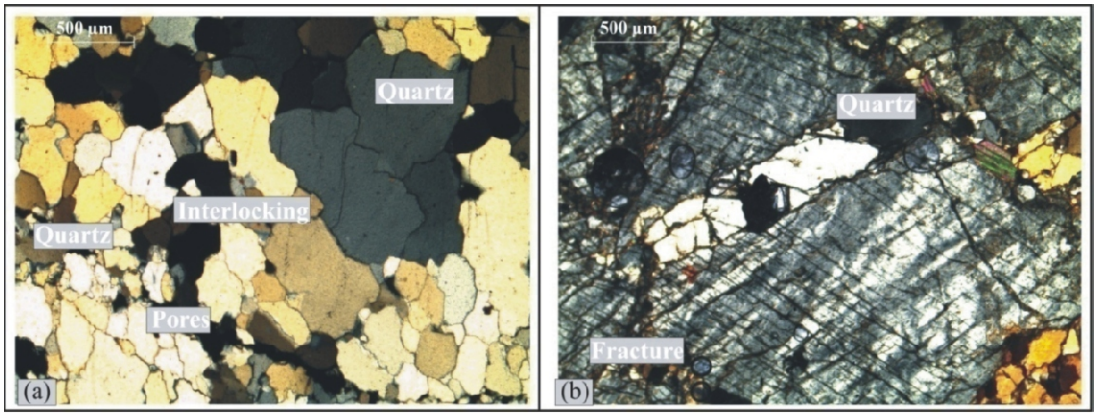

Fig.4 (a) Photomicrograph of thin section along XZ plane showing interlocking in quartz grains and pore spaces, (b) Fractures developed in thin section due to compression

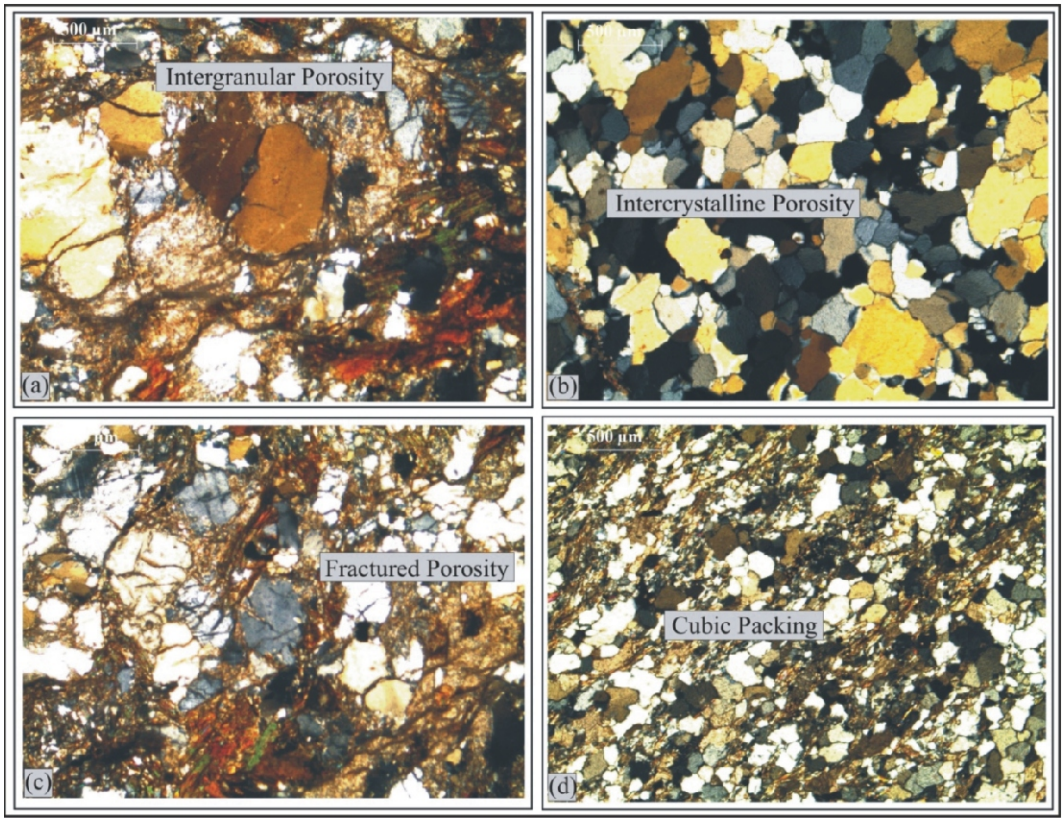

Fig. 5 Photomicrograph showing (a) Intergranular porosity between the detrital framework grains. (b) Intercrystalline porosity with no constrictions of throat between grains. (c) fractured and intercrystalline porosity (d) Cubic packing surrounded by the fine grained matrix.

Conclusions

The investigated soil slopes along the road segment in the study area is subject to frequent failures therefore, geotechnical analysis of soils was performed to understand the behaviour of

the slope material in relation to inherent geotechnical properties of soils along with the amount of precipitation. The following conclusions are drawn:

The grain size analysis classifies the soil material into three types, i.e. clayey silt, silty clay and sandy silt. The higher fraction of sandy material in two samples (Ls4 = 29.4; Ls10= 29.6) accounts for less cohesion and subsequently decreases in the shear strength of the material. The relative combination of sand, silt, and clay in the material helps in determining the water-holding capacity and water movement. The higher fraction of these materials in the study area suggests that material having higher retaining capacity of water and creates water barrier in the sediments which in turn helps in promoting the failures. The medium values of porosity and effective permeability in all the samples depends upon the amount and duration of concentration of precipitation. The medium permeability also leads to movement of water up to bed rocks which increases pore water pressure within the sediments and helps in initiating the failures. The petrophysical study of the rocks collected from the study area revealed the presence of both primary and secondary porosity. These porosities include intercrystalline porosity, which is characteristic of metamorphic rocks of the area. The most important porosity type observed is the fracture porosity and is present in all types of the rocks under investigation. The fracture porosity is extremely important in engineering geology because it gives rock very high and connected permeability which inturns helps in deep percolation of water.

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Application of Floating-gate MOSFET in the Design of Bulk Driven Current Mirror

Roshani Gupta*, Rockey Gupta** and Susheel Sharma***

ABSTRACT

Analog circuits based on current mode approach have gained prominence in the design of mixed mode circuits for low voltage and low power applications. The current mirror is one of the most important building blocks employed in the design of complex analog circuits. High performance current mirrors based on floating-gate and quasi floating-gate MOSFETs have already been designed for low voltage and low power analog applications. This paper presents the design of bulk driven current mirror using floating-gate MOSFETs (FGMOS) and quasi floating-gate MOSFETs (QFGMOS) whose performance has been compared with simple FGMOS and QFGMOS current mirrors (CMs). It has been observed that bulk driven CMs using FGMOS and QFGMOS exhibit higher bandwidth and better linearity as compared to simple FGMOS and QFGMOS CMs. Also, QFGMOS bulk driven current mirror dissipates less power amongst all current mirror topologies presented. Further, the output resistance of QFGMOS and FGMOS bulk driven CMs shows enhancement over that exhibited by QFGMOS and FGMOS counterparts. The design of presented circuits has been validated through PSpice simulations with level 7 parameters having feature size of 0.13μm at ± 0.5V.

Keywords : Current mirror, bulk driven MOSFET, FGMOS, QFGMOS

Introduction

The current mirror (CM) forms one of the fundamental building blocks of analog integrated circuits. Modern mixed mode VLSI systems have been designed to operate with supplies of the order of sub-volts and require high performance analog and digital parts. As a result analog circuits also need to operate with low voltage supply matching with its digital counterparts. Hence, high performance current mirrors are desired for energy efficient analog sub-circuits in modern VLSI systems. A CM is basically a simple structure comprising of two transistors which is used to reflect an input reference current with high output resistance and often employed as active loads for providing large voltage gain and less chip area. The output current in CM is desired to be independent of the output terminal voltage and is in direct proportion to the input current. Current mirrors can be designed using bipolar or CMOS transistors. CMOS current mirrors (CMs) have better accuracy than their bipolar counterparts and are less sensitive to process variations [1-3].

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Current Mirror

A simple CM consists of two matched transistors as shown in Fig. 1 which has properties of an ideal current source like zero input resistance and infinite output resistance for any arbitrary voltage across the output terminals.

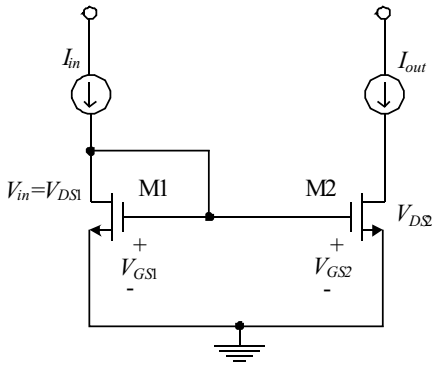

Fig. 1 Simple current mirror

In current mirror, if the gate-source voltages of both transistors are equal, the channel currents should also be equal [1-3]. MOSFET M1 as shown in Fig. 1 is in saturation since $V_{DS1} = V_{GS1}$. If $V_{DS2} \geq V_{GS2} - V_{T2}$, then M2 is also in saturation. Assuming M2 in saturation, the equation for current transfer function is given by [3]:

$$\frac{I_{out}}{I_{in}} = \left(\frac{L_1 W_2}{W_1 L_2}\right)\left(\frac{V_{GS} - V_{T2}}{V_{GS} - V_{T1}}\right)^2 \left[\frac{1+\lambda V_{DS2}}{1+\lambda V_{DS1}}\left(\frac{K'_2}{K'_1}\right)\right] \tag{1}$$

where symbols have their usual standard meaning. Here K' and V_T are identical for both transistors since M1 and M2 are fabricated on the same substrate. Assuming $V_{DS1} = V_{DS2}$, Eq. (1) becomes

$$\frac{I_{out}}{I_{in}} = \left(\frac{W_2/L_2}{W_1/L_1}\right) \tag{2}$$

Thus, the current transfer ratio of a current mirror is a function of the aspect ratio of the transistors and can be adjusted during fabrication. For the perfectly matched devices, we have

$$I_{out} = I_{in} \tag{3}$$

The CM shown in Fig. 1 has been simulated to obtain drain characteristics by choosing aspect ratio (W/L) of M1 as 3.9μm/0.39μm and M2 as 13 μm/0.52 μm. The drain characteristics indicates that as I_{in} goes on increasing, the drain current (I_D) also increases as shown in Fig. 2. Also, it can be seen that the output current is not constant in saturation region and it is varying with change in output voltage. This implies that the output current depends upon output voltage which results in low value of output resistance.

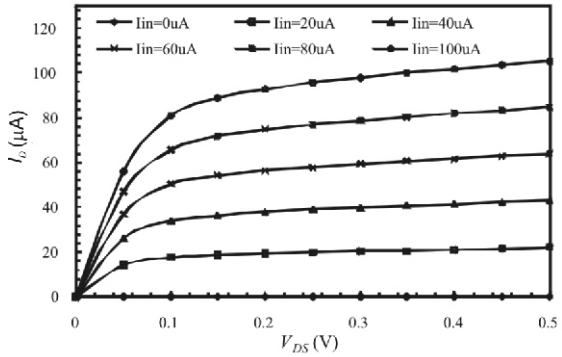

Fig. 2 Drain characteristics of simple current mirror

FGMOS current mirror

The FGMOS current mirror (FCM) consists of two transistors M1 and M2 as shown in Fig. 3. The M1 is FGMOS having two inputs where one of the input terminals is used for applying bias voltage while other input terminal is used for signal processing and M2 is a conventional MOSFET [4-6].

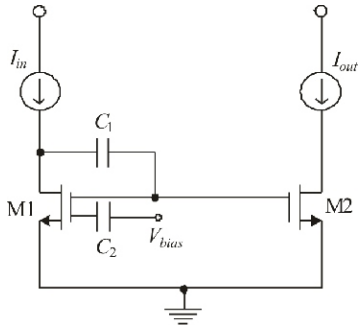

Fig. 3 FGMOS based Current mirror

The structure of FCM though provides threshold voltage tunability at the expense of large silicon area besides degradation of effective transconductance and gain bandwidth product [7, 8]. Now, the current transfer function for FGMOS current mirror can be obtained by substituting V_{T1} for FGMOS in Eq. (1) and is given by [8]:

$$\frac{I_{out}}{I_{in}} = \left(\frac{L_1 W_2}{W_1 L_2}\right)\left(\frac{V_{GS} - V_{T2}}{V_{GS} - \left(\frac{V_{T1} - V_{bias} k_{2,FG}}{k_{1,FG}}\right)}\right)^2 \left[\frac{1+\lambda V_{DS2}}{1+\lambda V_{DS1}}\left(\frac{K_2'}{K_1'}\right)\right] \quad (4)$$

The circuit of FGMOS current mirror shown in Fig. 3 has been simulated by choosing the same aspect ratio as in CM of Fig. 1 in order to obtain drain and transfer characteristics shown in Figs. 4 and 5 respectively. Simulation results show that the current transfer ratio is 0.94 for the input current range up to 100 μA.

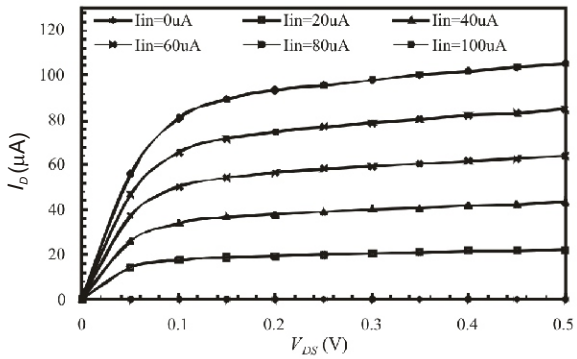

Fig. 4 Drain characteristics of FGMOS current mirror

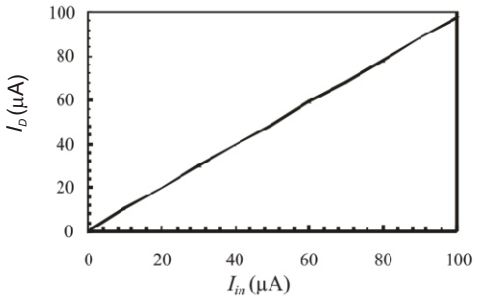

Fig. 5 Transfer characteristics of FGMOS current mirror

QFGMOS Current Mirror

A circuit of QFGMOS current mirror has been obtained by modifying Fig. 3 by replacing C_2 by a reverse biased MOSFET M3 so as to weekly connect the gate of M1 to positive supply rail as shown in Fig. 6.

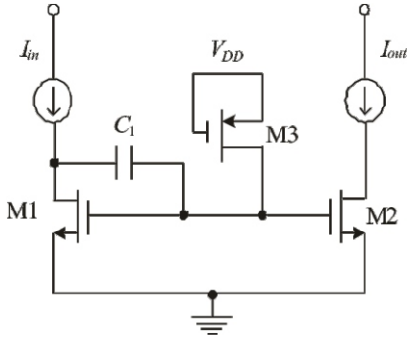

Fig. 6 QFGMOS based current mirror

In QFGMOS based CM, there is no need of bias voltage and hence the use of large capacitance required for biasing purpose is avoided as required in FGMOS CM resulting in better frequency response [9].

The corresponding current transfer function for QFGMOS CM is given by:

$$\frac{I_{out}}{I_{in}} = \left(\frac{L_1 W_2}{W_1 L_2}\right)\left(\frac{V_{GS} - V_{T2}}{V_{GS} - \left(\frac{V_{T1} - V_{DD} k_{2,QFG}}{k_{1,QFG}}\right)}\right)^2 \left[\frac{1+\lambda V_{DS2}}{1+\lambda V_{DS1}}\left(\frac{K_2'}{K_1'}\right)\right] \quad (5)$$

The circuit shown in Fig. 6 has been simulated by selecting the similar aspect ratios of M1 and M2 as in Fig. 3 and that of M3 as 1.3 μm/0.13 μm. The drain and current transfer characteristics of QFGMOS based CM are shown in Figs. 7 and 8 respectively.

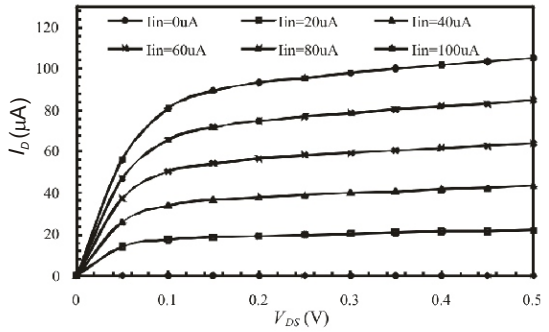

Fig. 7 Drain characteristics of QFGMOS current mirror

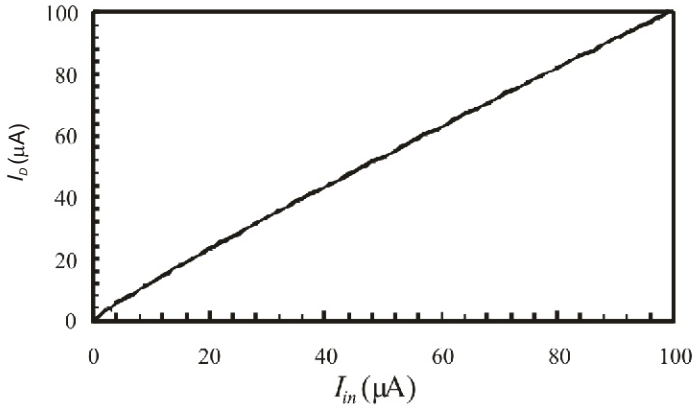

Fig. 8 Transfer characteristics of QFGMOS current mirror

From the simulation results, the current transfer ratio of QFGMOS CM is found to be 0.96 at 100 μA.

The comparative frequency response of FGMOS and QFGMOS CMs is shown in Fig. 9.

It has been observed that QFGMOS CM exhibits larger bandwidth (4.05 GHz) as compared to FGMOS CM (788.26 MHz).

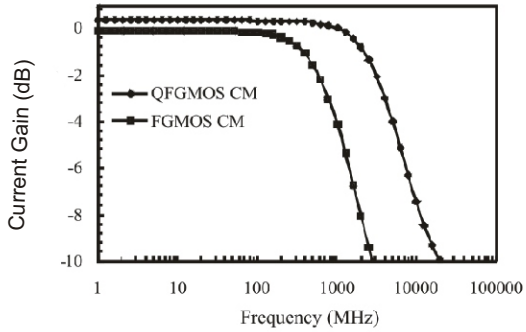

Fig. 9 Comparative ac response of FGMOS and QFGMOS current mirror

Bulk driven MOSFET

The conventional MOS transistor is a four terminal device wherein fourth terminal called bulk is applied to positive or negative supply for p-channel or n-channel transistors respectively, or tied to respective source terminals. If bulk-terminal is used for signal input, then threshold voltage can be reduced [10-12].

The circuit of bulk driven MOSFET is shown in Fig. 10 where V_{GS} is kept constant at 0.3V and input signal is applied at bulk terminal.

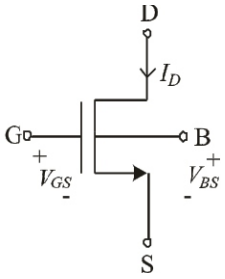

Fig. 10 Bulk driven MOSFET

The expression for threshold voltage in bulk-driven MOSFET is given by [1]:

$$V_{th} = V_{tho} + \gamma \left(\sqrt{\left|2\phi_F + V_{SB}\right|} - \sqrt{\left|2\phi_F\right|}\right) \quad (6)$$

where V_{tho} denotes the threshold voltage with $V_{SB} = 0$ and γ is bulk threshold parameter and ϕ_F is bulk surface potential. As evident from Eq. (6), the threshold voltage can be altered by V_{SB} of suitable polarity.

The comparative transfer characteristics of simple MOSFET and bulk driven MOSFET are shown in Fig. 11. From the graph, it is quite evident that bulk driven MOSFET conducts much earlier than conventional MOSFET which requires enough gate voltage to overcome threshold voltage ($V_T = 0.25$ V).

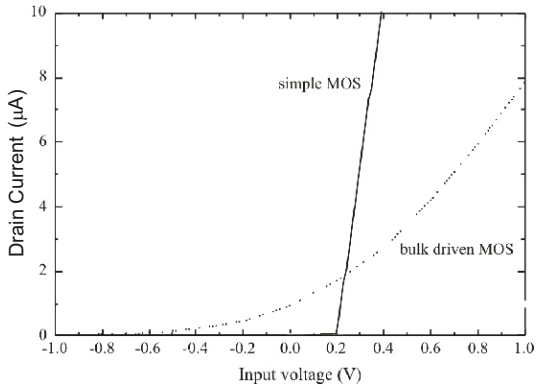

Fig. 11 Comparative transfer characteristics of conventional and bulk driven MOSFET

Bulk driven current mirror

Since bulk driven MOSFETs do not require threshold voltage for conduction, therefore the performance of current mirrors can be enhanced when conventional MOSFETs are replaced by bulk driven MOSFETs [12-15]. NMOS version of the bulk-driven current mirror (BDCM) is shown in Fig. 12.

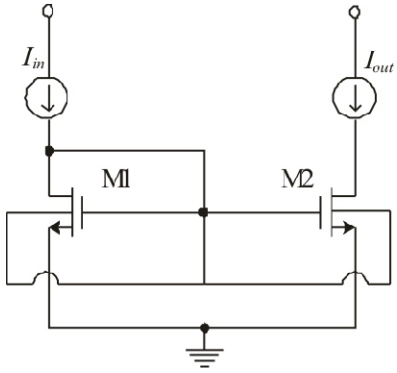

Fig. 12 Bulk driven current mirror

In this circuit, instead of the gate-drain diode connection as used in CM (Fig. 1), a bulk-drain connection with the gate has been employed. The drain characteristics of BDCM are shown in Fig. 13.

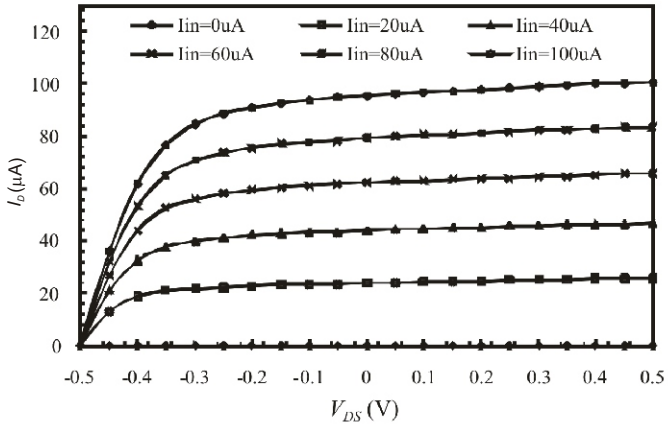

Fig. 13 Drain characteristics of bulk driven current mirror

The comparative drain characteristics of simple CM and bulk driven CM have been obtained by selecting I_{in} =100 μA as shown in Fig. 14.

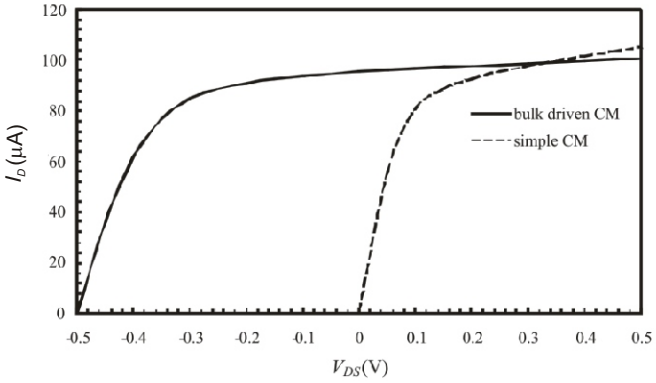

Fig. 14 Comparative drain characteristics of simple CM and bulk driven CM

As evident from the figure, bulk driven CM has larger output resistance (64 kΩ) as compared to simple CM (7.83 kΩ).

FGMOS bulk driven current mirror

The performance of bulk driven CM can be further enhanced if the circuit is implemented using FGMOS as shown in Fig. 15.

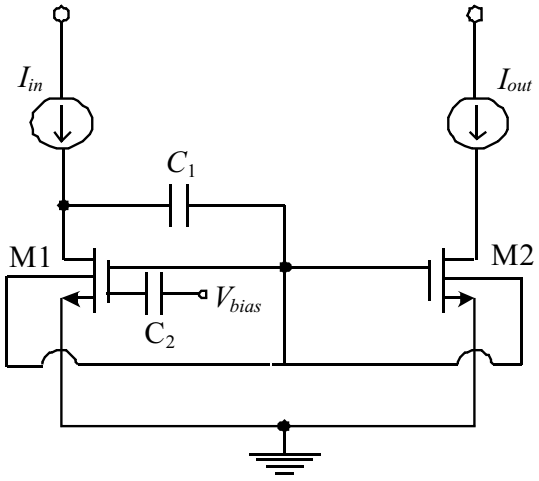

Fig. 15 Bulk driven FGMOS current mirror

In this circuit, M1 is used as bulk driven FGMOS where the bulk and gate are connected together, while the other gate terminal is used for biasing purpose to reduce its threshold voltage. The drain characteristics of FGMOS bulk driven CM are depicted in Fig. 16. Further, the comparative drain characteristics of FGMOS CM and bulk driven FGMOS CM have been obtained by selecting Iin = 100 μA and are shown in Fig. 17.

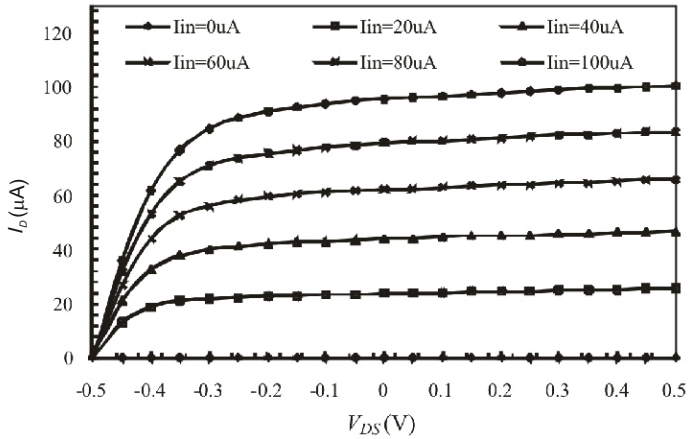

Fig. 16 Drain characteristics of bulk driven FGMOS current mirror

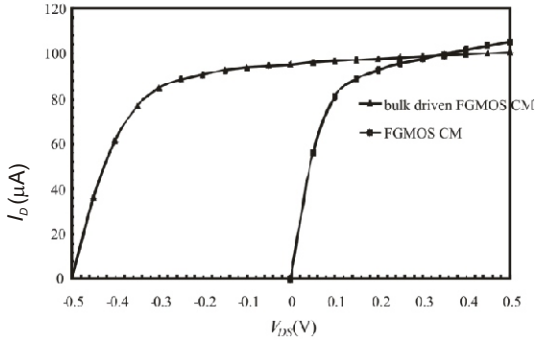

Fig. 17 Comparative drain characteristics of FGMOS CM and bulk driven FGMOS CM

It can be seen from these characteristics that output curve is more horizontal for bulk driven FGMOS CM than that of FGMOS CM suggesting its enhanced output resistance. The output resistance of bulk driven FGMOS CM has been found to be 46 kΩ while that of FGMOS CM is 9.84 kΩ.

From the transfer characteristics of FGMOS bulk driven CM (Fig. 18), the current transfer ratio has been obtained as 0.97 for the current range up to 100 μA.

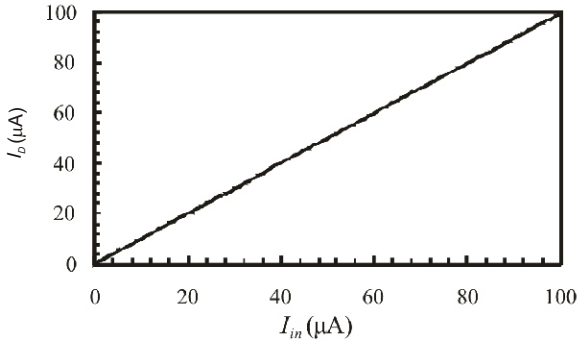

Fig. 18 Transfer characteristics of bulk driven FGMOS CM

QFGMOS bulk driven current mirror

The FGMOS BDCM shown in Fig. 15 has poor frequency response due to need of large capacitance (C_2) for applying bias voltage. The frequency response can be improved if bulk driven FGMOS is replaced by bulk driven QFGMOS as shown in Fig. 19.

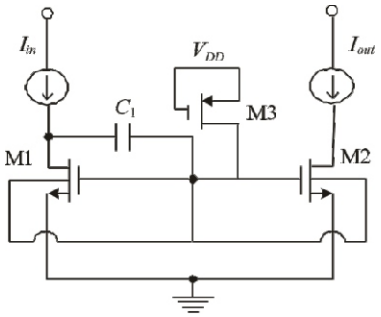

Fig. 19 Bulk driven QFGMOS current mirror

This circuit has been simulated to obtain drain characteristics as shown in Fig. 20.

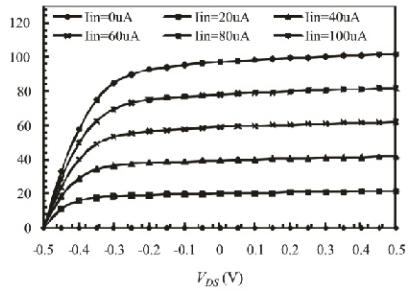

Fig. 20 Drain characteristics of bulk driven QFGMOS current mirror

Now the comparative drain characteristics of bulk driven QFGMOS CM and QFGMOS CM have been obtained by selecting I_{in} =100 μA as shown in Fig. 21.

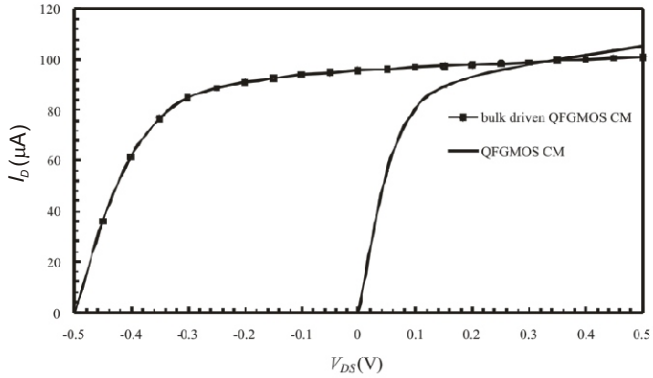

Fig. 21 Comparative drain characteristics of QFGMOS CM and bulk driven QFGMOS CM

It has been observed that the output current curve for bulk driven QFGMOS CM is more horizontal in the saturation region than that of QFGMOS CM. The output resistance of bulk driven

QFGMOS CM is 140 kΩ which is more than QFGMOS CM with output resistance of 51 kΩ. The current transfer characteristic of QFGMOS BDCM is shown in Fig. 22 presenting current transfer ratio of 0.99 for input current range up to 100 μA.

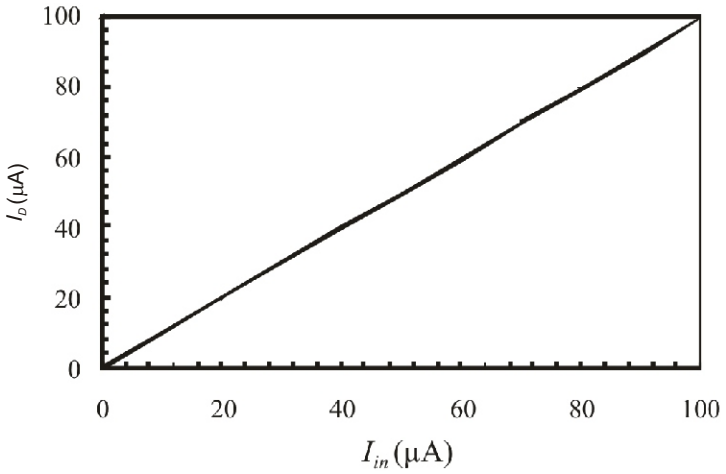

Fig. 22 Transfer characteristics of bulk driven QFGMOS CM

The comparative frequency response of FGMOS and QFGMOS bulk driven CMs is shown in Fig. 23 revealing that QFGMOS BDCM exhibits higher bandwidth (9.49 GHz) as compared to FGMOS BDCM (936.67 MHz).

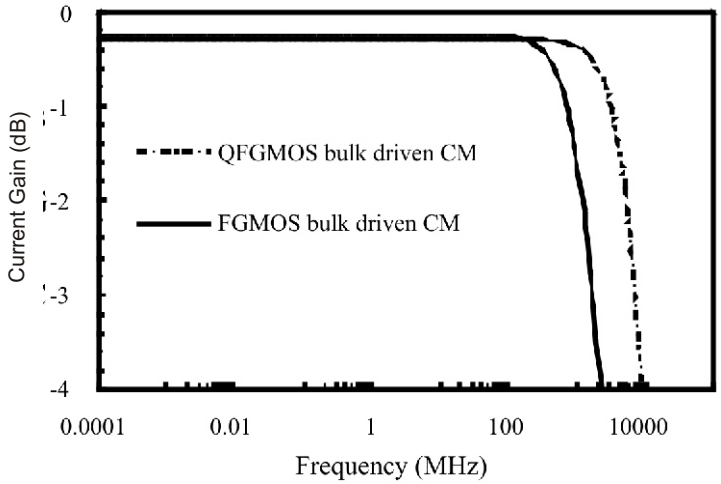

Fig. 23 Comparative ac response of FGMOS and QFGMOS bulk driven CM

Further, the comparative study of different current mirror topologies in terms of various performance parameters is presented in table 1.

Table 1 Performance comparison of current mirror circuits

Parameters	FGMOS CM	QFGMOS CM	FGMOS BDCM	QFGMOS BDCM
Power dissipation	0.25 mW	0.1 mW	98 μW	60 μW
Input resistance	1.3 kΩ	0.96 kΩ	1.25 kΩ	0.4 kΩ
Output resistance	9.84 kΩ	51 kΩ	46 kΩ	140 kΩ
Bandwidth	788.26 MHz	4.05 GHz	936.67 MHz	9.49 GHz
Current transfer ratio	0.94	0.96	0.97	0.99

Conclusion

In this paper, the design of current mirror using bulk driven floating-gate and quasi floating-gate MOSFETs has been presented and their performance is compared with simple FGMOS and QFGMOS current mirror designs. A comparative study of these current mirrors in terms of various performance parameters like input resistance, output resistance, current transfer ratio, bandwidth and power dissipation has been carried out. It has been observed that QFGMOS and FGMOS bulk driven CMs exhibit larger bandwidth as compared to QFGMOS and FGMOS current mirrors. Also, QFGMOS bulk driven CM dissipates least power amongst all current mirror topologies. Further, QFGMOS and FGMOS bulk driven CMs exhibit higher output resistance and better linearity as compared to QFGMOS and FGMOS CMs.

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Hypertension, Vitamin D and VDR Gene Methylation : A Review Study

Isar Sharma*, Indu Priya*, Sakshi Sharma*, Ritu Mahajan** & Nisha Kapoor***

ABSTRACT

Hypertension is a severe cardiovascular disorder with a multifactorial manner of occurrence associated with environmental, developmental and genetic set off. It is a disorder that involves genes, epigenetics, lifestyle and metabolic mechanisms in a combined effect, each conferring a small increase in the overall disease burden and it can be heritable. Its true etiology is not fully understood, however recent studies showed relationship between vitamin D and vitamin D receptor (VDR) with hypertension. As summarised below, we have looked over the literature reporting association of vitamin D and its receptor with cardiovascular disorders. It is evident from various studies that vitamin D levels in the body affects blood pressure and low levels of vitamin D in the body are already known to have link with increased blood pressure. Vitamin D participates in the regulation of calcium and phosphorus and also works in the regulation of renin-angiotensin-aldosterone system (RAA) and smooth muscle cells (in relation with cardiovascular system). There are cells that have nuclear receptors through which vitamin D and VDR works. The aim of this review is to combine the role of vitamin D, its receptor and epigenetic changes with cardiovascular diseases like hypertension.

Keywords : Hypertension, Cardiovascular system, Epigenetics, Vitamin D, Vitamin D receptor (VDR)

Introduction

Our body needs energy and oxygen which comes from the blood that pumps around our body when our heart beats. To make the blood circulate a pressure is needed and this pressure is exerted on the walls of our arteries (blood vessels). Our blood pressure is a measure of the strength of this pushing, in combination with the resistance from the artery walls. A normal individual's heart pumps blood around the body easily, at a normal pressure. High blood pressure means that our heart pumping blood harder and the arteries have to carry the blood flowing under greater pressure. All this puts a strain on our arteries and our heart, which in turn increases our risk of a heart attack, a stroke or of suffering from kidney disease [1]. This condition of prolonged high blood pressure is usually known as hypertension.

Symptoms of hypertension: Tiredness, dizziness, fainted spells, chest pain or pressure, a

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racing heart beat, bluish lips and skin, nausea, short of breath during routine activity (such as climbing of stairs) are some symptoms of hypertension. Not everyone experience these symptoms and they vary in severity, so it can be difficult to diagnose. A detailed description of all the symptoms is important so that a right diagnosis can be made because high blood pressure rarely causes any perceptible symptoms. One cannot usually feel or notice high blood pressure and it is estimated that around seven million people with high blood pressure are undiagnosed [2].

Causes of hypertension: One cannot always give a clear explanation as to why someone has a high blood pressure. However, there are several factors that can play a role in increasing the risks of developing hypertension. Some of the contributing factors to blood pressure risk are [WHO guidelines]: Obesity and overweight, high blood pressure family history, less exercise, high salt diet, high fat diet, smoking, regularly drinking alcohol beyond the low risk guidelines and other metabolic disease history like diabetes.

Stress and bad temper also causes high blood pressure by raising heart rate, and in turn, blood pressure. But it is not been totally evident that stress alone has a long-lasting effect on blood pressure. However, the things usually done by people to counter stress, such as eating junk and high calorie food and excess drinking of alcohol, can cause long term blood pressure problems.

Diagnosis: Hypertension is a dangerous health condition which lacks noticeable symptoms in many sufferers. The only way of finding out if there is a problem is to have routine monitoring of blood pressure. A reading of blood pressure consists of two numbers or levels, the systolic pressure and the diastolic pressure. The normal blood pressure should be in the range of 120mmHg systolic pressure/80mmHg diastolic pressure - 140/90mmHg [3], but it varies according to the age, sex and other metabolic conditions.

Clinical manifestations of Hypertension: High blood pressure is one of the main cause of stroke and heart attack and the risk of having a stroke or heart attack is reduced by lowering the blood pressure [1, 2].

Stroke: A stroke is a serious, life threatening medical condition that arises when the blood supply to a part of the brain is cut off. Strokes are a medical emergency and urgent treatment is essential so that less damage can happen. Uncontrolled high blood pressure puts a burden on blood vessels all over the body, including crucial and essential arteries in the brain. This force can cause vessels to weaken which results in bleeding into the brain and in every possible way it can result in a stroke [Courtesy: drinkaware.co.uk, Blood Pressure Association, British Heart Foundation, The Stroke Association].

Heart attack: A heart attack is a major and crucial medical emergency in which the supply of blood to the heart is suddenly blocked, usually by a blood clot. Lack of blood to the heart can adversely damage the heart muscles. High blood pressure can cause a risk of having heart attack or developing heart disease in future. Untreated hypertension can cause angina (chest pain and breathlessness caused when the blood supply to the muscles of the heart is confined) and may lead to a heart attack in due course, because of the high strain on heart and blood vessels. The symptoms of a heart attack vary from person to person. One may feel tightness or pain in the chest and this can spread to the neck, arms, jaw, stomach, or back. For some people, the pain or constraint is severe, while for others it is nothing more than a mild discomfort. One may also feel dizzy or light-headed, nausea or vomit and short of breath [Courtesy: drinkaware.co.uk, Blood Pressure Association, British Heart Foundation, The Stroke Association].

Other effects of hypertension are kidney damage and damage to the retina (the light-sensitive lining at the back of the eye which allows us to see) [4].

Prevention and Treatment of hypertension: One can lower the blood pressure by making changes to the lifestyle because one can only manage the lifestyle to have a controlled blood pressure. Healthy diet, exercise, minimum caffeine intake, eating low salt and low fat diet, quit smoking and lowering alcohol intake are some of the changes one can have to prevent high blood pressure (alcohol can have a serious long-term effect on blood pressure and research has shown that heavy drinking can lead to increased risk of hypertension for both men and women [5]).

Vitamin D and its role: Vitamin D is also known as antirachitic vitamin. The most established and the basic role of vitamin D (cholecalciferol) in human body is its participation in the regulation of calcium and phosphorus. It increases the intestinal absorption of calcium for proper mineralization of bones [6, 7, 8]. Vitamin D promotes calcification by a direct action on bone and it is known to prevent and cure rickets. Lack of vitamin D results in a medical condition called osteomalacia, which is a defect of bones. Earlier it was thought that vitamin D only prevent rickets [9], but recent findings showed that it has various other functions to perform as many cells of different organs and tissues have nuclear receptors through which vitamin D and vitamin D receptor (VDR) operates and works. There is high body of affirmation that cholecalciferol regulates the cardiovascular system, in affect with renin-angiotensin-aldosterone system (RAA), cardiomyocytes and smooth muscle cells and its deficiency has been related to high risk of hypertension[10].

Vitamin D is a fat soluble vitamin and it resembles sterols in structure and functions like a

hormone and its action may be compared with that of aldosterone. The principal natural vitamers (forms) of this vitamin are: Vitamin D2 (calciferol, ergocalciferol) and vitamin D3 (cholecalciferol). Vitamin D2 is found in plants and vitamin D3 is found in animals.

Physiology of Vitamin D: Vitamin D is synthesized in the skin as vitamin D3 by the exposure of ultraviolet- B (UVB) from the sun and sometimes obtained directly from the diet as vitamin D2 or vitamin D3. When vitamin D enters the body, it get circulated in the body with the help of vitamin D binding protein (DBP) and is expeditiously converted to 25-hydroxyvitamin D (25(OH)D) by the liver (major circulating form). With the influence of parathyroid hormone (PTH), 25-hydroxy vitamin D is converted to its hormonal form which is 1,25-dihydroxyvitamin D (1,25 (OH)2D) by the 1-alpha-hydroxylase (1α-OHase) in the kidney. Other tissues in the body also have the 1-alpha-hydroxylase and can convert 25(OH)D to 1,25 (OH)2D [11]. However, only the renal 1-alpha-hydroxylase notably contributes to circulating 1,25 (OH)2D levels[11]. It is considered that the presence of the extra-renal 1-alpha-hydroxylase allow 25(OH) D to be converted to 1,25-dihydroxyvitamin D to function as a paracrine or autocrine hormone.

Circulating 1,25-dihydroxyvitamin D then enters the target cell in its free form and binds to the vitamin D receptor (VDR) in the cytoplasm which then get translocated to the nucleus and heterodimerizes with the retinoic x receptor (RXR) [12]. The 1,25-dihydroxyvitamin D-VDR-RXR complex then gets bind to vitamin D response elements (VDRE) on DNA to increase the transcription of vitamin D regulated genes and this regulation by vitamin D also include genes important for mineralization of bones and calcium transport in the intestine [13]. Some functions of vitamin D may also include genes important for innate immunity, muscle function (both skeletal and smooth), cancer proliferation and endothelial cell proliferation [11].

The status of Vitamin D is chiefly determined by a serum 25-hydroxyvitamin D concentration as opposed to 1,25-dihydroxyvitamin D, for various reasons including its high circulating half life (~3 weeks versus ~8 hours). The concentration of 25(OH)D is 1000 times higher in circulation as compared to 1,25(OH)2D (ng/mL vs pg/mL) and the production of 1,25(OH)2D is majorly under the influence of PTH which firmly regulates calcium levels[14]. Thus, 1,25-dihydroxyvitamin D levels could be elevated in individuals with severe vitamin D deficiency in order to maintain normal serum calcium levels. As a mediator of cardiovascular disease, it is hypothesized that 25-hydroxyvitamin D is the best biomarker to describe vitamin D status, although it has not been confirmed yet[14].

Sources of Vitamin D: Vitamin D is found mainly in fish liver oil and in yolk of egg. It is also present in small amount in milk and animal fat. Vitamin D2 is formed by ultraviolet irradiation of ergosterol (a substance found in yeast and ergot, from which it is named). Vitamin D3 occurs

naturally in fish liver oil and egg yolk. It is formed when 7-dehydrocholesterol of the skin is activated by ultraviolet light.

Causes of vitamin D deficiency: Vitamin D deficiency is becoming a common problem and in many countries, this phenomenon is already present in approximately 50% of the world's population, and its causes are often complex and difficult to define [15]. Reason for the deficiency of vitamin D is the problem with vitamin D synthesis in the skin, which is the major source of vitamin D. This is primarily due to geographical latitude, cloudy weather, increased air pollution, excessive use of cosmetic UVB filters, staying indoors, lifestyle, and the aging process [16, 17]. Inadequate dietary intake, malabsorption, liver disease, kidney disease, and obesity or dark skin color can also lead to vitamin D deficiency. Melatonin contained in the skin acts as sunscreen, thus people with dark skin require longer exposure to ultraviolet to produce a sufficient quantity of 25(OH)D3 [18]. Vitamin D deficiency is most common in older individuals because there is less activation of vitamin D metabolites in the liver and kidneys [19]. On the other hand, obesity is a major risk factor for the deficiency of vitamin D because of vitamin D's high solubility in fat and storage in adipose tissue with consequently slow release into the circulation. The consequences of untreated vitamin D deficiency are related to less successful treatment of other underlying diseases, such as diabetes, hypertension, autoimmune diseases, and cancer [20].

VDR gene: VDR gene is located in the chromosome no. 12 (12q13.11) with an exon count of 12. In humans, the vitamin D receptor is encoded by the VDR gene and VDR is expressed in most tissues of the body and regulates intestinal transport of calcium [21]. According to the data available in NCBI, this gene encodes the nuclear hormone receptor for vitamin D3 and this receptor also functions as a receptor for the secondary bile acid lithocholic acid. The receptor belongs to the family of trans-acting transcriptional regulatory factors and shows sequence similarity to the steroid and thyroid hormone receptors. Majorly, downstream targets of this nuclear hormone receptor are principally involved in mineral metabolism though the receptor regulates a variety of other metabolic pathways, such as those involved in the immune response and cancer. Mutations in this gene are associated with type II vitamin D-resistant rickets. Alternative splicing results in multiple transcript variants encoding different proteins. [provided by RefSeq, Feb 2011]. Upon activation by vitamin D, the VDR forms a heterodimer with the retinoid-X receptor and binds to hormone response elements on DNA, resulting in expression or transrepression of specific products [12, 13].

VDR is found in vascular smooth muscle cells and endothelial cells and calcitriol through VDR affects the proliferation, migration, and contraction of smooth muscle cells in blood vessels

as well as the formation of calcifications in vascular walls [22].

Effect of epigenetics on VDR gene (DNA methylation): The epigenetic changes like methylation may affect the proper functioning of the gene (like VDR gene) which in turn results in the higher risk for any abnormality and make the individual susceptible for certain kinds of disorders and malfunctioning of the body (as any defect or change in the receptor gene can alter the ability of that receptor to bind with the ligand and operate accordingly and properly). Epigenetic changes like methylation of the vitamin D receptor (VDR) gene can have a major impact in the vitamin D metabolism and its connection with the hypertension.

DNA methylation can result in the regulation of gene expression and is required for normal (and abnormal) cellular differentiation pathways. DNA methylation pattern (also called second code), is an additional layer of information superimposed on the DNA code that determines many phenotypic attributes. Though the DNA code is largely unchanging, DNA methylation patterns do change in response to spatial, temporal and environmental cues. To accurately describe the phenotype, the methylation pattern of DNA must be determined. Also selective gene inactivation has been shown to result from the DNA methylation of cytosine in the promotor regions [48]. A methylation-specific cytosine is often associated with a guanine residue as a CpG dinucleotide or CpG site (cytosine and guanine linked by only one phosphate). CpG islands are regions with a high frequency of CpG sites. Multiple CpG islands (that is, regions of >500bp and higher than 55% GC content) have been identified around regulatory regions of genes [49].

Methylation of a CpG residue can be determined by treating genomic DNA with Sodium bisulfite that converts nonmethylated cytosine to uracil, while methylated cytosine is protected from bisulfite conversion. Comparing the sequence of bisulfite-converted DNA with untreated DNA clearly indicates the presence of methylated C residues, because they appear as C in bisulfite-converted DNA. Non methylated C is converted to U (and to T in the sequence reaction), so it appears as T. [courtesy: Thermo Fisher scientific Applied Biosystems]

A 2017 study linked epigenetic change of VDR gene with multiple sclerosis [50] and a recent study of 2018 found the role of VDR gene methylation in hepatocellular carcinoma [51]. Further, its methylation status in tuberculosis [52] and adrenal tumors [53] has already been determined. Epigenetics of VDR gene also have impact on immune response. According to a recent study it is being explained that VDR gene methylation act as a molecular adaptation to light exposure [54].

Vitamin D and Hypertension - Few Studies: A trial based on vitamin D supplementation reported a 14 mmHg decrease in systolic blood pressure in patients with type 2 diabetes without hypertension and it was also found that a single large dose of oral vitamin D improved endothelial function in patients with type 2 diabetes and vitamin D deficiency [23-24]. Vitamin D may

influence blood pressure by modifying the activity of the renin-angiotensin-aldosterone system, preventing secondary hyperparathyroidism, and influencing arterial smooth muscle. This effect may be also modulated by a polymorphism of the VDR. [25].

It was shown that skin exposure to ultraviolet radiation causes an increase in serum vitamin D. It was shown in a study of patients with untreated hypertension, that controlled skin UVB irradiation for 6 weeks caused an increase in the concentration of serum calcidiol and a subsequent decrease in systolic and diastolic blood pressure by 6 mm Hg. It was further demonstrated that the anti- hypertensive effect was not related to the exposure of UVA rays, as UVA does not stimulate the cutaneous synthesis of vitamin D [26].

Based on the Tromso study, patients were monitored for the concentration of vitamin D serum levels for many years and it was shown that the vitamin D serum levels correlate with the current value of systolic blood pressure, but it is not a prognostic factor for the development of hypertension in future [27].

Kota, et al., demonstrated that systolic blood pressure, diastolic blood pressure, and mean arterial pressure had increased among individuals experiencing inadequacy of Vitamin D and proposed that Vitamin D deficiency is associated with renin-angiotensin-aldosterone system (RAAS) regulation [28]. One comparable review demonstrated that individuals with larger amounts of Vitamin D had lower blood pressure and a lower danger of developing hypertension [29].

Several studies have examined the relationship between vitamin D status and incident hypertension. In a study (HPFS and the Nurses' Health Study) of men and women with vitamin D deficiency (< 15 ng/mL), a 3 to 6 fold increased risk of developing incident hypertension over a 4 year follow-up period was reported [32]. A few in vitro and in vivo studies have evaluated the role of vitamin D acting directly on cardiac tissue, especially in response to injury [33]. Rahman, et al., demonstrated that matrix metalloproteinases (MMP) proteins that contribute to aberrant cardiomyocyte remodeling in response to injury and atherosclerosis, were up-regulated in vitamin D receptor knockout mice [33] and they have impaired cardiac relaxation and contractibility [34]. Vitamin D receptor knock-out mice also developed left ventricular hypertrophy [35, 36].

A study described that diabetic patients who ingested a single large dose of vitamin D (100,000 IU) had significant improvement in endothelial function measured by flow mediated dilation and decrease in blood pressure [37]. Finally, a randomized controlled trial of vitamin D supplementation in subjects with heart failure demonstrated significant reductions in inflammatory cytokines involved in the pathophysiology of heart failure [38].

The proper mechanism for how vitamin D in actual may protect against cardiovascular disease has not been fully elucidated till date. There are some proposed mechanisms which include effects on the renin-angiotensin system, on glycemic control, inflammatory cytokines, direct effects on the vasculature [39, 40] and regulation of parathyroid hormone levels and calcium deposition in vascular smooth muscle [41]. The studies to investigate these mechanisms have been conducted mainly in pre-clinical studies with very less information available from clinical trials.

An experiment in 2012 in Denmark looked at the effects of Vitamin D supplements on lowering blood pressure in people with hypertension. For 20 weeks, people took either 3,000 IU per day of Vitamin D or a placebo pill and their blood pressure was measured. It was found that the people in the Vitamin D group lowered their blood pressure more than the people getting the placebo. People in the Vitamin D group who had low levels of Vitamin D at the beginning of the study had a reduction in their blood pressures and it was concluded that vitamin D may be effective in lowering blood pressure in people who have low levels of Vitamin D [42].

A study (Mendelian randomization) was conducted to test whether 25(OH)D levels are significantly associated with blood pressure risk. Different variants of genes that affect 25(OH)D synthesis or substrate availability (Vitamin D 25-hydroxylase and 7-dehydrocholesterol reductase) were analysed and 146,581 participants were used respectively. It was found that each 10% increment in genetically instrumented 25(OH)D concentration was associated with a decrease in systolic BP (-0.37 mmHg, P = 0.052) and diastolic BP (-0.29 mmHg, P = 0.01), and an 8.1% reduced odds of hypertension (P = 0.002). The findings of a study conducted later, further confirmed that increased 25(OH)D concentrations might decrease the risk of hypertension [43,44].

In a review done by Lee, et al. it was shown that serum Vitamin D and parathyroid hormone (PTH) levels independently have no significant connection in relation to hypertension among Chinese individuals [45]. In a cross-sectional review of 251 individuals (age 40 or more years old) by Kashi, et al., it was discovered that there was no association between hypertension and serum 25(OH) Vitamin D, calcium, and PTH levels in combination [46]. Snijder reported that some other elements might have an impact on the relation between Vitamin D and hypertension, especially in older age groups, suggesting that Vitamin D effect's on blood pressure might be indirect based on its role in parathyroid hormone performance [47].

A recent review article in 2017 has also reported many studies which show a strong association and a role of vitamin D in causing and preventing hypertension [30]. A study by Mehta (2017) suggested that low levels of Vitamin D, along with sugar and fats, should be considered as

new risk factors in causing hypertension [31].

Conclusion

Hypertension is a serious chronic disease, which can cause other cardiovascular disorders and may lead to death, eventually. This article intends to provide an overview of vitamin D and its receptor and their role in regulating blood pressure and hypertension. Vitamin D deficiency is very common worldwide and several studies have demonstrated and confirmed the association between low Vitamin D levels in the body and risk of cardiovascular disorders and metabolic syndromes.

Most of the studies of clinical trials of Vitamin D in the treatment of high blood pressure have mixed results and have limited conclusions. Future studies are required to establish the independent and exact role of vitamin D in the control or regulation of hypertension.

Vitamin D regulates some major processes like Renin-Angiotensin-Aldosterone system (RAA), and it also have some effects on cardiac mechanism, inflammatory markers and responses.

The role of VDR in regulating the hypertension is as important as vitamin D itself so it becomes very important to determine the functioning of VDR gene in hypertensive individuals. Studies and trials should be conducted to provide assistance for checking any genetic defect or mutation in the VDR gene which may be responsible for Vitamin D modulated hypertension

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SOCIAL SCIENCES

Conservation of Archaeological Stone Monuments and Objects

Malay Dey*

ABSTRACT

Man's relationship to cultural property and the value he attaches to it are the result of the interplay of many different factors. But because an item of cultural property is valued, no matter how varied the reasons, there is the concomitant responsibility to preserve such objects whether they are small or big. The monuments in the world are the standing examples of stretching the horizon of human skill, imagination and thoughts. A high proportion of the world's cultural heritage is made up of stone, and it is slowly but inexorably disappearing. If we do not take care to reduce or prevent this deterioration of monuments we will lose our heritage. The present article has tried to find out the causes of deterioration of archaeological stone monuments and objects and some methods for conservation of stone objects

Keywords : Stone monuments, archaeological objects, stone classification, stone characteristics, weathering, pollution, bio deterioration, conservation

Introduction

Stone carving tradition is regarded as old as civilization itself. In olden times, selecting rough natural stones and shaping them to a predetermined design was an art mastered by human beings which continuous to flourish till date. All over the world temples and historical buildings have served to display art and designs in stone. Sculptors have shown their skills in carving out immortal art of worldwide significance in the rocks, stones, and caves of India. Some of these sculptures are very old and have been declared UNESCO World Heritage Sites, in the hope that these excellent invaluable creations will be preserved for future generations.

The monuments of India are popular worldwide and are significant for their beauty. These monuments are the standing examples of stretching the horizon of human skill, imagination and thoughts. The rulers of India had their own method of expressing their ideas in bricks, marble, stone and mortars. There are thousands of many famous monuments of our cultural heritage that have been damaged during wars between kingdoms and foreign invasion. A large number of monuments were destroyed during the foreign invasions of India such as Somnath temple in Gujarat, Nalanda university- one of the most prominent seats of learning in ancient India, etc.

Besides, there are many structures which have fallen prey to exposure to climatic changes over the centuries such as weathering, bio-deterioration, etc. and have deteriorated. Such deterioration of structures made of stone is clearly visible to anyone who has looked closely at a historic stone building or structure. Though there are a few stones that seem to be little affected

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by centuries of exposure to the weather, yet the majority of stones are damaged gradually due to weathering.

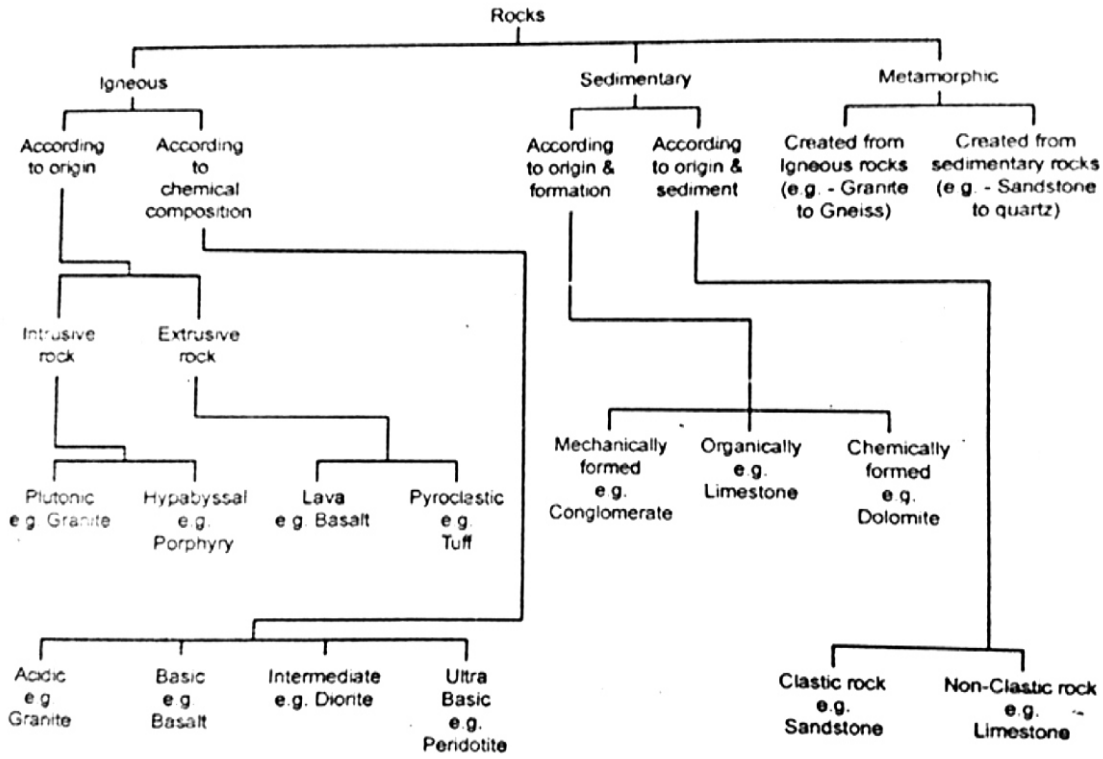
Table below illustrates some important stone monuments in India which have been affected by different Natural Agents and Atmospheric Pollution.

NAME OF THE MONUMENT	STATUS	MADE UP OF	LOCATION	DEGRADATION FACTORS
Taj mahal	World Heritage site	**Makrana Marble** which is unique because of its purity and lustre	Uttar Pradesh	Air Pollution
Qutub Minar	World Heritage site	**Red Sandstone and Marble**	Delhi	Air Pollution
Red fort and Agra Fort	World Heritage site	**Red Sandstone** of Vindhyan age.	Delhi and Agra	Air Pollution
Diwan-i-Khas and Diwan-i-Aam in Fathepur Sikri	World Heritage site	**White Marble**	Agra	Air Pollution
Hawa Mahal	Due to the use of Pink Sandstone Jaipur is called as pink city of India.	locally found **Marble and red pink Sandstone**	Jaipur	Air Pollution
Dilwara Temple	Popular for extraordinary architectural design and stone carvings.	**Marble**	Mount Abu in Rajasthan	Biological and Physical Factors
Sanchi Stupa	World Heritage site	**Sandstone**	Madhya Pradesh	Physical and Biological factors
Charminar	National Monument	**Granite, Mortar and pulverised Marble**	Hyderabad city	Air Pollution
Brihadeswar temple also known as Rajarajesvaram or Peruvudaiyar Kovil	Hindu Temple	**Granite**	Thanjavur in Tamil Nadu	Physical Weathering and Air Pollution
Ajanta Ellora	World Heritage Site	**Basalt**	Maharastra	Physiacal and Biological Factors
Ramanathaswamy Temple	Hindu Temple	**Sandstones and Marble**	Rameshwaram Tamilnadu	Physiacal and Biological Factors
Meenakshi temple	Hindu Temple	**Granite, Marble, Conglomerate, Slate and Limestone.**	Tamilnadu	Physiacal and Biological Factors
Mahabalipuram	World Heritage Site	**Granite**	Tamil Nadu	Physiacal and Biological Factors

A high proportion of the world's cultural heritage is made up of stone, and it is slowly but inexorably disappearing. If care is not taken to reduce or prevent this deterioration of monuments our heritage will be lost for ever.

One needs to understand and characterize the stones involved in many of the monuments in order to analyse the decay and measure its extent, severity, and rate.

Classification of Rocks : According to origin rocks are classified into three categories-Igneous 2. Sedimentary 3. Metamorphic



Classification of Stone[1]

Igneous:- Among the main three types of rocks igneous rocks are hard, massive and compact. Igneous rock forms as molten material, called magma, cools and solidifies. As the hot magma rises to the surface and cools the chemical elements within it combine, and minerals begin to crystallize. As cooling continues, the size of crystals get bigger, more numerous and begin to interfere with the surrounding crystals which are also growing; the result is a mass of partially formed and interlocking crystals. If cooling is slow minerals with sharp edges and perfect faces are rare; normally so many form at once that they don't have room to grow in this way. There are no layers of igneous rocks. These rocks are free of fossils. There are no pores in the igneous rocks and as such they are impervious in which water cannot easily enter. They are not easily weathered.

Granite and Basalt are main rocks which are used to build up archaeological monuments and objects.

Sedimentary:- Sedimentary rocks form at the earth's surface by the action of weathering and erosion of pre-existing rocks. Rocks are gradually broken down by physical and chemical means when they are exposed to the atmosphere. Wind-blown particles wear away by friction or erosion; rain pounds and the rainwater dissolves some parts; alternate freezing and thawing of water in tinycracks break down the surface layer; gravity and weather shift unstable particles down slope and they abrade or break other rocks that they hit. Natural calamities also occur: earthquakes trigger massive rockslides; floods move a large amount of materials and undercut their banks; volcanoes blast cubic kilometres of rock into rubble. Broken rocks, grains and dissolved materials wash into rivers and are carried or rolled downstream. Materials are abraded and gradually rounded off as they grind together like pebbles in a lapidary tumbler. When the rivers enter lakes or the ocean, particles are dropped and dissolved materials tend to deposit as fine precipitates of mud or ooze. The dropped particles vary in size from boulders through gravel and sand to silt and mud. Sediment may also be transported by others forces like glacial ice or the wind. The deposited materials, when other layers of transported sediment are added on top, become compacted and mineral matter precipitates from trapped water and cement the grains together forming sedimentary rocks. Because the accumulation of layers of deposited material forms the sedimentary rocks, they very often have a layered appearance. Sedimentary rocks may have various other structures apparent within them, such as ripples, animal burrows or plant roots. Often plants and animal specially marine animals remain drop into and become buried in the accumulating sediment, becoming fossils. Limestone and Sandstone are main sedimentary rocks which are used to build up archaeological monuments and objects.

Metamorphic:- Metamorphic rocks form when pre-existing rocks are subjected either to elevated temperatures or pressures, or to the actions of chemically active solutions. Compared to sedimentary rocks they are hard and heavy. Archaeological monuments and objects are generally made of four important metamorphic rocks i.e. Gneiss, Marble, Quartzite and Slate.

In this context, it becomes necessary to understand how some stones used for making any monument/ object are affected by different natural and anthropogenic factors-:

Granite: Granite is the basic material for carving out sculptures in India especially in South India. Granite is a pink or greyish coloured, medium to coarse-grained, evenly granular rock which represents the lightest coloured variety of intrusive rock. The grains are mainly white/pink orthoclase feldspar, with lesser amounts of white/grey plagioclase feldspar, and quartz; small amounts of dark biotite and/or hornblende are mixed in with these light mineral components. In some granite, where the feldspar is red in colour, the rock will appear darker. Most of the cave temples are cut of these rocks.

Physical weathering on Granite structures is very common. Hot temperatures can give rise to thermal expansion in rocks and cool temperatures can cause rocks to contract. In areas where

the temperature is hot during the day, rocks get hot and can expand by a small amount. During the night the temperature can drop significantly making it very cold and so the rocks contract. This continuous expansion of the rock during hot day and contraction during the cold night exerts stress on the rock and cracks form eventually causing break down of the rock to fall away.

Granite is not good conductors in the outer rock layers than in the inner ones. The outer layers are thus peeled off from the main mass of the rock in the form of concentric sheets. This is just like peeling off layers of an onion. This process is known as exfoliation. Granite structures are mainly damaged by this type of weathering.

Basalt: This igneous rock is a fine-grained, dark-coloured, dense which has a dull, granular appearance. Basalt is the volcanic equivalent of gabbro. It is often porphyritic. Commonly basalt is vesicular, that is, it has holes (vesicles) which were once gas bubbles; later, these holes often fill with mineral matter (amygdule). Basalts when formed by underwater eruptions characteristically develop pillow-like shapes. Basalt is used in sculpturing.

Basalt is also damaged by Physical Weathering. Temperature fluctuation exerts stress on the rock and cracks form eventually causing break down of the rock to fall away.

Conglomerate: It is cemented-together gravel type rock. It consists mostly of rounded fragments which are greater than 2 millimetres in size. The spaces between the grains are filled with varying amounts of fine-grained material or cement. As like most sedimentary rocks, conglomerate is laid down in layers; however, these layers are often so thick that they are not visible in an isolated outcrop.

Sandstone: consists of rounded sand grains cemented together; it is one of the most common sedimentary rocks. Colours are widely variable and shades of grey, yellow, brown and red are frequent: darker shades are also common. A sandstone may contain obvious layers (bedding) or lines at angles to the layers (cross bedding), but in some cases the beds are too far apart to see in one exposure, as is the case with conglomerate. Sandstone was also chosen to cut and shape sculptures.

Sandstone and Conglomerate are porous rocks. Depending on the capillary properties of porous rocks, the processes of wetting, drying, transport of water and aqueous salt solutions consequently follow, thus causing the destruction of rock.

Limestone: It is a white, grey or black, fine-grained rock which fizzes vigorously when a drop of dilute hydrochloric acid is put on it. Limestone generally contains fossils, such as shells or other animal remains, and in some cases the fossils may make up most of the rock. When limestone is hit with a hammer it may give off a sulphurous smell. Calcite is the dominant constituent in limestone and it is the material which causes the rock to effervesce in acid. Calcite is also a common material in other sedimentary rocks, where it can occur in fossils or in veins and fracture coatings. For this reason one must be conscious when testing for a reaction to acid, and put the drop of acid on rock surface which does not contain fossils or veins. Most of the regions in Madhya Pradesh, Odisha, Rajasthan etc. have limestone rock cut temples.

Marble: It is limestone or dolomite that has recrystalized due to metamorphism. It is a light coloured rock and consists of medium to coarse grained interlocking calcite or dolomite crystals. A marble formed of calcite crystals will fizz with dilute acid. On the other hand, a dolomite marble will fizz if powdered or reacted with hot or concentrated acid. Darker streaks are often present in marble as are calcite veins. Marble scratches easily with a knife. It is the marbles that are the most important in museum work as they have been used to such a large extent for sculpture as well as building purposes.

Limestone and marble are highly damaged by Chemical Weathering. Chemical weathering occurs when rocks are broken down by a chemical change. Rainwater can become slightly acidic by absorbing carbon dioxide in the atmosphere. This acidic rainwater reacts with the mineral grains in the rock giving rise to new minerals and salts.

The degree of chemical weathering depends on the type of rock. Marble and limestone are more readily chemically weathered than other stones. Other factors such as temperature also play an important role as the chemical reactions occur more quickly in areas of high temperatures. Acid rain is also a contributor to chemical weathering. When fossil fuels such as coal, gas and gasoline are burnt they release oxides sulphur, carbon and nitrogen into the atmosphere. These gases pollute air and combine with moisture in the air to form sulphuric acid, carbonic acid and nitric acid, making the resulting rainwater more acidic than normal.

Slate: It is the metamorphic product of shale. The colour of the slate is generally dark grey, green or black, but sometimes may also be red or brown. Individual grains cannot be distinguished with the naked eye. Slate is a fine-grained brittle rock which splits readily into thin smooth-faced layers or sheets due to physical weathering.

The phenomena of decay are commonly seen on public building and outdoor monuments due to biological weathering, atmospheric pollution and bio-deterioration.

Biological Weathering:- Biological weathering takes place when rocks are worn away by living organisms. Trees and other plants can grow within the cracks in rock monuments. As the roots of the plants grow bigger they push open cracks in the rocks making them wider and deeper. Over time the growing tree eventually pieces the rock apart.

Tiny organisms like bacteria, algae and moss can grow on rock structure and produce chemicals which can break down the surface layer of the rock. Burrowing animals such as rabbits can accelerate the formation of cracks.

Atmospheric pollution:- Any qualitative and quantitative change in the natural composition of atmosphere, soil and water is called pollution. It has been proven from different researches that the archaeological and heritage sites located within the different parts of India are exposed to the risks of industrial pollution that threatens the existence of these historical evidences. Outdoor stone objects are prone to be seriously damaged by the acids present in an industrial atmosphere. With the increasing size of factories and workshops and residential complexes, the rate of increase of pollution is on the rise. The colour of white marble of which Taj

Mahal is built is going to be yellowish in colour which is due to SO2 (Sulphur di oxide) emitted from the Mathura refinery, resulting in formation of acid rain which later on corrodes the marble surface by dissolving the CaCO3(calcium carbonate) present in the marble. Pollutants like CO (Carbon monoxide), SO2(Sulphur dioxide), which are responsible for the deterioration of red colored sandstone of Gwalior Fort. Similarly, dust deposition on the surface of ancient monument Charminar of Hyderabad is causing blackening of the surface.

Bio-deterioration of stone monuments:- Micro-organisms and organisms normally play an important role in some fundamental geological process- weathering of rocks, formation and transportation of soil and sediments, genesis and degradation of minerals. When some of these phenomena occur on stonework of great artistic or historic interest particularly that of buildings and monuments, that is obviously detrimental. In fact, it causes not only an aesthetically undesirable effect but more importantly a progressive decohesion and transformation of stone. In nature bio-deterioration of stone cannot be considered as an isolated phenomenon; in fact, it always occurs with other physical, chemical or physio-chemical deterioration process, with which it is strictly correlated. Deterioration mainly occurs due to the growth of algae, fungi, bacteria, mosses, liverworts and other plants and animal.

A deposit of above organisms may be seen on stone objects, especially on those which have remained open for sometime. Such a deposit is not only ugly, imparting a patchy green or black appearance to the objects; it may also produce pits in the surface of the stone, thereby weakening its structure.

Conservation methods used for protecting stone monuments and objects are illustrated below:-

Removal of dirt from Indoor Objects:- Most of the deterioration on stone is due to water. First and the foremost job is to remove the unwanted dirt and salt from the objects, protecting the surface with water repelling and consolidating the crumbling surface. Stone sculpture often accumulates dust, dirt and stain. In the museum, the first thing essential for good conservation is to keep objects free from dust by periodic cleaning for which purpose a brush with long, soft hair or a feather duster should be used.

Pure water with detergent is used to remove the dirt particularly where maintenance has been irregular and dirt is excessive. Detergent such as Lissapol N, Teepol X or Xilon at a concentration of 60g to 5 liters. But nothing stronger should be used. Stain of grease, oil, wax or paint can be cleaned with suitable organic solvent like toluene, acetone, benzene, trichloroethylene, tri-ethanolamine ($C_6H_{15}NO_3$) etc. or their mixture. If the oily grease is deeply rooted, then the accretions may be removed by applying paper pulp in rectified spirit to the surface of stone where the accretions are found and covered with a polymer sheet to avoid the escape of the solvent and removing the paper pulp after an hour or so. The grease is removed step by step and the real colour of the stone is regained after repeated application of the paper pulp with the suitable solvent. Oil paint stains can be scraped fairly clean with a scalpel and the

residue dissolved away using a 3/1 mixture of methanol and tri-ethylamine ($CH_3CH_2NH_2$) or pyridine or morpholine, or even Carbowax (Poly-ethylene glycol). Certain kinds of stain seem to defy all solvent and can only be taken away by using a plastic stripping film a method developed for removing fossils from coal. The process consists in the application of a viscous film of nitrocellulose obtained from one or other of the formulae given below:-

For rapid drying:- methanol, I Vol; ether, I Vol; castor oil 5% by volume.

For slow drying:- acetone, 2 Vol; amyl acetate, 2 Vol; triacetin, 2% by volume.

Removal of dirt from Outdoor Objects:- It is important to take decision whether it is appropriate to clean the historical buildings. The purpose of cleaning a historic stone building must be considered carefully before taking any decision to clean. There are several major reasons for cleaning historic buildings:[2]

- ❒ Improve the appearance of the building by removing unwanted dirt or soiling materials,
- ❒ Non-historic paint from the masonry
- ❒ Retard deterioration by removing soiling materials that may be damaging the monuments
- ❒ Provide a clean surface to accurately match repointing mortars or patching compounds,
- ❒ To view the condition of the buildings clearly

Cleaning methods of stone monuments are generally divided into three major groups:-

1. Water, 2. chemical, and 3. abrasive.

Water cleaning methods are generally the gentlest means possible, and they can be used safely to remove dirt from all types of monuments. Water-based methods are four types: soaking; pressure water washing; water washing supplemented with non-ionic detergent; and steam, or hot-pressurized water cleaning. Once water cleaning has been done, it is essential to follow up with a water rinse to wash off the loosened soiling material from the building. In chemical cleaning methods, chemicals react with dirt, soiling material or paint to affect their removal, after which the cleaning effluent is rinsed off the building surface with water. Abrasive methods mechanically remove the dirt. This methods include blasting with grit and the use of grinders and sanding discs. Laser cleaning is the latest technique that is used sometimes by conservators to clean small areas of historic building. It can be quite effective for cleaning limited areas, but it is expensive.

Removal of salts:- The crystallization of salts is a major cause of deterioration of stone. Storage, in a room in which the air is conditioned, will of course arrest the movement of salts and preserve the stone. But air conditioning is costly, particularly for large objects. For that reason it is generally preferable to extract the salt from stone objects. There are two well-known methods of removing soluble salt from stone-

I) Immersion in water:- The stone objects is lowered into a tank and completely immersed in water. The salt is removed slowly. Depending on the size of the objects, the tank water must be removed and changed periodically. Daily for small objects and weekly for large objects. According to the progress of the washing as determined by tests made on samples of the tank

water, the stone must not be allowed to dry while the water is being changed or more damage may be caused by further crystallization. The immersion tank can be made of glass, rubber or plastic material such as PVC or polyethylene, but never of iron or copper for these metals may stain the stone with rust or with green copper compounds. The water may be rain water, well water, or even the ordinary domestic water supply as long as it is not saline and not ferruginous. It is perhaps best with small objects to complete the treatment by using distilled water.

Ii) Paper-pulp method:- The best method known for the curing of salt-laden stone objects is to treat them with the paper pulp method. In this method, paper pulp is soaked overnight in water and while wet it is applied on stone with a layer of some 5-10mm thickness. The water is first absorbed by the stone and dissolves the soluble salt in it, then as moisture evaporates from the pulp the salts are drawn from the stone and eventually remain as crystal in the pulp with which they can be easily removed. When the pulp is completely dry, it is removed from the object. A test is conducted to ascertain whether the salts are removed or not. If still present, the process is repeated till the salts are completely removed. If the surface is very weak or if it is polychromatic, it should be consolidated, as a matter of routine, with soluble nylon before any attempt is made to remove the salts.

Protection of stone against Biological attack:- Vegetable organisms (plants and trees), cryptograms (algae, moss and lichens), moulds and bacteria soon develop in stone work when humidity of the surrounding air is above 75% at temperature 300-400c. Great care must be taken in removing the roots and plants; mosses and lichens respond to treatment with a soft brush after softening, if necessary, 5% to 10% solution of ammonium hydroxide is used for removing algae.

Active Conservation:

Consolidation:- Where stone is severely weakened by decay, some form of consolidation may be necessary to restore some strength. Ideally, one might hope to make the stone at least as strong as it was originally, so it might resist further decay. Consolidants are usually applied to the surface of the stone by brush, spray, pipette, or by immersion, and are drawn into the stone by capillarity. For strengthening fragile stones conservators may adopt a method of impregnation using either mixture of molten waxes or solutions of waxes, lime (Nothing could be more natural than putting lime into limestone), polyester, Barium Hydroxide, Organic Polymers etc. as consolidants.

Last but not least heritage awareness is an important component of conservation. One of the basic causes for damage of heritage is due to lack of awareness to the public at large and non-involvement of people in the process of conservation as well. The Constitution of India prescribed under the fundamental duties that the protection of heritage is one of the important duties of each and every Citizen of India, but the efforts made by the local authorities and agencies are not significant. The local people need to take part in the process of conservation.

Therefore, now it is necessary that greater emphasis to be laid down for creating awareness to the public including people at large. In today's competitive world, we have to preserve the monuments and showcase them to the next generation as the contributions or achievements of our ancestors. A little effort on our side can create drastic changes that will make the past, the present and the future generations of the country and the world proud of India.

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Electoral Reforms : A Step towards Sustaining Democratic Spirit in India

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ABSTRACT

In the present scenario, elections in India are crippled with several issues such as criminalisation of politics, weakness of Election Commission, uncontrolled political parties etc. Criminalisation of politics is a grave problem in India. It is the bane of society and negation of democracy. The election at present are not being held in ideal conditions because of the enormous amount of money required to be spent and large muscle power needed for winning the elections. While the first three general elections (1952-62) in our country were by and large free and fair, a discernible decline in standards began with the fourth general election in 1967.It is subversive of free and fair elections which is the basic feature of the Constitution. Various Committees and commissions were formed to submit their views for electoral reforms. The Election Commission which is responsible for free and fair election, continuously has appealed to all political parties not to give tickets to criminals; but all its efforts went in vain. Moreover Election Commission also lacks power to control political parties. It is very shocking that Commission has no power to de-register political parties if parties are not following commission's directions. Another issue is financing of political parties. Study reveals that political parties are accepting major portion of donation from unknown sources which clearly indicates infusion of black money in political setup of democratic India. This is not a good sign at all. In this paper an attempt has been made to highlight critical issues pertaining to free and fair election and appropriate suggestions are being made to curb these issues.

Keywords : Constituent Assembly Debates, Criminalisation of politics, Democracy, Election, Election Commission, Political Parties.

Introduction

"Politics encircles us today like the coil of a snake from which one cannot get out, no matter how much one tries."

- Mahatma Gandhi

Wise words observed by Mahatma Gandhi clearly describe the importance of politics in any democratic setup. Democracy requires the equal participation from common people of nation i.e. by casting their vote in elections. While explaining the denotation of Election in India, Gopal Krishna Gandhi observed that "I mean to diminish no individual, institution or phase in our history when I say that India is valued the world over for great many things, but for three over all other : The Taj Mahal, Mahatma Gandhi and India's electoral democracy."(S.Y.Quraishi,

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2014:04)

India is considered as largest democracy in the world due to its population and participation of general people in the elections with a parliamentary system of government. The true spirit of this system lies in the commitment to hold free and fair elections. These elections determine not only the structure of government, membership to both house of parliament and State & Union territory legislative assemblies, the Presidency and Vice-Presidency but also the future & growth of a country. Conducting elections in India is a mammoth task. During 2004 parliamentary elections, total number of voters were 67,14,87,930 out of which 38,99,48,330 voters contributed by casting their vote. The election commission of India employed nearly 4 million people to run the elections. The total number of polling stations were 7,00,000. These polling stations were spread all over India right from snow-clad mountains in Himalaya to the lonely deserts of Rajasthan.

Catering the need of 125 billion people and allowing them to be the part of democratic setup in India, the electoral system of India is considered as one of the finest electoral system among democratic countries around the globe. However, there are certain issues which have emerged as a serious threat to the election procedure in India and malign the image of democracy.

After getting independence, the common people were hopeful that now in free India they will have their say in the governance of country which was denied to them by Britishers nearly for 200 years, however, their aspiration remained as a distant dream due to prevailing corrupt practices in election procedure which grew manifold with the passage of time and subsequent elections.

The present day elections are crippled with issues like unregulated funding of political parties, mushrooming of political parties losing their substratum, keeping political parties out of the purview of RTI, lack of State funded elections, ECI emerging as weak constitutional body to regulate elections, system of First Past the Post procedure, hate speech during elections, lack of political will to recognise measures viz Right to Recall and Right to Reject are the key contemporary issues and challenges which need to be addressed.

Such a democratic system in India truly represents the views of Abraham Lincoln, who stated that “Democracy is the government of the people, for the people and by the people”. It is a system through which every single individual, whether rich or poor, Hindu or Muslim participates in the formation of government. Since the public at large cannot participate in policy and law making, we have adopted the system of elected representative to make the policies and laws on the behalf of general people. This is called parliamentary democracy. Explaining the importance and viability of parliamentary democracy in India, Somnath Chatterjee in his article “Six decades

of Parliamentary Democracy" talked about the democratic setup of India in following words :

"one of the greatest challenge before the founding fathers while preparing the framework for self-government of Independent India was to come up with the viable system of governance and administrate structure that would involve the active participation of all sections of the people and one that would reflect and represent the diversity of India and be capable of meeting the challenges faced by resurgent nation. The country adopted a parliamentary democratic system after a purposive and elaborate debate among our visionary and sagacious national leaders who were in the forefront of our long drawn struggle for freedom. The members of Constituent Assembly adopted the Constitution with the conviction that it best suited our ethos and culture and specificities of our nation, while the world around us expressed scepticism about our ability to operate a democratic system successfully."(The Hindu, 15th August 2007).

The purpose of Elections shall always be to restore the faith of general people in democracy by strengthening the good governance in society. In a democratic country like India, good governance can only be achieved through participation from people in election process by electing competent representative. The people of India continuously have shown their faith in democratic setup of their country, which is evident from the fact of increasing voting percentage in every general election.

1. ELECTION MECHANISM IN INDIA

In a democratic country like India, conducting free and fair election is a mammoth task. The framers of Indian Constitution, while drafting constitution faced such question that what should be the mechanism to conduct elections in India which represents the true character of people's democracy. The Constitution of India through its provision talks about the establishment of Election Commission of India.

i. Views of Constituent Assembly on Establishment of Election Commission

Prior to the commencement of Constitution of India, As per Government of India Act, 1935, elections to Central and Provincial governments were controlled and conducted by the Executive i.e. the Central and Provincial government. But soon after independence, the Constituent Assembly was formed for drafting constitution for independent India. In context of elections, common intention was framed by all framers that right to vote shall be made fundamental right and to protect this fundamental right. Members were also of opinion that to protect right to vote, it is desirous that there shall be independent body or institution to conduct elections and elections shall be made free from political influence and local pressure.

After deciding the broad guidelines for elections, the next issue was whether the provisions relating to elections shall be placed in the chapter of Fundamental Rights?

The Fundamental Rights Sub-Committee vide its meeting dated March 29, 1947 accepted the wish of all assembly members and approved that

1) universal adult suffrage must be guaranteed by the Constitution;
2) elections should be free, secret and periodic; and
3) elections should be managed by an independent commission setup under union law.

C.Rajgopalachari was of opinion that franchise should not be made part of Fundamental rights, whereas Dr. B.R.Ambedkar was in favour of keeping adult franchise and its provisions in the chapter of Fundamental Rights. This war of opinion was finally settled by Govind Balabh Pant by keeping these provisions regarding setting up of election commission, adult franchise and free and fair election in some other part of Constitution. (B.Shiva Rao,1968:462)

Another complex issue before the assembly members was that elections to be managed by Central Election Commission which has to be appointed by the President i.e. Executive. Many members were having apprehension that if elections to be conducted under executive authority, he will be having a power to transfer officers from one area to another with the aim of supporting a particular candidate. Ultimately such practice will definitely vitiate the object of free and fair elections. So it was decided that elections shall be taken from the hands of executive and should be hand it over to independent authority. (CAD, IV:973)

At the time of adopting Article 324 relating to establishment of Election Commission and appointment of Chief Election Commissioner and other Election Commissioners, Dr. B. R. Ambedkar came up with the article, which was having several features

1) There will be Central Election Commission which would be responsible for direction, control and supervision of all elections to parliament and State legislatures of all States and also the elections to the office of President and Vice-President;
2) The commission will comprise of Chief Election Commissioner and other election commissioners as may be appointed by the Union Government;
3) The Union and State government were required to make available staff required for smooth exercise of elections.

These provision were criticised mainly on the point of neglecting state governments as no power was given to provincial governments. Dr. Ambedkar defended the provision by stating that government in some provinces was 'instructing and managing things in such a manner that those people who do not belong to them either racially, culturally or linguistically, are being excluded from being brought on to the electoral rolls, in order to prevent injustice being done to such kind of persons, it was necessary not to give powers to provincial governments'.

K.M.Munshi went a step further and said, 'complaints had been received that certain provincial governments could not be trusted to be as impartial to elections as they should be,

further he stated that ten or eleven states were not accustomed to even little measures of democracy'. (CAD, IV:960)

As opposed to the views of Dr. Ambedkar and K.M.Munshi, H.N.Kunzru criticized the article. He emphasized that it was not proper to deprive state governments of all powers. H.N.Kunzru further stated that this article lacks proper safeguards. Questioning the impartial character of Election Commission, he said by leaving great deal of power in the hands of President, it gave wide room for political influence by the central government in the appointment of Chief Election Commissioner and other Election Commissioners. (B.Shiva Rao,1968:466)

Solution to this problem was also suggested by H.N. Kunzru. His remedy was that Parliament should be authorized to make provision for these matters by law. (CAD, VIII:920) Accepting the remedy suggested by H.N. Kunzru, K.M. Munshi suggested that in order to meet Kunzru's criticism an amendment requiring that the appointment of Chief Election Commissioner and other Election Commissioner would be subject to law made by Parliament and that the power of President to make rules regulating their conditions of service would also be subject to any law made by Parliament. (CAD, VIII:925). With these modifications the article was adopted and it was numbered as Article 324.

The above mentioned Constituent Assembly proceedings already paved the way for independent Election Commission by giving authority to Parliament, that the Parliament can make law for strengthening the impartial nature of Election Commission. However it is very unfortunate that even after successive 70 years, the governments did nothing to implement Article 324 in its real sense. It clearly shows that the constitution has provided clear mandate for independent and impartial Election Commission but it is the will of various union government that they did nothing in order to keep Election Commission within their control.

3. LAWS RELATING TO ELECTIONS IN INDIA

The Constitution of India being a parent law provides for establishment of Election Commission of India, adult franchise and free and fair election. However, there are various statutes which provide complete framework work for elections in India. various election laws of the country comprise the Presidential and Vice Presidential Elections Act, 1952, The Representation of the People Act, 1950, The Representation of the People Act, 1951, The Government of Union Territories Act, 1963 supplemented by Registration of Election Rules, 1960 and Conduct of Election Rule, 1961, The Delimitation Act 2002. The Representation of the People Act, 1951 embodies a comprehensive code regulating the whole election process. It prescribes inter alia, qualifications for membership of State and Central Legislatures, disqualifications for membership of the above bodies as well as disqualifications for voting, for establishment of the required administrative machinery for conduct of elections, registration of

political parties, the procedure for conduct of elections and declaration of election results, for a correct account of election expenditure to be maintained and submitted to the prescribed authority, list of electoral offences, the power of the Election Commission while conducting inquires. (S.S. Visweshwara, 1997:51). The Supreme Court in Jyothi Basu v. Debi Ghosal has ruled that Representation of People Act, 1951 regulates the entire election and that outside the Statute there is no right to elect, no right to be elected and no right to dispute the election.

4. VARIOUS ISSUES AND THREATS TO FREE AND FAIR ELECTION IN INDIA

i. Weak Election Commission

It is also significant to mention here that for free and fair election it is utmost necessary that the election conducting body i.e. Election Commission and its members i.e. Chief Election Commissioner and other Election Commissioners shall be appointed through transparent procedure and such procedure should be backed by law. In this regard it is significant to mention here that recently on the issue of making law for appointment of Election Commissioners, the Hon'ble Supreme Court in Anoop Baranwal v. Union of India, Ministry of Law and Justice Secretary has made observation that either the Central Government must write a law on appointment of Election Commissioners or face an intervention of judiciary. Bench headed by Chief Justice J.S.Khehar observed that “There is an express expectation in the constitution to frame a law to appoint an Election Commissioner because he has to supervise elections. He should be a neutral person between political parties. Appointment has to be in a transparent manner. The bench further observed that Parliament was in “breach” of its duty, and under such circumstances the court could step in to fill the gap. Norms similar to the ones on appointing a CBI director are required to meet the constitutional mandate.

ii. Criminalisation of Politics

One of the major setback in recent years for free and fair election is criminalisation of politics. The distortion in its working appeared for the first time in the fifth general elections, 1971 and multiplied in the successive elections especially those held in eighties and thereafter. (Kaur, 2009 : 35). In the present scenario the candidate who contests assembly or parliamentary election, has to spend millions in order to compete with other candidates. Cocktail of money and muscle power has become a perfect blend for winning elections. This is the reason that political parties are also keeping blind eye towards criminalisation of politics because parties also want support of these criminals cum politicians. All such flaws in electoral system of India significantly gave rise to criminalisation of politics and end number of corruption cases by politicians and political parties came into light. An analysis done by Association of Democratic Reforms on State Assembly elections 2017 in 5 States i.e. Uttar Pradesh, Punjab, Uttarakhand, Goa and Manipur presents the following picture:

STATE ASSEMBLY ELECTIONS 2017

STATE	TOTAL CANDIDATES	CRIMINAL CHARGES	SERIOUS CRIMINAL CHARGES	CROREPATI CANDIDATES
UTTAR PRADESH	4823	860 (18%)	704 (15%)	1455 (30%)
PUNJAB	1145	100 (9%)	77 (7%)	428 (37%)
UTTARAKHAND	637	91 (14%)	54 (8%)	201 (32%)
GOA	250	38 (15%)	19 (8%)	155 (62%)
MANIPUR	266	9 (3%)	4 (2%)	83 (31%)
STATE	WINNING CANDIDATES	CRIMINAL CHARGES	SERIOUS CRIMINAL CHARGES	CROREPATI WINNERS
UTTAR PRADESH	402	143 (36%)	107 (27%)	322 (80%)
PUNJAB	117	16 (14%)	11 (9%)	95 (81%)
UTTARAKHAND	70	22 (31%)	14 (20%)	51 (73%)
GOA	40	9 (23%)	6 (15%)	40 (100%)
MANIPUR	60	2 (3%)	2 (3%)	32 (53%)

Source: http://www.myneta.info/

The above mentioned tables depict the deterioration of political setup. It is evident from the analysis of data that the combination of being criminal and super rich is the key to win the election. If I take example of Uttar Pradesh Assembly elections held in 2017, out of total candidates, 18% candidates were having criminal charges, 15% candidates were having serious criminal charges and 30% were billionaire. However, when it comes to winning candidates the average of criminal charges, serious criminal charges and ratio of billionaire increases significantly. Out of the winning candidates, 36% MLAs were having criminal charges, 27% MLAs were having serious criminal charges and 80% were billionaire. The then Chief Election Commissioner Nasim Zaidi of India also stressed upon the issue of Transparency of political funding by considering it as a major challenge.

1. Infusion of black money in elections and lack of control over political parties

"Political party" means an association or a body of individual citizens of India registered with the Election Commission as a political party under section 29A of the Representation of Peoples Act 1951. (Representation of People's Act 1951, Sec.2 [f]) Political parties originated in their modern form in European and the United States in the 19th century along with the electoral

and Parliamentary system, whose development reflects the evolution of parties. Political party is defined as a group organised to achieve and exercise power within a political system. The Constitution of India adopted a Parliamentary form of government in which the existence of political parties is implicit. The parties can be registered by the Election Commission. (Representation of the Peoples Act 1951, Sec.29A). A party registered with the Election Commission may be granted recognition as a National or State party on the fulfilment of certain criteria based on its poll performance.

Main hurdle in conducting free and fair election is infusion of black money as we lack stringent provisions for controlling financing of political parties. According to Association for Democratic Reforms (ADR), an NGO who works for electoral reforms conducted a study on financing of political parties and revealed that income of 48 National and Regional parties between 2004-05 and 2014 15 was calculated as Rs. 11,367 Crore. it was also revealed that out of Rs. 11,367 Crore, the sources for almost Rs. 7,833 crore were not traceable which means there was no record of Rs. 7,833 Crore as to from where political parties received such huge amount. It clearly shows that such amount indicates towards black money. (Association for Democratic Reforms)

In 2010 Association for Democratic Reform filed an application under Right to Information to all National Parties requesting information about 10 maximum voluntary contributions received by them in last 5 years but none of the party dared to provide information. Hence ADR and RTI Activist Subhash Agrawal filed a petition before Central Information Commission (CIC), the Commission vide its judgement dated 03rd June 2013 held that political parties are 'Public Authorities' within the purview of RTI and directed them to appoint CPIO and provide information. However despite several efforts CIC failed to bring political parties under RTI. In this regard PIL having citation Association for Democratic Reforms and Anr. v. Union of India and Ors is being filed by the Association for Democratic Reforms praying to bring political parties under RTI and to compel these parties to declare their funding. The PIL is presently pending before Hon'ble Supreme Court for adjudication.

5. A STEP TOWARDS ELECTORAL REFORMS

Various committees and commissions were formed from time to time for electoral reforms. Some of the committees are mentioned here:-

1. The Goswami committee was formed under the chairmanship of the then law minister Mr. Dinesh Goswami. The committee submitted its report and recommended various reforms to election mechanism. The committee stressed upon the need of independent Commission, separate Secretariat for effective working of Election Commission. The committee also formed their opinion that appointment of CEC shall be made by President after consultation with chief justice of India and leader of opposition to maintain the transparency in appointment. Such consultation shall be backed by statutory provisions. The committee

also focussed on the issue of registration and de-registration of political parties and compulsory auditing and maintenance of election expenses of political parties. The issues raised by the Goswami Committee are still not implemented.

2. The committee was formed by Ministry of Home Affairs under the chairmanship of Sh. Indrajit Gupta. The main task of committee was to examine the concept of State Funding of elections as invoked in other countries. The committee discussed in detail various pros and cons of state funding. Presently countries like U.S, Canada, Germany, France, Sweden, Italy etc., are having state funding in one or another way. The committee made observation that advantage can be taken from these countries but we need to develop our own pattern of State funding. The observation made by the committee relating state funding is of huge importance. However till today no efforts are being made by Government.
3. The Law Commission's 170th Report on Electoral Reforms also raised key concern regarding internal democracy and control of election expenses of parties. Free and fair elections in India cannot be achieved until and unless we make provision regulating the funding of political parties.
4. The Law Commission in its 255th Report has widely discussed the issue of election finance which covers various aspects such as regulation on contribution to political parties, disclosure of contribution by political parties. The report has also made a comparative analysis of election setup with other countries like UK, Germany, USA, Australia and Japan. The Commission in its report has also made recommendation regarding the State Funding of elections, strengthening the office of Election Commission of India and other contemporary issues.
5. The problem of Criminalisation of politics was brought into sharp focus by the report of a committee headed by Shri N.N. Vohra which mentioned about powerful network of criminals, politicians and industrialists. It is said in Bihar, Haryana and Uttar Pradesh, crime syndicates enjoy protection of government functionaries and patronage of politicians. (Rajgopal, 1998 : 34). It is widely believed that there is a growing nexus between the political parties and antisocial elements which is leading to criminalisation of politics, where the criminals themselves join in election fray and often even get elected in the process. Some of them have adorned ministerial berths and thus law breakers have become law makers. (ECI, 2004:4).

6. ELECTORAL REFORMS AND JUDICIAL ATTITUDE IN INDIA

Judiciary being the protector and watchdog of Democracy has played significant role in protecting the dignity of elections in India. From time to time Judiciary has intervened and protected the true spirit of democracy which lies in free and fair election.

In 2004, the Hon'ble Supreme Court vide its judgement in Union of India v. Association for Democratic Reforms, gave the guidelines to the Election Commission to call for information on affidavit by issuing necessary order in exercise of its power under Article 324 of the

Constitution of India from each candidate seeking election to Parliament or a State Legislature as a necessary part of his nomination paper, furnishing therein, information on the following aspects in relation to candidature:

1. Whether the candidate is convicted/acquitted/discharged of any criminal offence in the past- if any, whether he is punished with imprisonment or fine.
2. Prior to six months of filling of nomination, whether the candidate is accused in any pending case of any offence punishable with imprisonment for two years or more and in which charge is framed or cognizance is taken by the court of law. If so, the details thereof.
3. The assets (immovable, movable, bank balance etc.) of a candidate and of his/her spouse that of dependents.
4. Liabilities, if any, particularly whether there are any overdue of any public financial institution or government dues.
5. The educational qualifications of the candidate.

In 2013, the Hon'ble Supreme Court vide its judgment in Lily Thomas v. Union of India, held that once a person, who was a member of either House of Parliament or House of the State Legislatures, becomes disqualified under law, his seat automatically falls vacant. The Court further observed that Sub-Section (4) of Section 8 of the Act which carves out a saving in the case of sitting members of Parliament or state Legislature from the disqualifications under sub-sections (1), (2) and (3) of Section 8 of the Act or which defers the date on which the disqualification will take effect in the case of a sitting member of Parliament or a state legislature is beyond the powers conferred on Parliament by the Constitution and the same is ultra vires the Constitution. Efforts made by the Parliament to make a law or to bring an Ordinance to override the effect of this judgment have failed.

7. CONCLUSION AND SUGGESTION

The Hon'ble Supreme Court in Mohinder Singh Gill v. Chief Election Commissioner has also made a remark showing the importance of election in democracy by stating that “it needs little argument to hold that the heart of the parliamentary system is free and fair elections periodically held, based on adult franchise, although social and economic democracy may demand much more.”

Such an alarming situation makes a strong ground and necessity to call for electoral reforms. For healthy and effective democracy, the most sacred duty lies upon the shoulders of elected government and common people to bring significant electoral reform to improve the nature of politics and bring good governance in India otherwise the people will lose their faith in democratic setup of this country. So far the practice is when the people are not satisfied with any elected representative or elected government, they change them but this makes very minute

change or improvement in the governance of nation. Such a grave situation indicates that there is a dire need to change the game instead of changing the player.

Suggestions

1. Election Commission of India is discharging its duties effectively, however, it appears to be a weak institution lacking essential powers. It is required that for effective implementation, the election commission should have its own secretariat.
2. Political parties functions under public domain hence need to be considered as public authorities so that they can be brought within the ambit of Right to Information Act, 2005.
3. Election Commission is having no right to de-register non-serious political parties which ultimately result into mushrooming of political parties.

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Constitution of India, 1950 - Article 324 : (1) The superintendence, direction and control of the preparation of the electoral rolls for, and the conduct of, all elections to Parliament and to the Legislature of every State and of elections to the offices of President and Vice-President held under this Constitution shall be vested in a Commission (referred to in this Constitution as the Election Commission).(2) The Election Commission shall consist of the Chief Election Commissioner and such number of other Election Commissioners, if any, as the President may from time to time fix and the appointment of the Chief Election Commissioner and other Election Commissioners shall, subject to the provisions of any law made in that behalf by Parliament, be made by the President.(3) When any other Election Commissioner is so appointed the Chief Election Commissioner shall act as the Chairman of the Election Commission. (4) Before each general election to the House of the People and to the Legislative Assembly of each State, and before the first general election and thereafter before each biennial election to the Legislative Council of each State having such Council, the President may also appoint after consultation with the Election Commission such Regional Commissioners as he may consider necessary to assist the Election Commission in the performance of the functions conferred on the Commission by clause (1).(5) Subject to the provisions of any law made by Parliament, the conditions of service and tenure of office of the Election Commissioners and the Regional Commissioners shall be such as the President may by rule determine. (6) The President, or the Governor of a State, shall, when so requested by the Election Commission, make available to the Election Commission or to a Regional Commissioner such staff as may be necessary for the discharge of the functions conferred on the Election Commission by clause (1).

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Scope for the Study on Bio-Archaeological Perspective of Ancient Science

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ABSTRACT

Most recently, the report of the first unequivocal case of ancient brain surgical practice, known as trepanation, observed in a Bronze Age Harappan skull in India. And a decade ago, a Neolithic skull from Burzahom in the Kashmir valley was reported with multiple trepanations as the first case from the Indian subcontinent. Animals and Plant products have augmented human culture since time immemorial. Perhaps, ethno-biology is the first science that originated with the evaluation or existence of man. Bio-archaeology developed by the merging of perspectives from skeletal biology and archaeology as the disciplines pushed themselves out of a state of mutual intellectual crisis. Bio-archaeology is at the forefront in documenting the evolution and adaptation of human populations. To supplement the bio-archaeological study we need to include agriculture, horticulture, ethno-medicine, ethnic population, races and language etc.

Keywords : Bio-archaeology, megalithic science, neolithic, skeletal, diseases

Introduction

The bio-archaeological perspective can be considered distinct from the broader scope of research carried out on human remains, especially as compared to research often characterized as “skeletal biology.” Principal among these differences is the extent to which culture and historical processes are central to the research interests of bio-archaeologists. Predetermined in particular culture historical contexts, bio-archaeology generates hypotheses for evaluation that draw together the reciprocal influences of culture on human biology and vice versa, and examines such bio-cultural themes as the adoption of agriculture (Cohen and Armelagos 1984), the emergence of social complexity (Danforth 1999), prehistoric population movements, and contact between distant cultures (Larsen and Milner 1994). Indeed, the goals of research are often more solidly derived from questions of archaeological than of biological origin. The following are the themes for the scope of the research. The objective of the paper is to find out the scope and discuss the development of bio-archaeological research from the discovered human evidences. A considerable amount of data has been collected from the Neolithic-megalithic sites with applied standard archaeological methods.

Bio-archaeology in Neolithic and megalithic cultures:

Several regionally distinct Neolithic cultures have been identified in India, such as in Kashmir valley, the northern Vindhyas and the middle Ganga valley, eastern India, northeast India and south India. A variety of megalithic monuments, erected as burials or memorials, are

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found in the northern Vindhyas in southern Uttar Pradesh, Chhattisgarh, Vidarbha region of Maharashtra and over most parts of south India. These monuments include cairns, stone circles, dolmens, dolmenoid cists, port-hole cists, menhirs and rock cut caves, the last confined to Kerala (Krishnaswami 1949, Gururaja Rao 1972, Sundara 1975).

At several places in the northern Vindhyas, Vidarbha and south India, there are large megalithic fields containing several hundred burial monuments. In comparison to the burial sites, the habitation sites are few and far between, suggesting that a part of the megalithic population may have led a semi-nomadic life. The erection of these burials could be achieved only with the help of iron tools meant for quarrying and dressing large rock slabs and boulders. Some of the burial types like port-hole cists (a type of megalithic monument) are very elaborate, involving several large dressed slabs and provision of a hole in one of the slabs for insertion of new dead bodies at a later date.

Disposal of the dead and biological composition:

In Vidarbha, the practice of horse sacrifice and its burial along with its master and its bronze ornaments and other equipment like bridle and stirrups, was common. The Neolithic people buried their dead, practicing both primary and secondary burial. The dead body was laid in an extended form and buried with many items mainly clay pots, which originally must have contained food and drink. In a primary burial, the body was placed in a crouched position and sometimes dogs were buried with the master. Discovery of semi-precious stone beads in some graves shows that the dead body was buried wearing necklaces. In secondary burials, bones were sometimes treated with red ochre. Graves of animals like dog, wolf and ibex have also been found. Seven uncalibrated C14 dates from Burzahom give a time bracket of 2400-1500 B.C. for the Neolithic culture of Kashmir.

In terms of their biological composition, the Harappan populations were very close to the contemporary populations of various Harappan regions. Early studies on human skeletons were almost exclusively concerned with metrical analysis and classification of populations into racial categories. In recent years, the emphasis has shifted to understand the adaptation of individual populations to their natural and social environments and in learning about their nutritional patterns and disease (Kennedy 1984).

The various biological and Bio-cultural issues:

The following are the issues, which is linked with biology: demographic change, change in the overall health of the Neolithic-megalithic populations, change in the diet system, change in the physical burden/stress, change in intra- and inter-community rates of violent encounters, change in the economy, settlement patterns and site nature and organization, change in human activities and division of labor, social structure and social organization change.

The ethnographic scene of Neolithic and megalithic people:

In India, three major linguistic-cultural streams are identified namely the Indo-Aryan, Dravidian and Austro-Asiatic. The hilly and rocky region is covered by dry deciduous forests and

is largely inhabited by tribal communities which include very primitive groups like the Kurukh, Kols, Musahars and Korwas Gadabas, Saoras and Bondos Birhors. They still subsist by hunting and gathering and practise shifting cultivation. And the Gonds, Mundas, and Santhals practise primitive plough cultivation. All of them, however, combine a certain degree of hunting and gathering with agriculture. The Neolithic people practiced an agro-pastoral economy. The domesticated animals represented in the bone record comprise cattle (Bos indicus), buffalo (Bubalus bubalis), sheep (Ovis aries), goat (Capra hircus aegagrus), pig (Sus scrofa cristatus), dog (Canis familiaris) and fowl (Gallus sp.) (Thomas 1974). Cattle played a predominant role in the economy as is evident by the abundance of bone refuse.

Skeletons Representation:

Skeletons represent the most direct evidence of the biology of past populations, and their study provides insight into health and well-being, dietary history, lifestyle (activity), violence and trauma, ancestry, and demography. Human skeletal remains offer direct research opportunities to address archaeological questions about individuals and groups. Through bio-archaeological analysis, it is possible to learn a great deal about the lives of prehistoric people. Bio-archaeology allows for the interpretation of events that occur during life, such as disease, physiological stress, injury, violence, physical activity, diet, tooth use, and paleo-demography. (Larsen 1997)

Radiocarbon Chronologies:

Archaeologists have long used carbon-14 dating (also known as radiocarbon dating) to estimate the age of certain objects. Traditional radiocarbon dating is applied to organic remains between 500 and 50,000 years old and exploits the fact that trace amounts of radioactive carbon are found in the natural environment. Now, new applications for the technique are emerging in forensic science. In recent years, forensic scientists have started to apply carbon-14 dating to cases in which rule enforcement agencies hope to find out the age of a skeleton or other unidentified human remains.

Reconstruction from Bone Chemistry:

Dietary reconstruction in archaeological contexts is often based on plant and animal remains. Plants and animals, of course, provide valuable perspectives on diet, but they largely document the presence of a particular food or group of foods and not the quantity of a food or foods. Just because a particular plant has been identified in various archaeological assemblages does not mean that it was an important element of the diet for a population. Therefore, quantification is a necessary requisite for drawing meaningful inferences about nutrition. Bone chemistry provides a powerful approach for documenting diet and for assessing the importance of particular foods in past populations.

Infectious Disease and Health:

Bio-archaeologists and paleo-pathologists have studied various types of infections that

result from disease. Most of the life-threatening acute infections (smallpox) are not well known from archaeological skeletons, primarily because the pathogenic agents that result in the disease kill the human host quickly. There are a number of chronic infectious diseases that have been documented in the study of ancient remains from Kashmir Neolithic and megalithic sites (India).

Violence and Trauma:

All human populations experience some form of physical confrontation at some point in time. Archaeologists document violence (especially warfare) by various lines of evidence, including fortifications, defensible site locations, settlement pattern, weaponry, and iconographic and symbolic representations that depict people, places, and activities relating to conflict (Redmond, 1994; Steponaitis, 1991). Unfortunately, these kinds of evidence identify the threat of conflict and not its outcome for the individuals involved. Bio-archaeologists are well positioned to study the presence and pattern of injuries deriving from violent activities.

Function and Tooth Use:

Although spot on teeth is important for identifying tooth use patterns, microscopic damage yields much more detailed information (Teaford, 1991). Using scanning electron microscopy, a range of experimental analyses shows that teeth of animals and humans who eat soft or non-abrasive foods have fewer micro wear features (scratches and pits) than animals and humans who eat hard or abrasive foods.

Population History and Biological Relatedness:

Form and structure of bones and teeth contain key information about the history of a population and its relationship to other populations, especially since this morphology is at least in part genetically determined. Relatedness between human groups has long been an important area of interest in anthropology. Biological Distance or “bio-distance” is the measurement of relatedness or divergence between populations or subgroups within populations based on the analysis of polygenic skeletal and dental traits (Buikstra et al. 1990).

Ancient DNA: Tracing Ancestry:

The study of DNA from archaeological remains offers a new and potentially powerful means of addressing many of the issues previously under the purview of bio-distance analysis of skeletal and dental morphology alone. This new frontier in bio-distance analysis has strong potential to address this and other issues in anthropology relating to spatial and temporal associations between and within populations. The study of DNA in living and extinct populations engenders new perspectives on population origins in different tribal areas.

Sex and Age Structure of Ancient Times Groups:

Physical anthropologists have developed an extensive repertoire of methods for estimating age-at-death and identifying sex of skeletons (see Buikstra and Mielke, 1985; Buikstra and Ubelaker, 1994; Jackes, 2000; Russell, 1998; White, 2000). Methods for

identification of sex of juvenile skeletons are imprecise, but new avenues for identifying the presence of the sex chromosomes, XX and XY, via DNA analysis are beginning to open up the possibility of sex identification (Faerman et al., 1995; Kaestle, 1995; Stone, 2000).

Climate Change:

Climate change has long been invoked to explain extinction events, the rise and fall of civilizations, and alterations in productivity in the past. Bio-archaeology, the study of human remains from archaeological settings, offers an important opportunity to address key issues relating to climate and a range of other circumstances. In the last two decades, bio-archaeologists have investigated the consequences of key adaptive shifts on health and well-being in the Holocene. Climate change is an important element for understanding human settlement and population change.

Behavioral Study from the Human Skeleton:

Remodeling of bone occurs in response to physical stress. Habitual squatting in humans is associated with modifications of the ankle, specifically, the neck of the talus (squatting facets) and its trochlear surface (trochlear extensions). Individual populations exhibit different incidences of these modifications that reflect their lifestyle and behavior. Certain types of behavior can leave markers on the skeleton, indicating some type of strenuous activities. Activities such as hunting and gathering, cultivation, grinding and kneeling (squatting at rest) leave skeletal markers on the bone.

Study of Palaeo-pathology:

The scope of skeletal studies and palaeo-pathology in India is vast, and new methods strengthen the potentiality of the material. However, much of the human skeletal material from Indian sites remains unstudied or has only been partially studied using recent approaches. Research in India has global implications as the sub-continent has played a vital role in migrations of human population from ancient times. Research in India also has potential to shed light on important questions about the evolution of infectious diseases, human-environmental interactions, and human variation.

Indigenous People and Ecological Change:

Cultural ecological researchers have often helped indigenous people defend their ecosystems and natural resources against deterioration caused by the uninvited intrusion of outside commercial interests. The most important anthropological support, from both archaeologists and cultural anthropologists, has been in helping indigenous communities document their long-term use of particular places and resources, in order that extensive, traditionally owned and used territories can be legally titled to communities and be protected. In some cases, it has been useful to document that traditional uses were sustainable. Anthropologists have also helped to demonstrate that indigenous communities have highly developed knowledge of their ecosystems, including the names and natural histories of plants

and animals. Some indigenous communities have asked researchers to help them with the difficult problem of managing natural resources for both subsistence and commercial uses. Other communities have sought to protect portions of their territories for eco-tourism.

Intellectual Property Issues and Genetic Study:

Technological advances have increased substantial access to genetic and biological data obtained from both living and ancient populations. Today, such information is being used to define cultural relationships and affiliation, and plays an important role in issues over sovereignty, or rights to land, material objects, and intellectual property. Human genetic material is also patentable in some countries.

Heritage Management:

Those working in the field of heritage management must recognize that human biological and genetic materials may fall within their mandate. They also need to be aware of what is potentially at stake for both archaeologists and descendant communities when genetic and biological data are used in contexts outside the realm of heritage studies. The heritage management especially interesting is that it operates at the interface between two often diametrically opposed positions of human remains and biological materials as being either part of the legacy of humankind or the specific “property” of specific individuals, lineages, or cultural groups.

Study of Violence:

Bio-archaeologists are ideally positioned to explore the causes of violence in past societies. Human remains from archaeological sites are a unique source of data on the environmental, economic, and social factors that predispose people to both violent conflict and peaceful coexistence. The controversy amongst the Gonds tribes in Chhattisgarh in past and present provides a good example of bio-archaeology's relevance.

Study on Agriculture:

V. G. Childe, (1964) who suggested that food surpluses generated by agricultural subsistence were the source of improved nutritional health, which in turn explained the population explosion following the Neolithic time. The early researches of paleo-pathologists are designed to document the role that agriculture played in improving health. From the skeleton one can draw the study on agricultural condition, which is also known as Neolithic revolution.

In Search of Culture and Political Influence in DNA:

Integral to the belief that race is rooted in biology; there is an ideology that culture, the identity derived from culture, and legitimate political authority, are rooted in biology. This can be seen as genetic testing is used, proposed, or speculated for use to detect a biological basis for such authorities, whether in living people or in past remains.

Conclusion:

Bio-cultural approach is one which views humans as biological, social and cultural

beings in relation to the environment. The direct nature of skeletal remains makes possible a range of investigations that are not accessible from other lines of evidence. There is a need to identify the centers and acquire necessary equipment for further study in Neolithic and megalithic period in Indian context. The bio-archaeological approach will provide the solution how the past process took place. The most contentious currently debated issues about the people who had settled first in the Indian Subcontinent will be solved if we apply the bio-archaeological approach. To study tribes and other communities that form the population of India both from the biological and cultural points of view is being essential to look out this approach. Bio-cultural approaches and models with many challenging tasks of social relevance may be considered the most effective ways to formulate and address research questions that are socially relevant in the twenty first century.

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Rapid Urbanisation and Mushrooming of Slums in India : Issues & Challenges

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ABSTRACT

Rapid urbanization leads to massive growth of slum followed by misery, poverty, unemployment, exploitation, inequalities, degradation in the quality of urban life. Poor quality of rural-urban migration leads to poor quality of urbanization. The cities all over the world are facing problems due to urbanization. Pollution, heavy thick black smog, is common in many countries as a result of increasing number of cars, taxis and buses. Urbanization is mainly a product of demographic explosion and poverty induced rural - urban migration. The slum problem has further been compounded by the rapid increase in urban population. Constant migration of rural population to cities in search of jobs is causing unbearable strains on urban housing and basic services. The infrastructure of India's towns is very poor. Sewage, water, sanitation, roads and housing are woefully inadequate for their inhabitants. The conditions of the slum areas in India have deteriorated due to the high density of population, narrow roads and lack of proper basic amenities. Some of the slums do not even have a single small room. They have mud huts and the roofs of the huts covered with waste materials like bamboo, straw, low quality wood, tin and plastic sheets and even plastic banners. A large number of slums are situated on government land and land owned by the Indian Railways, The slums located on Railway land are usually classified as non-notified slums.

Keywords : Urbanization, Slum and Migration.

Introduction

Urbanization means an increase in the proportion of people living in urban areas compared to rural areas. An urban area is a built-up area such as a town or city. Urbanization is integrally connected to the three pillars of sustainable development, economic development, social development and environmental protection. A rural area is an area of countryside. As a country industrializes, the number of people living in urban areas tends to increase. Rapid urbanization leads to massive growth of slums followed by misery, poverty, unemployment, exploitation, inequalities and degradation in the quality of urban life. Poor quality of rural-urban migration leads to poor quality of urbanization. The cities all over the world are facing problems due to urbanization. Pollution is heavythick black smog is common in many countries as a result of too many cars, taxis and buses. Urbanization is mainly a result of demographic explosion and poverty induced rural - urban migration. The contribution of urban areas to India's GDP has increased from 29 per cent in 1950-51 to 47 per cent in 1980-81, to 62 to 63 per cent in 2007, and it is expected to increase75 per cent by 2021. (Planning Commission,

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2008).

The slum problem has further been compounded by the rapid increase in urban population. Continuous migration of rural population to cities in search of jobs is causing unbearable strain on urban housing and basic services. The infrastructure of Indian's towns is very poor. Sewage, water, sanitation, roads and housing are woefully inadequate for their inhabitants. The conditions of the slum areas in India have deteriorated due to the high density of population, narrow roads and lack of proper basic amenities. Some of the slums do not even have a single small room. They have mud huts and the roofs of the huts covered with waste materials like bamboo, straw, palm leaves, low quality wood and tin and plastic sheets and plastic banners. Under Section-3 of the Slum Area Improvement and Clearance Act, 1956, slums have been defined as mainly those residential areas where dwellings are in any respect unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and designs of such buildings, narrowness or faulty arrangement of streets, lack of ventilation, light, sanitation facilities or any combination of these factors which are detrimental to safety, health and morals. The NSSO definition of a non-notified slum was slightly more generous than that of the Census; any crowded settlement with poor sanitation and at least 20 households was considered a slum by the NSSO, while the Census required there to be at least 60-70 households. Nearly 45 per cent of slums are located on private land, and 60 per cent of them have pucca structures. 71 per cent have tap water and over 90 per cent have electricity. Around 14 million slum households and 17.4 per cent of urban household in India are identified by the Census in 2011. Over a third of India's slum population lives in its 46 million-plus cities. Of the metros, Mumbai has the highest proportion of slum-dwelling households (41.3% of its population). Kolkata is next at nearly 30 per cent with Chennai not far behind. Delhi has 14.6 per cent of its households living in slums while Bangalore is the best of the five metros at less than 10per cent. Among all million-plus cities, Vishakhapatnam has the highest proportion of slums (44.1% of households).

Literature Reviews

Ramachandran's (1992) book on "Urbanization and Urban System in India" addresses current urban problems in India, including proliferation of slums, the inadequacy of city transport, inflated land values, deficiencies in infrastructure and the unequal spatial distribution of urban services. He has extensive discussions of criteria for defining urban places, the theory of systems approaches to urban hierarchy in geographical space and the nature of city-region relationships. He also deals with the policy of urbanization. Amitabh Kundu (1994) published an article on "Pattern of Urbanization with special reference to Small and Medium Towns in India". He has explained that the urban growth across the size categories presents some interesting features. The Class I cities in developed states grew at a faster rate as compared to small and medium towns. The less developed states like Assam, Bihar, Himachal Pradesh, Orissa and Rajasthan experienced high urban growth in their Class I cities as compared to smaller towns. Amitabh Kundu (2003) published an article "Impact of Neo-Liberal Paradigm on Urban Dynamics in India". According to him, The urban growth rate from 1951 to 1991 was generally high in relatively less developed states like Bihar, Madhya Pradesh, Orissa, Rajasthan and U.P. The relatively better developed states like Punjab, Tamil Nadu and West

Bengal experienced low urban growth. The developed states like Gujarat, Haryana and Maharashtra recorded high or medium growth.

Philip Amis (1995) in his paper titled “Employment Creation or Environmental Improvements: A Literature Review of Urban Poverty and Policy in India” highlights a general literature review on the question of Indian urban poverty with the object of considering the importance of an employment creation or environmental improvement approach to poverty alleviation. This paper is to examine the nature of urban poverty in India and the policy response. This paper also explores the policy responses aimed at creating employment and increasing incomes as well as environmental improvement initiatives. G.V. Joshi and Norbert Lobo (2003) in their book “Rural Urban Migration and Rural Unemployment in India” explained that there is no dispute regarding the fact that rural-to-urban migration is a component of population change. Its impact is felt in the region where both 'push' and 'pull' factors operate with varying intensity. This study highlights the variations in the extent of rural-to-urban migration at the national, state and district levels. Om Prakash Mathur (2005) in his book “Globalisation and Urban Development” studied the implications of globalization and liberalisation on India's urban system. As per author, the implication of India's post-1991 liberalisation and globalization on the national urban system, not only resulted in rapid economic growth but also affected cities in different ways, primarily by the growth of Foreign Direct Investment (FDI). The urban population distribution in India reflects the absence of primacy.

Siddharth Agarwal and Shivani Taneja (2005) in their article “All Slums are Not Equal: Child Health Conditions Among the Urban Poor” noticed that Increasing urbanization has resulted in a faster growth of slum population. Disparities among slums exist owing to various factors. This has led to varying degrees of health burden on the slum children. Child health conditions in slums with inadequate services are worse in comparison to relatively better served slums. Sivaramakrishnan, Amitabh, Kundu and B.N. Singh (2005) in their book “Handbook of Urbanization in India: An Analysis of Trends and Process” explained the urbanization; their trends and process. They studied urban settlements by comparative method. In this book, for the first time comprehensive analysis of urbanization trends in India was done using 2001 Census data. They studied 17 major states across India; the study takes into account regional dimensions both at state and district level. Micro level analysis of two developed states- Maharashtra and Punjab and two relatively backward states- Rajasthan and Bihar.

Pranati Datta (2006) in his article “Urbanization in India” analyzes urbanization as an index of transformation from traditional rural economies to modern industrial one. In this paper author has suggested that the relationship between population growth, resource depletion and environmental degradation has been a matter of debate for decades. Rishi Muni Dwivedi (2007) in his book “Urban Development and Housing in India - 1947 to 2007” has said that urbanization is a natural consequence of economic changes that take place as a country develops. Some challenges in the urbanization process are, overcoming the infrastructural deficiencies and taking the best advantage of economic aspect in urbanization. Chetan Vaidya (2009) in his paper titled “Urban Issues, Reforms and Way Forward in India” has examined that India has to improve its urban areas to achieve

objectives of economic development. The paper has analyzed urban trends, projected population, service delivery, institutional arrangements, municipal finances, innovative financing, etc. It has also described status of Jawaharlal Nehru National Urban Renewal Mission (JNNURM). JNNURM to produce a new regime of contractorisation that is dominated by caste politics. (Mukhopadhyay and Maringanti, 2014). The Twelve Five Year Plan (2012-17) proposed to consolidate the JNNURM and envisaged its wider role in urban reforms. The Rajiv Awas Yojana (RAY) was launched with the vision of creating a slum free India within two years. Final Government of India approved the RAY on 3rd September, 2013 for a period of 2013-2022. (Bhagat-2014).

The share of the population of Census towns has increased from 19 per cent to 36 per cent. Growth, in short, is occurring across the urban spectrum a reminder of the need to move away from metro-centricity (Bunnell and Maringanti 2010).

Global Scenario of Urbanization Trends

In the fast globalising world, more people live in urban areas than in rural areas, around 54 per cent of the world's population residing in urban areas in year 2014. In 1950, only 30 per cent of the world's population was living in urban areas (UN-2014). High-income countries of today have been highly urbanized for several decades; upper-middle-income countries have experienced the fastest pace of urbanization since 1950. In 1991, a majority (74%) of the population in high-income countries already lived in urban areas (Table-1). Their level of urbanization is expected to rise further, from 80 per cent today to 87 per cent in 2050. In the upper-middle-income countries of today, only 41 per cent of the population lived in urban areas in 1991, but these countries urbanized rapidly and are now 63 per cent urban in 2014. This percentage is expected to rise to 79 per cent urban by 2050. Countries such as Brazil, China, Iran and Mexico are in this group, and have experienced both rapid urbanization and rapid growth of gross national income.

Table-1

Global Urbanization Trends During 1991-2014

		Proportion Urban (percentage)		
Sr. No	Countries	1991	2014	2050
1	High-income countries	74	80	87
2	Middle-income countries	36	51	67
3	Upper-middle-income countries	41	63	79
4	Lower-middle-income countries	31	39	57
5	Low income countries	22	30	48
6	World	45	54	63

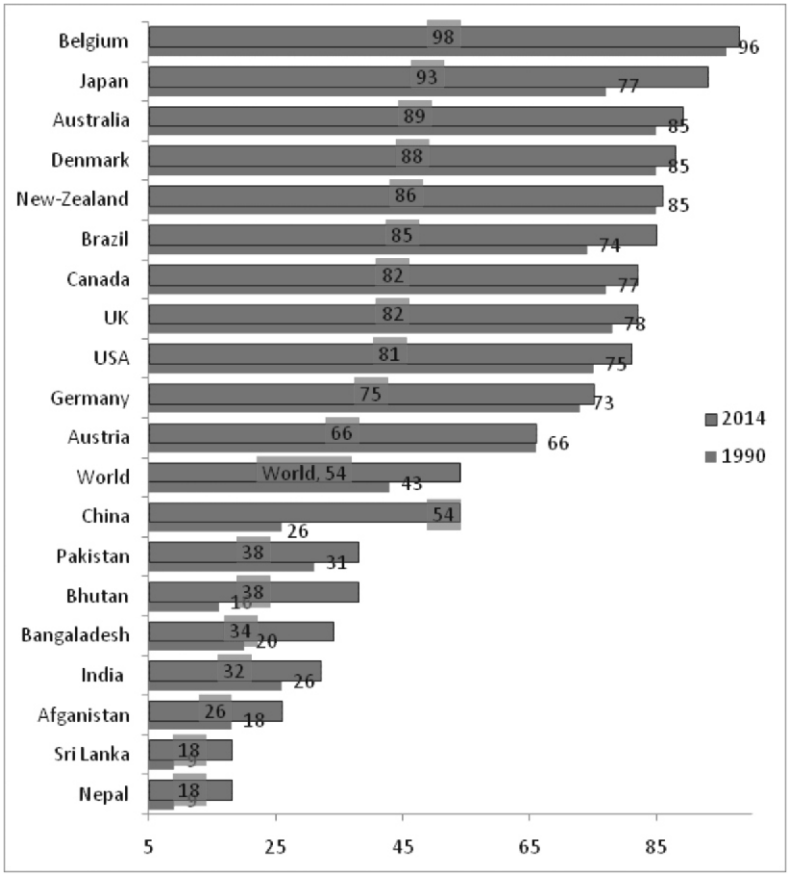
Source:- World Urbanization Prospects, the 2014 Revision, Department of Economic and Social Affairs, ST/ESA/SER.A/352, United Nations, Newyork,2014

There has been continuous spurt in the rise of urban population in all income categories countries from 1991 to 2014(Table-1). Previously the rate of urbanization was higher in high income countries. But as the ongoing trend indicates, the projected figure of percentage increase in urban population by 2050 is likely to double in low income countries from 22 per cent in 1991 to 48 per cent in 2050.This is not commensurate with the development of infrastructure and provision for basic civic

amenities required for quality of life.

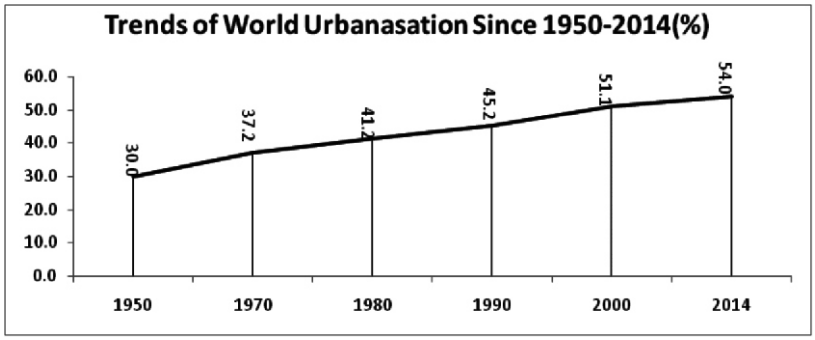
The urban population of the world is expected to increase by more than two thirds by 2050, with nearly 90 per cent of the increase to take place in the urban areas of Africa and Asia. The world's urban population is now close to 3.9 billion and is expected to reach 6.3 billion in 2050. Asia, despite its lower level of urbanization, is today home to 53 per cent of the urban population in the world. Europe has the second highest share of the world's urban population, at 14 per cent, followed by Latin America and the Caribbean with 13 per cent. Over the next four decades, Africa and Asia will experience a marked increase in their urban populations. By mid-century, the urban population of Africa is likely to triple and that of Asia to increase by 61 per cent. As a consequence, close to 90 per cent of the increase in the world's urban population will take place in the urban areas of Africa and Asia. (United Nations, 2014).The world globalization trends can be seen in figure-2.

Figure-1
Urbanization Trends in Selected Countries during 1991-2014(%)



Sources:-World Urbanization Prospects the 2014 Revision, Department of Economic and Social Affairs, ST/ESA/SER.A/352, United Nations, New York, 2014

Figure-2



Trends of Urbanization In India

According to the 2011 Census, urbanization has increased faster than expected. Total number of HHs was 246.69 million in India. The number of rural hhs were 167.83 million (68%), while urban households were 76.86 million (32 %) as against 191.96 million total number of hhs , rural hhs were 138.27 million and urban hhs were 53.69 million (28%) in Census 2001.

People move into cities to seek economic opportunities. Population residing in urban areas in India, according to 1901 Census, was 11.4per cent. This count increased to 28.53 per cent according to 2001 Census, and as per 2011 Census, standing at 31.16 per cent. Witnessing the fastest rate of urbanisation in the world, as per 2011 Census, Delhi's population rose by 4.1 per cent, Mumbai's by 3.1 per cent and Kolkata's by 2 per cent as per 2011 Census compared to 2001 Census. Number of towns in India increased from 5,161 in 2001 to as many as 7,935 in 2011. Number of population residing in urban areas has increased from 2.58 crores in 1901 to 37.71 crores in 2011.The share of the population of census towns has increased from 19 per cent to 36 per cent. Growth, in short, is occurring across the urban spectrum a reminder of the need to move away from metro-centricity (Bunnell and Maringanti 2010).Details can be seen in figure-3 and table -2

Table-2
Trends of Urbanization In India Since 1901 to 2011

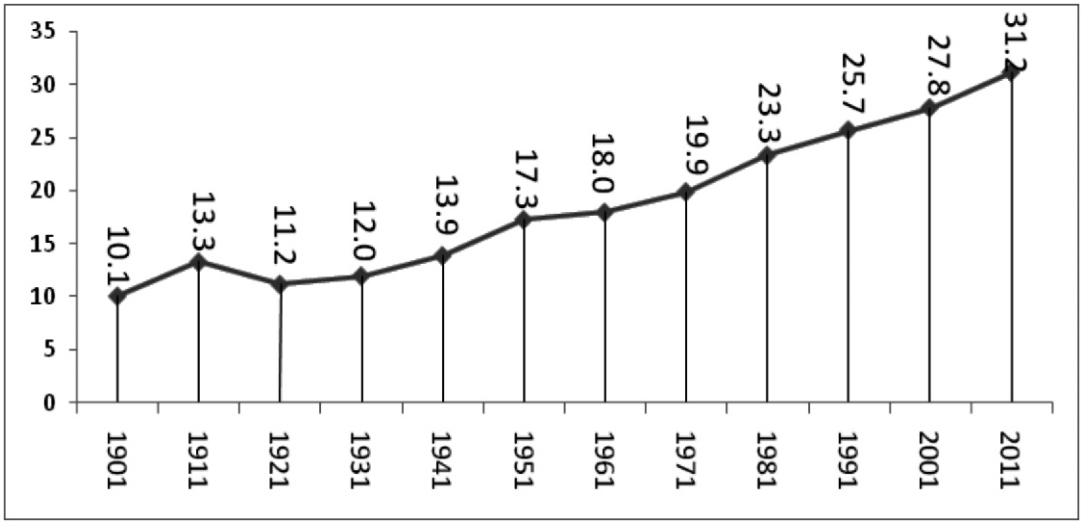
Year	Urban population (in Millions)	Rural Population (in Millions)	Total Population (in Millions)	Urbanization%	Annual Compound Growth Rate (%)			
1901	23.86	212.34	236.2	10.1	Urban	Rural	Total Population	Urbanization
1911	33.54	218.66	252.2	13.3	3.5	0.3	0.7	2.8
1921	28.15	223.15	251.3	11.2	-1.7	0.2	0.0	-1.7
1931	33.48	245.52	279.0	12.0	1.8	1.0	1.1	0.7
1941	44.30	274.40	318.7	13.9	2.8	1.1	1.3	1.5
1951	62.44	298.65	361.09	17.3	3.5	0.9	1.3	2.2
1961	78.94	360.29	439.23	18.0	2.4	1.9	2.0	0.4
1971	109.11	439.05	548.16	19.9	3.3	2.0	2.2	1.0
1981	159.46	523.87	683.33	23.3	3.9	1.8	2.2	1.6
1991	217.61	628.69	846.30	25.7	3.2	1.8	2.2	1.0
2001	286.10	742.60	1028.70	27.8	2.8	1.7	2.0	0.8
2011	377.10	833.10	1210.20	31.2	2.8	1.2	1.6	1.1

Sources : Census of India, Various years

Figure -2 and table-2 show the rising trend of urbanization in the world and in India. On the one hand the proportion of population in urban conglomerate increased from 30 per cent in 1950 to 54 per cent in 2014 whereas in India urban population has more than tripled from 10.1 percent in 1901 to 31.2 per cent in 2011.

Figure-3

Trends of Urbanization in India since 1901 to 2011(%)



The rising trend accelerated after India got freedom from colonial rule and witnessed rapid growth in both the secondary and tertiary sector of economy.

State wise Urbanization in India

More people in Tamil Nadu have moved from rural to urban areas in the last 10 years compared to other states, according to the 2011 Census data. Tamil Nadu tops the list of urbanized states with 48.45 per cent of its population living in urban areas, followed by Kerala, Maharashtra and Gujarat. In the last 20 years, the rate of urbanization in Tamil Nadu has been rapid. According to the 1991 Census, only 34.15 per cent of the total population in Tamil Nadu was classified as urban but in 2011, it has risen to 48.45 per cent, an increase of 14.3 per cent. Since the 2001 Census, the percentage of urban population has risen by 4.41 per cent. In Kerala, 47.72 per cent of people live in urban areas and in Maharashtra 45.23per cent. Among all the States and Union Territories, the National Capital Territory of Delhi is most urbanized with 93 per cent urban population followed by Union Territory of Chandigarh (89.8 %) and Pondicherry (66.6 %). Among the major States, Tamil Nadu is the most urbanized state with 43.9 per cent of the population living in urban areas followed by Maharashtra (42.4 %) and Gujarat (37.4 %). The proportion of urban population is the lowest in Himachal Pradesh with 9.8 per cent followed by Bihar with 10.5 per cent, Assam (12.7 %) and Orissa (14.9 %). In terms of absolute number of persons living in urban areas, Maharashtra leads with 41 million persons which are 14 per cent of the total population of the country. Uttar Pradesh accounts for about 35 million followed by Tamil Nadu 27 million. Interstate variation can be seen in table-3.

Table-3

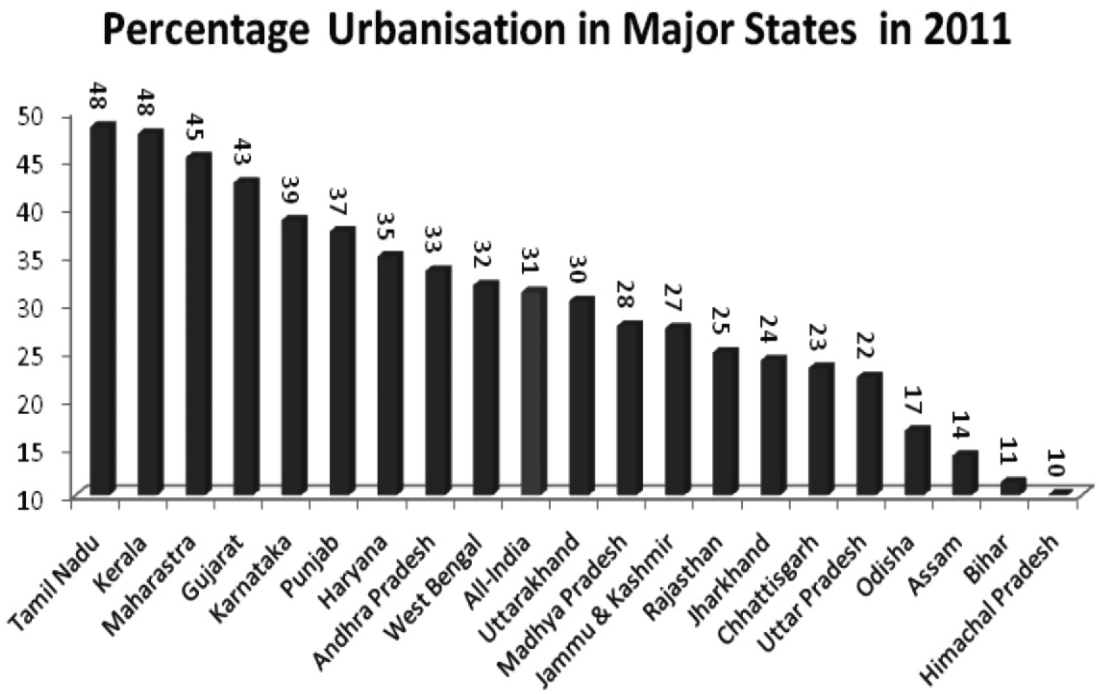
State-wise Growth of Urban Population (2004-11)

Sr. NO.	States	Urban Population		AEGR of urban population (2001–11)	Proportion of urban population in total population (%)		Proportion Change during 2001 to 2011
		2001	2011		2001	2011	
1	Andhra Pradesh	20,808,940	28,219,075	3.0	27.3	33.4	6.1
2	Assam	3,439,240	4,398,542	2.5	12.9	14.1	1.2
3	Bihar	8,681,800	11,758,016	3.0	10.5	11.3	0.8
4	Chhattisgarh	4,185,747	5,937,237	3.5	20.1	23.2	3.2
5	Delhi	12,905,780	16,368,899	2.4	93.2	97.5	4.3
6	Gujarat	18,930,250	25,745,083	3.1	37.4	42.6	5.2
7	Haryana	6,115,304	8,842,103	3.7	28.9	34.9	6.0
8	Himachal Pradesh	595,581	688,552	1.5	9.8	10.0	0.2
9	Jammu & Kashmir	2,516,638	3,433,242	3.1	24.8	27.4	2.6
10	Jharkhand	5,993,741	7,933,061	2.8	22.2	24.0	1.8
11	Karnataka	17,961,529	23,625,962	2.7	34.0	38.7	4.7
12	Kerala	8,266,925	15,934,926	6.6	26.0	47.7	21.7
13	Madhya Pradesh	15,967,145	20,069,405	2.3	26.5	27.6	1.2
14	Maharashtra	41,100,980	50,818,259	2.1	42.4	45.2	2.8
15	Odisha	5,517,238	7,003,656	2.4	15.0	16.7	1.7
16	Punjab	8,262,511	10,399,146	2.3	33.9	37.5	3.6
17	Rajasthan	13,214,375	17,048,085	2.5	23.4	24.9	1.5
18	Tamil Nadu	27,483,998	34,917,440	2.4	44.0	48.4	4.4
19	Uttar Pradesh	34,539,582	44,495,063	2.5	20.8	22.3	1.5
20	Uttarakhand	2,179,074	3,049,338	3.4	25.7	30.2	4.6
21	West Bengal	22,427,251	29,093,002	2.6	28.0	31.9	3.9
	All-India	**286,119,689**	**377,106,125**	**2.8**	**27.8**	**31.2**	3.3

Note : AEGR : Annual Exponential Growth Rate; All-India figures include UTs

Sources : Census of India, 2001; 2011

Among Indian States Delhi is the most urbanized state with 97.5 per cent urban population followed by Tamil Nadu with 48.4 per cent people dwelling in urban areas. Bihar with 11.3 per cent urban dwellers continues to be the least urbanized state followed by Assam, with 14.1 per cent in year 2014. It is clear evidence of correlation between economic growth and urbanization. Percentage of urban population in Uttar Pradesh and Uttarakhand are 22.2 and 30.2 per cent respectively (Table-3).



Causes of Urbanization

The population is migrating from rural to urban due to various reasons. People migrated for better education, job opportunities and good salary. Education is one of the significant factors inducing rural-urban migration. The rapid growth of urban population both natural and through migration, has put heavy pressure on public utilities like housing, sanitation, transport, water, electricity, health, education and so on. Causes of migration are usually identified as two broad categories, namely “push” and “pull” factors. Pull factors have predominated. Urban environment provides better employment and income opportunities. Important Push factors are famine, drought; poor living conditions such as housing, education and health care ; low agricultural productivity ; unemployment and pull factors are employment opportunity; higher incomes; better healthcare and education; urban facilities and way of life. But recently, it seems that push factors seem to be increasingly powerful. People in urban areas are usually payee more than in rural areas. M.P. Todaro agreed that rural-urban migration is largely explained by economic factors than non-economic factors (Todaro, 1997). State wise migration can be seen in table-4.

Table - 4

State wise Rural-to-Urban Migration (%) (2007-08)

Sr. No	States	Rural-to-urban		
		Males	**Females**	**Persons**
1	Andhra Pradesh	41.3	19.1	24.5
3	Assam	35.7	9.0	13.8
4	Bihar	49.2	8.5	11.7
5	Chhattisgarh	30.2	10.5	14.0
6	Delhi	57.5	53.9	55.9
8	Gujarat	54.1	20.6	28.0
9	Haryana	51.1	16.4	22.3
10	Himachal Pradesh	16.8	6.0	8.4
11	Jammu & Kashmir	27.2	9.2	11.1
12	Jharkhand	43.6	7.9	12.1
13	Karnataka	33.3	16.8	20.8
14	Kerala	16.5	15.0	15.4
15	Madhya Pradesh	32.5	13.2	15.4
16	Maharashtra	42.0	20.5	26.7
21	Odisha	30.9	9.4	12.3
22	Punjab	41.7	14.0	19.2
23	Rajasthan	46.5	12.8	17.9
25	Tamil Nadu	33.1	23.7	26.1
27	Uttar Pradesh	37.2	10.8	13.6
28	Uttarakhand	21.7	11.5	14.4
29	West Bengal	33.2	10.9	14.2
	All-India	**39.0**	**14.8**	**19.5**

Source : NSS 64th Round, Report No. 533: Migration in India: July 2007June 2008

The large number of rural migrants to the urban areas has far reaching social implications in transforming the nature and character of urbanization in India. The migrants move into the city not only physically but also bring along their friends, relatives, own culture, caste, etc,.The Uttar Pradesh government is preparing a blueprint for 'slum-free cities' in 21 urban centres under the centrally-sponsored Rajiv Awas Yojana (RAY).

The projects estimated at Rs 1,000 crore would be finalised and sent for central approval by month-end. 21 cities selected in UP include Agra, Meerut, Allahabad, Varanasi, Lucknow, Kanpur City, Mathura, Aligarh, Bareilly, Moradabad, Gorakhpur, Jhansi, Ghaziabad, Saharanpur, Muzaffarnagar, Rampur, Shahjahanpur, Firozabad, Rae Bareli, Etawah and Kannauj. (Business Standered,19 June 2013).

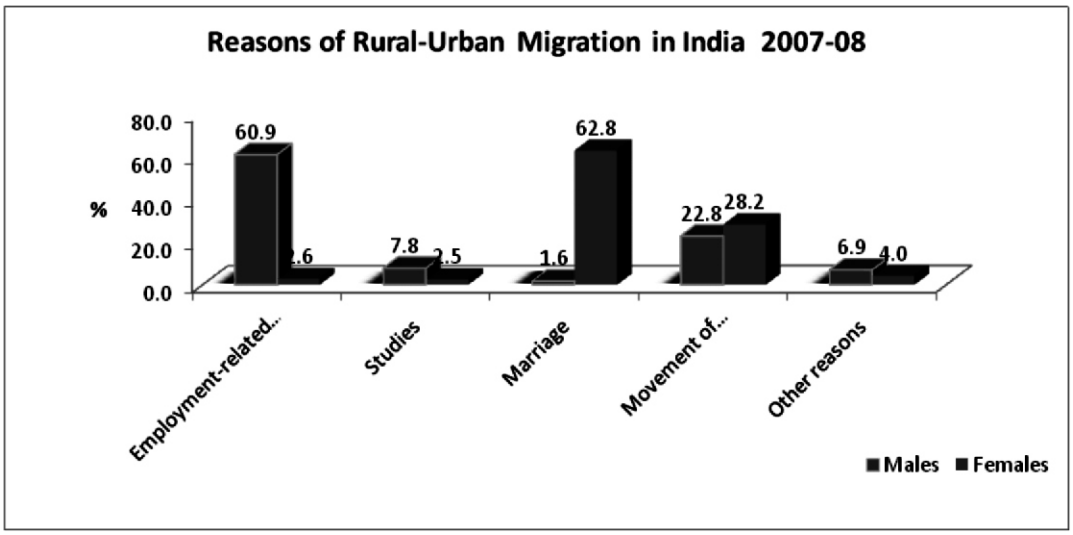
Table-5

Reasons for Rural-to- Urban Migration in India (%) 2007-08

Sr. No	Reasons for Migration	Males	Females
		Rural-to-urban	
1	Employment-related reasons	60.9	2.6
2	Studies	7.8	2.5
3	Marriage	1.6	62.8
4	Movement of parents/earning member	22.8	28.2
5	Other reasons	6.9	4.0
	All	**100**	**100**

Source: NSS 64th Round, Report No. 533: Migration in India: July 2007June 2008.

Figure - 5



Needless to say, the most potent contributing factor for rural- to urban migration is related to employment. That point is failure of model of economic development which could not create regional balance. Industrially backward state continue to remain incapable of absorbing the increasing workers population.

Urbanization and Status of Slums in India

Slum life has never been easy for the urban poor insofar as housing and living conditions are concerned. In slums across the country, there is a noticeable lack of basic physical and social infrastructure, services, sanitation and basic shelter. In India slums have been defined under section 3 of Slum Areas (Improvement and Clearance) Act 1956 as areas where buildings:

(i) Area in any respect unfit for human habitation.

(ii) Area by reason of dilapidation, overcrowding, faulty arrangement and design of such buildings,

narrowness or faulty arrangement of streets, lack of ventilation, light, sanitation facilities or any combination of these factors, which are detrimental to safety, health and morals.

As per UN Habitat a slum is characterized by lack of durable housing, insufficient living area, lack of access to clean water, inadequate sanitation and insecure tenure.

Status of Slums in India

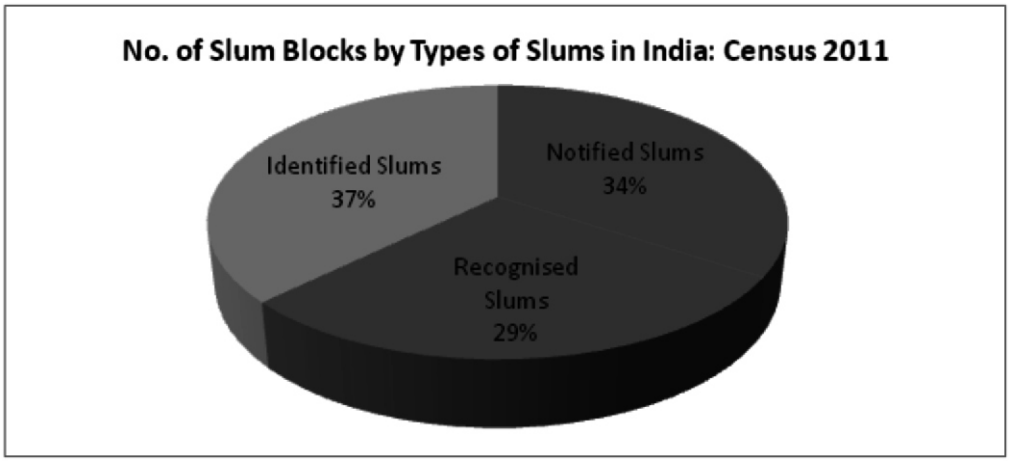
As per Census 2011, three types of slums have been defined, namely, Notified, Recognized and Identified slum.

i. **Notified slums :-** All notified areas in a town or city notified as 'Slum' by State, Union territories Administration or Local Government under any Act including a 'Slum Act' may be considered as Notified slums . The numbers of Notified slums in India are 37072 blocks.

ii. **Recognized slums:-** All areas recognized as 'Slum' by State, Union territories Administration or Local Government, Housing and Slum Boards, which may have not been formally notified as slum under any act may be considered as Recognized slums .The numbers of Recognized slums in India are 30846 blocks.

iii. **Identified Slum: -** A compact area of at least 300 populations or about 60-70 households of poorly built congested tenements, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities. Such areas should be identified personally by the Charge Officer and also inspected by an officer nominated by Directorate of Census Operations. This fact must be duly recorded in the charge register. Such areas may be considered Identified slums. The numbers of Identified slums in India are 40309 blocks. Details can be seen in below mentioned figure-7.

Figure-6



Number of Slum Households by Types of Slums in India:

As per Census 2011, total number of slum households (HHs) is around 137.49 lakh. Out of them around 49.65 lakh HHs are in notified Slums (36.11%), 37.96 lakh HHs in recognized slums (27.61%) and 49.88 lakh HHs in Identified Slums (36.28%).

Table-6

Top/ Bottom Five States Reporting Slum Households

Top Five States			Bottom Five States		
Sr. No.	States	Proportion of Slum HHs to Urban HHs (%)	Sr. No.	States	Proportion of Slum HHs to Urban HHs(%)
1	Andhra Pradesh	35.7	1	Chandigarh	9.7
2	Chhattisgarh	31.9	2	Gujarat	6.7
3	Madhya Pradesh	28.3	3	Jharkhand	5.3
4	Odisha	23.1	4	Assam	4.8
5	West Bengal	21.9	5	Kerala	1.5

Sources :- Census of India, 2011

If urbanization is the indicators of economic development, mushrooming of slum in urban centre is the indicator of widening disparity arising out of the model of development pursued in the country. It leaves ugly scarce on the social landscape. It speaks of poverty and deprivation breeding on the heaps of prosperity. In 2011 a total of 137.49hhs could be seen in notified recognised and identified slums in urban areas. As per table-6 Andhra Pradesh, Chhattisgarh and Madhya Pradesh are the top three states in terms of slum hhs in proportion to total hhs. This proportion is the lowest in the state of Kerala, which top in the rank of Human Development Index.

Table-7

Top Ten Million Plus Cities with High Proportion of Slum-2011

Sr. No	Million Plus Cities	Proportion of Slum HHs to Urban HHs(%)
1	Greater Visakhapatnam Municipal Corporation	44.1
2	Jabalpur Cantonment	43.3
3	Greater Mumbai Municipal Corporation	41.3
4	Vijayawada Municipal Corporation	40.6
5	Meerut Municipal Corporation	40.0
6	Raipur Municipal Corporation	39.0
7	Nagpur Municipal Corporation	34.3
8	Greater Hyderabad Municipal Corporation	31.9
9	Kota Municipal Corporation	31.8
10	Agra Municipal Corporation	29.8

Sources :- Census of India, 2011

Under the Basic Services for Urban Poor (BSUP), the Centre provides assistance to state governments for the integrated development of slums, including development of cluster houses, and other basic amenities like clean drinking water supply, electricity connections and road networks. In UP, the scheme has been sanctioned for seven mission cities, where government officials all eage, work is progressing smoothly. An official of State Urban Development Authority said: "Our infrastructure development work is progressing very well, especially in cities like Mathura and Meerut.

Table - 8

Sources of Drinking Water in Urban India -2011(% of HHs)

Sr. No.	Sources	Urban (%)	Slum (%)
1	Tap Water	70.6	74.0
2	Well	6.2	3.0
3	Hand Pump	11.9	12.7
4	Tube well/ Borehole	8.9	7.6
5	Other Sources	2.5	2.8

Sources :- Census of India, 2011

On the parameters of quality of life in urban slums, like drinking water, sanitation, toilet facilities and source of lighting slum inhabitation present very pathetic pictures. Details can be seen in the table-8, table-9, and table-10. Overcrowding, in sanitation and unhygienic condition create the problems of several communicable and un communicable diseases like malaria, dengue, bird flu and other water borne diseases.

Table - 9

Type of Latrine Facility in Urban India (% of HHs)

Sr. No	Type of La trine	Urban(%)	Slum (%)
1	**Latrine within the premises**	**81.4**	**66.0**
a	Water Closet	72.6	57.7
b	Pit latrine	7.1	6.2
c	Others latrine	1.7	2.2
2	**No Latrine within the premises**	**18.6** **Urban(%)**	**34.0** **Slum (%)**
a	Public latrine	6.0	15.1
b	Open	12.6	18.9

Sources :- Census of India, 2011

Table-10
Sources of Lighting in Urban India (% of HHs)

Sr. No	Sources of Lighting	Urban (%)	Slum (%)
1	Electricity	92.7	90.5
2	Kerosene	6.5	8.2
3	Solar	0.2	0.3
	Other oil	0.1	0.2
	Any other	0.2	0.2
	No lighting	0.3	0.5

Sources :- Census of India, 2011

Around 65 million people live in slums, up from 52 million in 2001, but slum populations have grown slower than the average urban population over the last decade. The average household living in a slum is no larger than an average urban Indian household, with 4.7 family members. The child sex ratio (0-6 years) of an average slum household is 922 girls for every 1,000 boys, compared to 905 for urban India. Maharashtra has around 11 million the highest slum population; 4.6 million of them in 'identified' slums. Andhra Pradesh follows with over 10 million in slums, and West Bengal and Uttar Pradesh have over 6 million slum residents each. Over 1 million of Delhi's 1.7 million slum resident live in 'identified' slums. Census 2011 reported total 4041 Statutory Towns. Out of these Slums reported from 2543 towns, this is 63 per cent of Statutory Towns. Total Slum Enumerated Blocks (SEBs) is about 1.08 lakh in the country. Largest number of Slum EBs are reported from Maharashtra (21359).

Challenges of Urbanization

Yusuf Meherally Memorial Lecture delivered by Vice President M. Hamid Ansari on September, 2011 pp, spoke of the challenges in improving urban governance and service delivery: He mentioned that Our urban spaces and governance mechanisms have become the theatres for political conflicts and economic struggles. Our urban spaces have also been used for promoting reforms as well as for contesting such reform measures". (Chandrashekhar and Venkatesh, 2015). Rapid rise in urban population is posing many challenges like increasing slums, decline in standard of living in urban areas, also causing environmental damage, provision of water supply, sewerage and solid waste management, storm water drainage, transport and e-Governance etc. Some of the major challenges of urbanization in India are (i) Urban Sprawl, (ii) Overcrowding, (iii) Housing, (iv) Unemployment, (v) Slums and Squatter Settlements, (vi) Improper Transportation, (vii) UnSafe Drinking Water, (viii) Sewerage Problems, (ix) Solid waste disposal, (x) Urban Crimes and security, (xi) Degradation of Urban Pollution.

Urban areas suffer from serious problems of environmental degradation. Global warming, air pollution, and water scarcity are serious threats to the environment. High levels of air pollution and noise pollution is noticed in urban areas due to industries and automobiles. Water is also polluted due to industrial wastewater discharge. Urban slums are facing major problem related to social and

physical infrastructure like proper education in slum, health facilities, road, power, etc. A report on Indian Urban Infrastructure and Services (HPEC Report, 2011) states that there is a backlog of 50-80 per cent in investment on urban infrastructure in most cities in India. The estimated investment required in urban infrastructure is of the tune of Rs.39.2 lakh crores in the period 2012-31(Aranya & Vaidya, 2014).

Housing is the most important problem in all cities due to large number of migrants from rural areas to urban areas, especially the metropolis and state capitals. Due to lack of proper housing fifty percent population lives in slums areas. Slum structures are temporary and they are overcrowded with very narrow lanes. These are illegal colonies; they do not have any civic amenities like drinking water, sewage, solid west disposal, electricity, etc. On the eve of elections some of the unauthorized slums are “regularized” by the political party in power for the votes of the residents. But later no serious efforts are made to improve the quality of life in urban slum centres. There is a big challenge regarding the land availability in urban slums. In a slum area, how does one decide who is eligible to get land title and houses. Some organization argue that one should do away with any criterion and anybody ”present” in the slum should be considered eligible. It is well known that powerful land mafia operates in the slums and that it can put up non-genuine people to claim the slum land. (Kumdu-2014). In the urban areas people are facing the problem of inadequate public transport, especially for those who belong to the low income groups. Public transport must be made much more cheaper efficient, regular, punctual, attractive and adequate.

Summing Up

Government of India has taken so many initiatives for betterment of urban sector during the Plan period. The Jawaharlal Nehru National Urban Renewal Mission (JNNURM) was launched in December 2005 for a period of seven years with an outlay of `66,085 crore. The objectives of the scheme included empowerment of Urban Local Bodies (ULBs), planned and holistic development of cities and making them inclusive. Under the Twelfth Plan period, JNNURM-II was launched as a State sector additional central assistance(ACA)scheme. The scheme has focused approach on urban reforms, capacity building. Swarna Jayanti Sahari Rozgaar Yojana (SJSRY) is designed to enable urban poor to get gainful employment. Under this scheme 3,941 towns have been covered. For making India slum free, pilot phase of Rajiv Awas Yojana was launched in 2011. The scheme has a progressive architecture which includes in-situ rehabilitation of slums and legislation to provide property rights to slum dwellers. Ministry of Housing & Urban Poverty Alleviation (MHUPA) constituted a Task Force on Rental Housing and also suggested that the rental housing must play a much stronger role in affordable housing policies .The Task Force looked at both the Demand and Supply side of the Rental Housing segment to understand the industry better and thereby offer specific and implementable solutions.

The Demand side of Rental Housing consists of three major segments, namely, Permanent - households settled in the urban areas but unable to buy a house, Transient - households/individuals migrating from other parts for the purpose of employment/education looking for temporary abode and Captive households that live in tenements provided by Corporate. (Government of India, 2013b).

The Supply side of Rental Housing consists of the following key participants in Rental Housing, namely, Individual Landlords - unorganised individual landlords that provide rental housing to households and individuals, Institutional Landlords large companies that provide organised rental housing to households and individuals, Hostels/Dormitories large and small providers that offer shared stay primarily to individuals and Corporate/Captive Housing employers that provide housing to staff.

Dr. Ishar Judge Ahluwalia Committee Report argues that the challenges of managing urbanization will have to be addressed through a combination of increased investment, strengthening the framework for governance and financing, and a comprehensive capacity building programme at all levels of government. There is need of the hour to strengthen basic amenities like safe drinking water, sewerage, waste management facilities and sanitation facilities in urban conglomerations, while also ensuring that the urban poor have access to these facilities at affordable cost. Improved water management, including recycling of waste water in large cities and new townships. Transportation in urban centers is a major constraint. Currently, public transport accounts for less than a quarter of urban transport in India. Therefore, urban mass transit including metro, rail, electric buses and trams as well as other forms of public transport must be greatly strengthened, especially in under-served urban cities. Basic services i.e. water, housing, transport, sewerage, drainage, and solid waste management require major improvement. There is need for successful sustainable urbanization that requires competent, responsive and accountable governments charged with the management of cities and urban expansion.

To conclude, it is very painful that unplanned urbanization has resulted into mushroom growth of slum clusters having no concern for quality of life for dignified living. Affluent elites in cities need slums as source of cheap labours in the forms of servants, maids and other manual workers in construction sectors. But no attention has been paid to ameliorate the problem of slum dwellers. It is not an exaggeration to say that urban political leaders use the slums for pursuing their political agenda like hiring of hapless slum dwellers for political rallies and also as vote-banks. But problem of slums has not occupied the centre stage of development agenda. From time to time schemes and missions have been launched but those are too inadequate to address the problem. Of Late, the PM Narendra Modi has shown some interest by announcing “Houses for All' in coming decades. Let us hope this resolve does not prove to be a fiasco as populist slogans like garibi hatao, har hath ko kam, her khet ko pani., Serve Siksha Abhiyan and many more. Clean India Campaign of PM sounds good but it will remain a misnomer unless the problems of slums and slum- dwellers are solved with utmost honesty and sincerity.

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BUSINESS STUDIES

Employee Engagement and Talent Management Practices in Banking Sector : A Study of Jammu District

Saloni Devi* & Rachna**

ABSTRACT

The study aims to provide a comprehensive understanding of the relationship between Employee Management and Talent Management practices and to investigate the impact of employee engagement on talent management practices in banking sector. To provide empirical evidences of the relationship of the concepts, a quantitative study was done by distributing self administered questionnaire to the employees working in private banks. Convenient sampling method was used to select the participants and total 142 respondents filled the questionnaire. The findings of the study accomplished the objectives of the current study. The model was devised on the basis of literature review and revealed that there is a positive relationship between Employee Engagement and Talent Management Practices. The research provides an immense contribution in the banking sector by providing an insight to how Employee engagement enhances the talent management practices in banks. The study is first of its kind in J&K to examine the impact of employee engagement on talent management practices viz., talent identification, succession planning, talent development and talent retention in banking sector. The study provides an insight in to practical and theoretical implications in the banking sector which will facilitate the managers in private banks to outshine. The study is cross sectional in nature. All data were collected through self-reported questionnaire. Further, only the responses of bank managers are taken in to consideration. So, in future research employees of these banks are also taken into consideration.

Keywords : Employee engagement, Talent management, Banking Sector

Introduction

In the recent years of globalization, the competition around the world has increased. Organizations have noticed the importance of skills, knowledge and abilities of their work force. Thus, employee engagement has become an area of concern for all the corporate leaders. As they constantly look for diverse methods to keep their work-force engaged. Employee turnover has taken various sectors in the industry by a storm, as employees are found to be frequently switching jobs thus, causing high attrition rates. In this situation, employee engagement and talent management plays a vital role for gaining competitive advantage. Hence, for many organizations across the world both employee engagement and talent management has become a prime concern for better employee retention and organizational performance.

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Employee engagement can be defined in various ways. An engaged employee is one who increases productivity, does not switch job frequently and more importantly is the representative of the company at all times. An engaged employee experiences three different levels of engagement. He could be engaged, not engaged or disengaged. Engaged employees are those who work with excitement towards the organization's goals. An employee who is not engaged is one who is seen to be participating but not with passion and energy towards the organization's common goal. Disengaged employees are those who are unhappy at their work. Engagement is also found to have three different facets, Intellectual engagement refers to dedication towards performing better at one's job, Affective Engagement or feeling positive after performing one's job and lastly Social Engagement which is involved in discussions with others about enhancing work related improvements. Though over the years, employer branding principles have been practiced by successful organizations yet there is lack of empirical research in the banking sector. The present paper explores how Employee engagement in select banks, help in talent identification, succession planning, talent development and talent retention.

Objectives of the Study

1. To Develop and validate employee engagement scale.
2. To find out the impact of employee engagement on talent management practices viz., talent identification, succession planning, talent development and talent retention in banking sector.

Literature Review

The literature review section is divided into two parts: First section is based on Employee Engagement and second section is based on Talent management practices.

Employee Engagement

Engagement is linked to perceptions of being valued that translate into flexible effort and lead to enhanced performance (Konrad, 2006).Today most of the organisations realised that satisfied talent is not necessarily the 'best' talent in terms of loyalty and productivity, but it is the 'engaged talent' who is intellectually and emotionally bound with the organisation and passionately about to participate in additional assignments, encouraged to come up with new improvement ideas, opportunity to speak up with constructive comments and enhance the organisation's interests (Development Dimensions International, 2007; CLC, 2004). It means talent engagement is an alignment of maximum job satisfaction with maximum job contribution. This is used as a comprehensive term from employee engagement that focuses specifically on the engagement of identified talents in organisations (Bux and Tay, 2010). Under this talented employees are aware about the business context, and work effectively with colleagues to

improve performance within the job for the benefit of the organisation. Talent engagement is a critical ingredient of individual and organisational success (Jeswani and Sarkar, 2008). Towers Perrin ISR global study (2006) included three components in the definition of talent engagement: Cognitive (think), Affective (feel), and Behavioural (act). Vazirani (2007) defined certain aspects of employee engagement, which are significant and should be managed both by the talents and the employer's effort i.e., Employee's self, Employee + Employer, and Employee +Employee.

Talent Management Practices

Talent Identification

Talent management process starts with the identification of most suitable individuals within an organisation, who have the potential and capabilities to sustain the organisation's sustainable competitive advantage (Piansoongnern et al., 2011; Lehmann, 2009; Puvitayaphan, 2008). Companies identify/recruit and attain those employees whose talents and interests fit with both the short-and long-term needs of the organisation (Bhatnagar, 2007). It is a continuous process, which is not dependent upon an individual's performance on a single performance test. Talented employees are identified and nominated for key positions at senior/higher levels through performance appraisal, personal and organisational feedback (profile analysis and talent group awareness, self-assessment and action planning) and direct comparison rating (Edwards and Bartlett, 1983).

Succession Planning

Succession planning is a practice ensuring organizations that their required workforce are engaged, and they are trained and developed for filling key positions in the organization. According to Department of Management and Administrative Services, (2010) the rationale behind succession planning is to make certain that the key positions of the organizations are filled by means of this planning effectively. Succession planning is a blend of processes that include active achievement of the organization's objectives, training and development, coaching, testing, experimenting, communication and understanding. Succession planning is an annual permanent feature of organizations now-a-days, which begins with the employment of personnel and continues till the identification of future managers of an organization among the personnel employed today purely on the basis of their capabilities and potential (Paul, E. Ricci, 2006). The research literature of 1980s and 1990s discussed the ideology of succession planning. The current research carried out by Conger (2004), Kesler (2002), Leibman (1996), Rothwell (2005) have defined the key items of succession planning and management system consisting of ten elements: organizational commitment with articulation of expectations, process transparency, assessment of organizational needs, identification of key positions, establishment

of knowledge, skill, and ability, evaluation of talents, development of individual growth plans, individual feedback, accountability, process evaluation, and integrity of process throughout the organization.

Talent Development

Today, leading organisations are frequently scanning their environment for both the short- and long-term changes that they anticipate in their markets and industries and change that information into their talent-development strategies. Developing talent requires planned activities that concentrate on developing skills and abilities for future business needs, as well as development of skills for current job performance (Heinen and O'Neill, 2004). Once the talented employees are identified, the development of high potential and high performing employees becomes a major component for strategic talent management to fill the pivotal talent positions (Hartmann et al., 2010; Collings and Mellahi, 2009) because these employees are a valuable resource for future senior roles. Talent management initiatives seek to develop the talented employees' capacity so that they contribute towards the progress of the organisation and remain engaged with their works to produce maximum returns (Bano et al., 2010; Puvitayaphan, 2008). For developing talent pools, organisations provide fewer development jobs, on-the-job experience coupled with targeted educational/learning opportunities (formal as well as informal), cross-functional training, stretch assignments, challenged tasks, career development and increased support between high potential employees through coaching and mentoring (Yarnall, 2011; Farashah et al., 2011; Areiqat et al., 2010; Agrawal, 2010; Hartmann et al., 2010; Sumardi and Othman, 2009; Lehmann, 2009; Puvitayaphan, 2008; Chhabra and Mishra, 2008; Greer and Virick, 2008; Heinen and O'Neill, 2004).

Talent Retention

Talent retention is considered as a platform component of talent management (Iles et al., 2010; Hausknecht et al., 2009) and its war starts at the hiring stage (Bhatnagar, 2007). Talent retention is a multifaceted and systemic phenomenon that requires attention and human resource strategies, which focus on multiple aspects of the organisational system (Kontoghiorghes and Frangou, 2009). There are some practices which are undertaken by all the organisation for retaining their talent viz., performance based pay, training, challenging work, intrinsic motivations and career development (Piansoongnern et al., 2011; Lehmann, 2009). Hausknecht et al. (2009) found that job satisfaction; extrinsic rewards, constituent attachments, organisational commitment and organisational prestige are the main five factors that influence the talent retention in the organisation.

Conceptual Framework and Hypotheses Development

H1:- Employee engagement significantly affects talent identification.

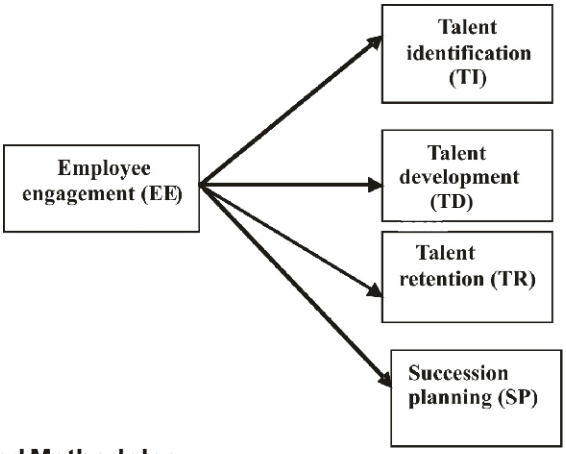
H2:- Employee engagement positively relates with talent development

H3:- Employee engagement has positive impact on the talent retention.

H4:-Employee engagement positively affects succession planning.

On the basis of above hypothesis, a conceptual framework (proposed model) of the study is framed for the study (see figure 1)

Figure 1: Conceptual Framework of the study (Proposed Model)



Research Design and Methodology

This research is evaluative in nature. The study tries to develop theoretical relationship between employee engagement and talent management practices in banking sector.

Sample Size and Design

The sample for the study comprised 142 bank managers of Private sector banks operating in Jammu district. Questionnaire technique has been used for data collection.

Data Analysis

The data has been analyzed with the help of two softwares (SPSS and AMOS). Before data analysis, it was duly purified with the help of exploratory factor analysis and validated through confirmatory factor analysis (CFA). The detailed result of exploratory and confirmatory factor analysis is as under.

Scale Purification-Exploratory Factor Analysis (EFA)

The 17 items of employee engagement scale were reduced to 13 after EFA under three factors namely compensation and career (f1), organisation culture (f2) and social responsibility (f3). This construct is explaining good variance (72 per cent). The Factor loadings, mean, standard deviation, alpha and Eigen values are presented in Table 1.

The nine items of talent identification were reduced to 4 after EFA and explaining 67per

cent variance. The mean and standard deviation of three factors is presented in Table 1.

The 14 statements of talent development got reduced to 12 under two factors with variance explained (67 per cent).

Talent retention construct which initially consisted of 12 statements got reduced to 8 under 2 factors explaining 66 per cent variance. The mean and standard deviation of 2 factors is presented in Table 1.

Succession planning construct was reduced to 8 from 10 statements. The variance explained was also very good (82 per cent) and Cronbach's alpha was .914 (Table 1) shows the reliability of the construct.

Table 1: Summary of Purification of Employee engagement scale, Talent identification scale, Talent development scale, Talent retention scale, and Succession planning scale

Scales and Factors	Mean (S.D.)	Factor Loading	[illegible]	Eigen value	KMO	VE
EMPLOYEE ENGAGEMENT						
Compensation and Career (F1)	**3.974**		**.865**	**3.286**	**.821**	**65.73**
Seniors acts as coach	**4.05(.869)**	**.737**				
Relevant training opportunities	**4.10(.732)**	**.718**				
Skill compatibility in work place	**3.96(.963)**	**.761**				
Performance reflected compensation	**3.83(1.006)**	**.793**				
Recognition of team achievements	**3.93(.820)**	**.766**				
Organisation Culture (F2)	**4.178**		**.908**	**3.171**		**79.28**
Comfortable work environment	**3.98(1.092)**	**.862**				
Health and safety	**4.26(.906)**	**.831**				
Learning in work place	**4.15(.869)**	**.850**				
Your bank has good reputation as an employer	**4.32(.815)**	**.692**				
Social Responsibility (F3)	**3.955**		**.780**	**2.692**		**67.29**
Selection of the most capable employees	**3.98(.943)**	**.547**				
Equitable justice	**3.82(.914)**	**.589**				
Bank is known for local charities	**3.99(.502)**	**.888**				
Bank is undertakes the activities for societal well being	**4.03(.413)**	**.895**				
TALENT IDENTIFICATION						
Talent is identified through potential appraisal	**4.00(.921)**	**.856**	**.839**	**2.710**		**67.65**
Identify talent based on the information in your hand	**3.82 (.892)**	**.802**			**.742**	
Talent is identified by managers by making judgments	**3.84 (.861)**	**.731**				
Talent is identified through performance appraisal	**3.98 (.864)**	**.893**				

TALENT RETENTION						
Career Opportunities (F1)	**3.902**		**.850**	**3.132**		**62.63**
Management examines the critical factors for retaining the employee.	**3.779.983)**	**.695**				
Organisation retains talented employees who thrive & contribute to growth.	**3.96(.984)**	**.883**				
There are career development programs to increase retention.	**3.979.948)**	**.833**			**.824**	
There are long-term investment plans/programs for retaining employees.	**3.81(1.002)**	**.729**				
Organisation builds personal relationships with employees	**4.00(.876)**	**.618**				
Employees Care (F2)	**3.633**		**.780**	**2.084**		**69.45**
Organisation takes feedback from employees related to their positions, satisfaction etc.	**3.78(1.097)**	**.830**				
Organisation cares what employees think	**3.56(1.085)**	**.869**				
Support employees through mentoring	**3.56(1.0380**	**.716**				
TALENT DEVELOPMENT						
Opportunities (F1)	**3.941**		**.926**	**4.871**		**69.59**
Develops high potential employees at every level	**4.00(.829)**	**.693**				
Provide opportunities for developing skills and competence	**4.04(.803)**	**.760**				
Is more accurate and efficient in developing emerging talent	**3.89(.875)**	**.789**				
Develop employees to fill pivotal positions	**3.77(.851)**	**.802**			**.871**	
Identifies development needs	**4.02(.853)**	**.820**				
Meet development needs effectively and timely	**3.97(.810)**	**.858**				
Has an internal development program	**3.90(.882)**	**.719**				
Development Programs (F2)	**3.828**		**.862**	**3.244**		**64.89**
Test individual requirement for future development	**3.88(.832)**	**.728**				
Enrolls employee in a long-term leadership development programs	**3.81(.884)**	**.814**				
Recognises managers for development of the talent pool	**3.84(.896)**	**.819**				
Offer higher order project assignments	**3.86(.697)**	**.725**				
Develop talent pool for internal recruitment	**3.75(.957)**	**.678**				
SUCESSION PLANNING	**4.126**					
Opportunities to learn and develop new skills	**4.16(.788)**	**.710**	**.914**	**6.563**	**.844**	**82.061**
Bank effectively maintains staffing levels	**4.09(.954)**	**.939**				

Senior management is interested in employee well-being	**4.09(.900)**	**.863**				
Give appropriate amount of decision-making authority to do job well	**4.11(.931)**	**.908**				
Recognise and praise employee for good work	**4.06(.862)**	**.915**				
Encourage employees for their development	**4.18(.857)**	**.898**				
Open-dialogue relationship with your employees	**4.11).863)**	**.803**				
Team work in your bank	**4.21(.782)**	**.836**				

Results

Measurement Model

The path model evaluation was carried out in two phases (suggested by Anderson and Gerbing, 1988; Henseler et al. 2009): the measurement model and the structural model for testing the theoretical model, which has been designed with the help of review of literature. Following these two-steps, a confirmatory factor analysis (CFA) was run first to analyse the measurement properties of the various scales, which provides an assessment of convergent and discriminant validity. Confirmatory factor analysis (CFA) uses a multivariate technique to test whether a pre-specified relationship exists between the manifest and latent variables. It is used to provide a confirmatory test of our measurement theory. The items that emerged after EFA under the individual factor were averaged for the application of CFA (Jones et al., 2001) and items with standardised regression weights (SRW) less than 0.50 were deleted (Hair et al., 2006). Fitness of the model has been assessed with various global fit indices like goodness of fit index (GFI), adjusted goodness of fit index, comparative fit index (CFI), normed fit index (NFI), Root mean squared error (RMR) and root mean square error of approximation (RMSEA). For the model to be fit, at least one absolute criterion and one incremental fitness criteria should meet the prescribed limits (Hair et al., 2006). The RMSEA for the model is below the cut-off criterion 0.08 (Bentler, 1990; Bollen, 1989; Marsh and Hacever, 1985) is acceptable for model fitness. The measurement models proved acceptable with all the values of absolute goodness fit measures and incremental fit measures being within the prescribed limit (Table 2). To meet the fitness of model, items from employee engagement, talent development and succession planning, were deleted due to less standardised regression weights and high covariance in modification indices (Joreskog and Sorbom, 1993).

Table 2: Fit Indices of CFA

Constructs	χ^2	DF	$\chi^{2/df}$	RMR	GFI	AGFI	NFI	CFI	RMSEA
Employee Engagement	30.757	19	1.619	.036	.934	.876	.945	.978	.079
Talent Identification	.508	1	.508	.006	.997	.974	.997	1.000	.000
Talent Development	9.918	13	.701	.022	.973	.943	.970	1.000	.000
Talent Retention	12.454	8	1.557	.046	.961	.897	.943	.978	.075
Succession Planning	.434	1	.434	.003	.998	.978	.999	1.000	.000

CFA was used to assess convergent validity (Bagozzi et al., 1991). Convergent validity was checked through factor loadings and AVE of all constructs (see Table 1). Authors suggested that Factor loading and AVE (average variance extracted) should be above 0.50 for proving the validity. Table 1 indicated that all the constructs proved their convergent validity.

Apart from validity, Reliability of the constructs has been checked through internal consistency by the application of Cronbach's alpha (Cronbach, 1951) as well as by extracting the composite reliability with the help of variance extracted. Alpha values equal to or greater than 0.70 indicate high construct reliability (Nunually, 1970; O'Leary-Kelly and Vokurka, 1998). Composite reliability is calculated as the squared sum of the individual item loadings divided by the squared sum of loadings plus the sum of error variances for the measures. This measure of internal consistency is similar to Cronbach's alpha except Cronbach's alpha assumes a priori that each measure of a construct contributes equally to construct (Cronbach, 1951). Bagozzi and Yi (1988) suggest that composite reliabilities of 0.6 or greater are desirable and that the individual item reliabilities will be usually lower than composites. Thus, Table 2 shows the Cronbach's alpha and composite construct reliability, which indicated that the scales are quite reliable.

Hypotheses Testing: SEM

Although SEM is attractive in testing model robustness, there is a requirement relating to sample size. Both estimation methods and test of model fit are based on the assumption of large samples. However, there is no absolute definition of “large sample” (Hair et al, 1995; Ding et al, 1995). In the present study, a sample size of 200 respondents is considered as sufficient for SEM. Structural Equation Modeling (SEM) is a multivariate technique that seeks to explain the relationship among multiple variables (Kaplan, 2000). In the present study, the relationship among employee engagement, talent identification, succession planning, talent development and talent retention have been assessed. First, a test of not-close fit was carried out for each model. The root-mean square error of approximation (RMSEA), a measure of model residuals, has been used in conducting this test. Since the upper bound of the RMSEA confidence interval for all of the models is quite below 0.10, the hypothesis of not-close fit could be rejected

(MacCallum et al., 1996). Thus, it could be inferred that none of the models had a poor fit. Furthermore, to minimize the effect of sample size in assessing model adequacy, CFI and SRMR were used to assess model fit in addition to the significance test, because CFI and SRMR are relatively unaffected by sample size (Hu and Bentler, 1998). The goodness-of-fit indices for the structural model1 ($\chi 2$ =70.661, df = 58, $\chi 2/df$=1.218, GFI = 0.907, AGFI = 0.855, NFI = 0.916, CFI = 0.983, RMR = 0.043, RMSEA = 0.047, see Table 3) are well within the generally accepted limits, indicating a good fit. It revealed that bank managers are aware of employee engagement's relevant role in identifying, planning, developing and retaining talented employees. Four paths have been traced (Figure 2) and the results revealed that all the paths explored in the model are significant. Result shows that employee engagement significantly affects the talent identification within organisation (β = 0.815, P < 0.001, see Table 3). It supports the first hypothesis, i.e., employee engagement significantly influences talent identification. The reason is that when the organisation has engaged employees full of energy and dedication, wins the reputation of being a good employer and gains competitive advantage, and which automatically helps the organisation tends to attract top talent. Hence, engagement leads to the identification of talented employees employer firstly identifies their talented employees in the organisation, so that they will be able to create its reputation as a good employer.

The second path traced the relationship between employee engagement and talent development. The standardised regression weight (β = 1.050, p < 0.001, see Table 3) is significant, which confirms the second hypothesis that higher the employee engagement better is the talent development. The third path traced the relationship between employee engagement and talent retention, which is highly positive (β = 1.096, p < 0.001) from other constructs as well as indicating the support for third hypothesis that higher the employee engagement better is the talent retention because employee engagement begins with identifying the distinctive qualities of the organisation that create an emotional connection between employer and employee-the qualities that make people love working there and bring them fulfillment. Organisations' used either a formal or informal HR strategy to retain their talent. Employer gives opportunities for growth, Job security, rewards and recognitions, attractive compensation and benefits package, opportunity for long-term career progression, recognition and appreciation of employees' work, and provides work life balance (Sokro, 2012), which are beneficially for retaining talented employees.

The last path traced the relationship between employee engagement and succession planning. The standardised regression weight (β = .660, p < 0.001, see Table 3) is significant, which confirms the fourth hypothesis developed by this study viz., employee engagement positively affects succession planning.

In second model (figure 3) the talent development dimension, is excluded. Then, the goodness-of-fit indices for the structural model2 ($\chi 2$ =50.446, df = 38, $\chi 2/df$=1.328, GFI = 0.920, AGFI = 0.861, NFI = 0.921, CFI = 0.979, RMR = 0.044, RMSEA = 0.058, see Table 5) are also well within the generally accepted limits, indicating a good fit. But, when it was compared with model1

(figure 2), the result indicated model 1 fit indices are better then model2 (figure 3). The traced path in model 2 (see Table 4), shows no change in relationship between employee engagement and succession planning as compare to above model (1). But in other two relations, employee engagement has significant but less relationship with talent identification and retention as compare to first model (figure 2). It shows that if employee engagement includes talent development in its strategy then it is easy to strengthen their relationship with other dimensions of talent management practices.

Table 3. Inner Regression Weights between Latent variables in the Structural Model (With Talent Development Construct)

Casual Path	SRW	CR
Employee engagement->Talent identification	.815	5.373***
Employee engagement->Talent development	1.050	8.387***
Employee engagement->Talent retention	1.096	8.107***
Employee engagement->Succession planning	.660	5.616***

Note: **Significance level = 0.05

Table 4 : Inner Regression Weights between Latent variables in the Structural Model (Without Talent Development Construct)

Casual Path	SRW	CR
Employee engagement->Talent identification	.784	5.264***
Employee engagement->Talent retention	1.065	7.260***
Employee engagement->Succession planning	.660	5.619***

Note: **Significance level = 0.05

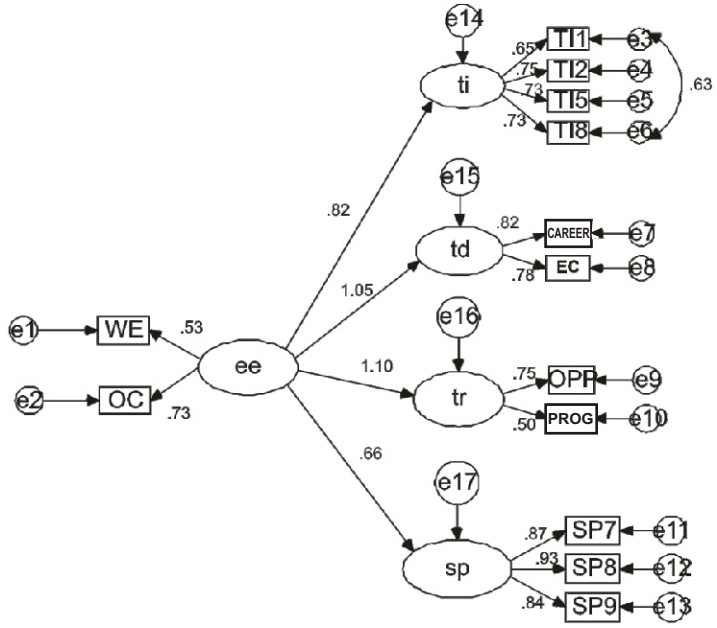


Figure 2 : Empirical Model of the Study

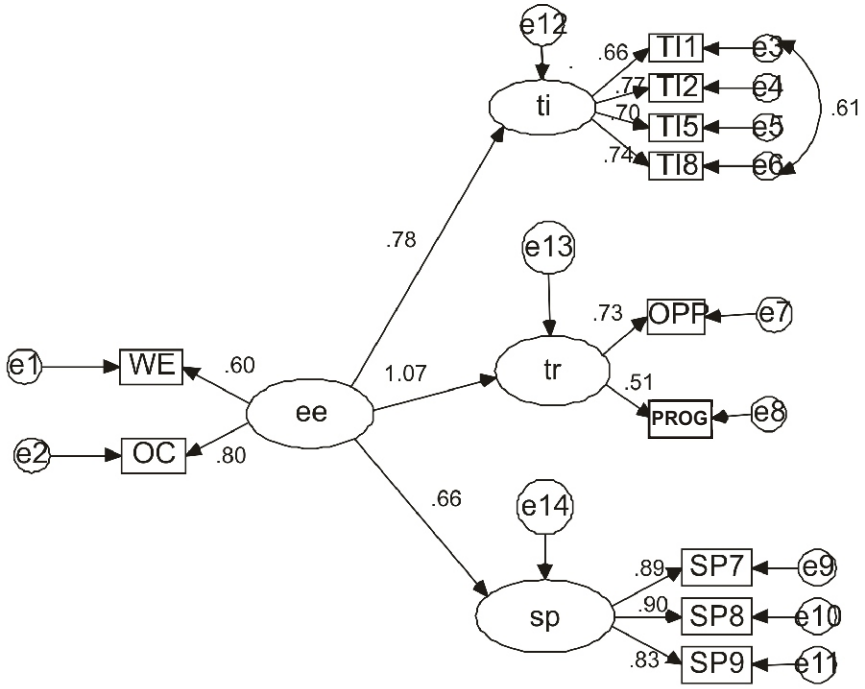


Figure 3: Alternate Model

Conclusion and Discussion

The objective of this piece of research was to investigate the relationship Employee engagement and Talent management practices. The literature review suggested Employee engagement demonstrates commitment to manage the talent in modern organizations. At the same time it also suggests that employee engagement is a key to the acquisition, development and retention of employees. Reviewed literature provided a strong evidence of the relationship between the variables tested i.e. Employee Engagement and talent management practices. Empirical review revealed that in order to perform well in the area of Bank managers should understand the factors that motivate employees to stay and to facilitate measures in keeping valuable employees because of the huge cost associated with employee turnover. The study used a sample population of one hundred and forty- two employees. The implications of the study is that compensation, organizational culture, corporate social responsibility & career development significantly influence Talent management practices viz. talent identification, succession planning ,talent development and talent retention in banking sector of Jammu district. Moreover, this study is completed by doing survey in select private banks operating in Jammu district. Hence the finding of the study may not be generalized.

Implication for Bank Managers

1) Managers should adopt the nomination as well as segmentation process for identifying the engaged and talented employees within banks strategies.

2) Managers have to devote sufficient time and attention towards engagement and development of talented employees.
3) Like other corporate sectors, banks should also endeavor to retain their talented employees at their hiring stage.
4) Managers have to maintained database of each talented employee and reviewed it at the time of identifying and retaining them.
5) Work-life misbalance is a great limitation of the banking sector. For being a good employer, bank managers have to start work on it. Further, it also helps to engage more employees for a longer period of time.

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Delivering a Superior Customer Experience for Creating Brand Resonance in Smartphones

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ABSTRACT

The study explored these relationships to outline how different dimensions of customer experience play an important role in creating strong brand resonance. It is quite evident that differentiation solely based on rational factors such as functionality, quality are no longer a sustainable competitive advantage, rather they are basic to survive in the highly competitive market place. In this perspective, companies are relying their hope on the concept of "customer experience", a comparatively new approach to bring about competitive differentiation that feeds on the emotional aspect of purchase. Managing customer experiences at different contact points create value, satisfaction loyalty, advocacy and emotional attachments for the firm. These bonds that consumer shares with the brand create strong connection known as resonance for the brand. The aim of this research is to find the effect of different dimensions of customer experience (CX) on brand resonance among the current smart phone users. The paper opted for both qualitative as well as quantitative research, including word association technique in initial phase to filter out brands high on customer experience and then for primary data a questionnaire using standardised scales were used for quantitative study. The study found a significant positive impact of various dimensions of customer experience on brand resonance. The paper further provides empirical insights into degree with which various dimensions of customer's experience during various brand encounters affect the overall customer's brand resonance.

Further research can be done in broader areas and different sectors. The research is not completely in line with the studies of the past and therefore further insight into the topic is required. More so the study is done in product segment wherein it provides an opportunity as well as a challenge. The paper has several practical implications for the smart phone companies who want to retain customers by creating effective customer experience for customers. The research results include implication for the development of band resonance through creating memorable customer experiences. It suggests the key dimensions of customer experience on which the stress has to be laid while managing or staging experiences for the customer.

Keywords : Customer experience, Sensory experience, Affective experience, Behavioural experience, Intellectual experience, Relational experience, Brand resonance.

Introduction

Background of the Study

In their prominent introduction of the "Experience Economy", Pine and Gilmore"s (1998),

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claimed that “as goods and services become commoditized, the customer experiences that companies create will matter most”. Moreover lately with an ever increasing competition, technological innovations, increasing modes of communication and changing customer behaviour the economy shifted from services to experience based economy. This was explained by Pine and Gilmore, 1998 with the help of an example of birthday celebrations how it has shifted from simple baking of cake in the house to an event outsourced to provide enjoyable experience to the kid by parents. This is an experience economy, where customer is ready to pay premium prices for the consumption of experiences. Further success of Disney, Apple, BMW, Starbuck's etc., can be attributed to this shift in consumption behaviour of the customer.

However, it is pertinent to mention that the idea of experiential attributes of consumption is not new. Holbrook and Hirschman (1982) were the first to introduce experiences as a part of consumption and marketing. Their view point represented a shift away from consumers as information-processors having only rational perspective, towards a more holistic perspective that considers both rational and emotional aspects of customer value. Pine and Gilmore (1999), and Richards (2001) agreed that there is a persistent change in consumers; they are no longer only concerned with buying goods and services, but are also concerned with engaging experiences. In addition, Pine and Gilmore also envisioned that future economic growth would come from businesses offering enriched, distinct consumer experiences.

Thus creating unique and valuable customer experiences has emerged as a key strategic focus among practitioners and is accepted as a theoretically unique construct in the academic literature. Companies are recognizing that their competitive edge can no longer rest on “great service,” which has become the norm (whether done live or via automation). Instead, they are shifting more and more resources towards “staging” (a term Pine and Gilmore use) experiences. The customers here are considered as emotional human beings rather than just rational economic decision makers. The shift can be seen keeping in view the changes in market place as well as customer's choices and decisions. The customers keep themselves more aware and informed by constantly being in touch with firm, other alternatives and other customers to keep themselves updated about the prices, quality, alternatives and feedbacks. Research suggests that modern consumers do not merely acquire products and services for functional attributes only but rather the experiences associated with it (Morrison & Crane 2007). Pine and Gilmore (1999) in their study supported the fact that current trend in consumer purchase behavior is dictated by the quality of the experience in addition to the quality of the service or good itself. As a result, experience has emerged as a key concept in marketing gaining acknowledgment for its contribution to marketing knowledge (Grundey, 2008) and further concepts like customer experience have gained increased interest in marketing literature.

Therefore, purposeful scripting and staging of interactive experiences is increasingly becoming the essence of marketing strategies to cope with experience economy. These emotional and authentic customer experiences help in strengthening the customer relationship with the brand thereby encouraging sustainable growth for survival in volatile future.

Literature Review

Background of Customer Experience

As a consequence of these evolving market trends and transformations, firms have also been shifting their emphasis on various competitive differentiators. It is quite evident that differentiation solely based on rational factors such as functionality, quality are no longer a sustainable competitive advantage, rather they are basic to survive in the highly competitive market place. Palmer (2010), has stated that competitive differentiators have evolved from mere product features to service benefits to relationships and now to experiential values. Approaches like Customer Relationship Management (CRM) are adopted by many firms to gain competitive advantage. However, studies revealed that incorporating CRM did not bring the results that marketers had expected (Meyer & Schwager, 2007; Schmitt, 2003; Palmer, 2010) due to complexities of market and customer. In this perspective, companies are relying their hope on the concept of "customer experience", a comparatively new approach to bring about competitive differentiation that feeds on the emotional aspect of purchase. Thus the increasing enthusiasm in the concept of experience for increasing companies differentiation capabilities has led to a new management framework named Customer Experience Management (hereafter, CEM).

In view of the above, definition provided by Carbone and Haeckel (1994) is more relevant as it adds overall value to CEM concept. As discussed by them, customer experience management is an integrated approach for managing customer experience thereby creating distinctive value through organized and planned efforts. These efforts in the form of clues originate from the product or service; behaviors of employees and service providers, other customers and the physical environment. Gartner Group (2001), defines customer experience management (CEM) as "the practice of designing and reacting to customer interactions to meet or exceed customer expectations and, thus, increase customer satisfaction, loyalty and advocacy." CEM aims to optimize customer's interaction with the brand and minimize any gap that exists between customer expectations and actual customer experiences at key brand points (Meyer & Schwager, 2007).

Berry et al., 2006 explained experience as "a series of discrete sub experiences that is full of messages which impact how customer feels about the company". Therefore management of experience involves managing a series of experience in the form of clues. These embedded clues / experiences are the take away impressions formed by customers encounter with product,

service and businesses (Carbone & Haeckel, 1994). These clues are in the form of technical performance (functional clues), tangible clues (mechanic clues), and the human interaction (humanic clues) (Berry et al., 2006). It is the accumulation of all these clues that create the actual experience both tangible as well as intangible and influence rational and emotional perceptions. Thus the experiences that a customer has with the brand at all contact points will have an influence on the overall perception and assessment of the firm and led to emotional attachment (Carbone & Haeckel, 1994). Thus, experience management is primarily concerned with the systematic design and implementation of the clues that are emitted by product or service and the environment.

Furthermore, successful incorporation of CEM strategies have a potential to create delightful customer experience which in turn generate repeat purchase behavior, positive word of mouth and foster loyalty. Customer experience is a strategic tool to create sustainable competitive advantage and differentiation in the minds of customers to facilitate memorability and brand love. It is a company's action perceived by consumer at all touch points (Ha & Perks, 2005). Therefore, managing a combination of both rational and emotional experiences with brand at various touch points is done to create customer experience.

Customer Experience and Brand Resonance

Customers do not always focus on product and service consumption but on hedonic experiences attached with the process. These experiences are produced and delivered by companies at various contact points where customer interacts with the brand (Czepel, Solomon & Surprenant, 1985; Lovelock, 1988) before and after purchase. These interactions at various contact points have an influence on the overall perception and assessment of the brand where customer evaluates the quality of firm's offerings. These touch points earlier by consumers were considered merely for rational evaluation and exchange process but nowadays they are the stage for crafting compelling experiences. For brands, these encounters are the points where customer evaluates and assess the quality of firm's offerings. These encounters are not merely interactions between the customer and the company for exchange but they provide the stage where the customer is engaged in compelling experiences to increase the memorability and loyalty towards the brand.

Customer's interactions with brand and brand personnel through various mediums can make for very descriptive and highly involving stories (Gabbot & Hogg, 1996) and include intense emotional imagery (Lang, 1993; Zaltman, 1997). These experiences of such encounters both good and bad serve as the base for our memory towards the brand. According to Chattopadhyay & Laborie (2005), brand contact points account for 90% of marketing communication investments. Therefore it is critical for companies to manage these contact points, for example Ola cab services roped in Narain Karthikeyan, formula 1 driver to give life time memorable

experience to its passengers and then these passengers shared their emotion along with selfies through social media. This is one of the many examples of firms going beyond services to provide customer experience by engaging passengers in a way that turned an ordinary cab ride into a memorable event. They created something entirely different as an economic offering, as the experience of riding with formula 1 driver was more valuable to customers than the service of being transported by the cab. They used cab service as a stage to sell customer experiences.

Among several experience dimensions found throughout the literature, Schmitt (1999) identifies the five dimensions of sensory, affective, cognitive, physical, and relational experiences. The sensory dimension is defined as experiences as a result of sensory evaluation of goods or services by the consumer that helps to build a certain images in his mind (Hulten, 2011). Brand through various subtle cues try to stimulate all these senses for consumer. The consumers all five senses are engaged to recognize these qualities and unite them with the brand name. According to Hulten (2011), multi sensory brand experience refers to brand engaging more than one sense of consumer in anticipation of generating multiple experiences. These sensory data that consumer notices and remembers results in increased purchase intentions. The second dimension of customer experience is affective or emotional response or arousal. These emotional responses may sound simple but their results are profound. The cognitive assessment of brand lead to specific actions and behaviours (Bagozzi et al., 1999). The emotional response is a vital facet that defines consumers' experience (Halvena & Holbrook, 1986). These experiences that brand creates to engage consumers emotions and feelings places him in a positive mood with sense of joy, (Schmitt, 1999) thus establishing strong emotional bond (Brakus et al., 2009). In short affective experiences are the feelings aroused due to brand related specific stimuli. Feelings represent both emotion and mood but they are different. Emotions are strong feelings mostly followed action (Bagozzi et al., n.d.) whereas moods are diffused low intensity feelings uncoupled with actions. These affective experiences create consumers attitude towards the product in terms of brand image, brand preference and enhanced brand experience along with activating various behavioural domains.

The third dimension is the behavioural experience, which encompasses concrete actions in response to brand stimuli. They basically targets consumer's bodily experiences, lifestyle and social interactions (Brakus et al., 2009). The act experiences are accumulated when the brand alter customers behaviour and lifestyle (Schmitt, 1999). The motivation and inspiration that consumer gets from the brand to enact behavioural change. The theory behind act experience is that customer's lifestyle significantly has an impact on their choices and preferences. It proposed for interacting consumption experience wherein the product as behavioural stimuli that involves a consumer into a role or action (Helman & De Chernatony, 1999). The fourth dimension of customer experience is intellectual, related to thinking or

activities that occur in mind. These brand stimuli lead to creative thinking, problem solving or in particular curiosity. They target the consumer's rational and emotional thinking in order to develop creativity and problem-solving experiences. It is active rather than a passive dimension where all the activities take place in mind and not outside and its results are surprising. This element is linked directly to high-technological products as the stimuli they emit are usually related to new technologies offering intellectual involvements and brain stimulations. However, Schmitt (1999), suggested that this dimension can also be extended to other product categories that are not technology oriented. Relational experiences the fifth dimension of customer experience is the most important since it explores experiences that are beyond individual feelings and emotions and include other people. These stimuli indicate the social aspects attached with the brand like esteem, pride, sense of community, belongingness etc.

Therefore, delivering combination of customer experience dimensions is of critical importance in a brand strategy for creating strong brand resonance. The meaning of brand resonance reveals that it is nothing but psychological connection between consumer and their preferred brand (Keller, 2001). It plays a crucial role in customer relationship management and the development of sustainable brand equity (Moor & Wurster, 2007). A customer who truly resonates with brand has a high degree of loyalty marked by a close relationship with the brand such that they actively seek means and ways to interact with the brand and share their experiences with others. A loyal customer is ready to revisit store and pay premium prices for the pleasure involved (Chaudhuri & Holbrook, 2001). Brand resonance includes a variety of brand-related outcomes from brand equity, repeat purchase, brand attachment, word of mouth, to deep emotional ties (Aaker, 1995; Keller, 2008).

Deriving from above discussion, the following hypotheses are suggested for studying the relationship between the main construct customer experiences dimensions (sensory, affective, behavioural, cognitive and relational) and brand resonance.

Research Hypotheses

H1: Sensory component of customer experience is positively related to brand resonance.

H2: There is a positive relationship between affective component and brand resonance.

H3: There is a positive relationship between behavioural component and brand resonance.

H4: Cognitive component has a significant positive relationship with brand resonance.

H5: Relational component is positively related to brand resonance.

Research Methodology

This study comprised of both quantitative and qualitative research techniques and is descriptive in nature. Thus, during the first stage, a qualitative approach using word association technique was undertaken to identify the smart phone brands perceived to be high on delivering

brand experience.

In the present research, the companies were not taken on market share index to study the brand experience index, as the customer's perception of brand experience may differ from the market share standings of the companies. The respondents were told to read a list of words describing high and low brand experiences and associate the words with the smartphone brands and their responses were analyzed to find out the brands perceived to be high on experience. The smartphone brands having maximum number of words describing high brand experiences by maximum number of respondents were taken for the study. This study fortified our base for brand choices rich in brand experience which came out to be Apple and Samsung.

Measures and Instrument Development

In the second stage, a questionnaire was drafted with validated measurement scales from previous studies, which had examined the constructs earlier. Dimensional measurements for brand resonance adopted from Keller (2001) and customer experience from Schmitt (1999). All the variables that measure the tested constructs were listed in first part of the questionnaire. The variables that appeared in second part include the demographic profiles, such as gender, age, income, occupation and academic qualification. The questionnaire consisted of two constructs i.e. customer experience and brand resonance. All items were measured on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree).

Sample and Data Collection

The data was obtained from smart phone customers of Dehradun city over a period of five months. A structured questionnaire was distributed to 150 smartphone consumers. A total of 150 responses were returned, and five responses with missing information were eliminated leading to a total of 145 valid responses.

Results

Demographic Profile

A total of 145 valid respondents were analyzed in this study. According to the study, the gender distribution of the respondents consists of males (59%) and females (41%). Bulks of the respondents are in the age group of 20-30 years (61%; 88 people); followed by the age group between 31 to 40 years old (31 %; 45 people) and the age group above 40 (8%; 12 people). Most of the respondents are currently graduates and post graduates (82.8%).

Reliability Test and Validity

The data collected was purified using various statistical tests for purification before data analysis and interpretation. In present study the internal consistency reliability has been used to calculate the reliability of the scale. A popular approach to measure reliability is to use the coefficient alpha (Malhotra, 2006). The reliability of the scales has been validated using

Cronbach's alpha coefficient for each scale. The Cronbach's alpha coefficient for all variables were between 0.918- .957 (table 1), higher than the minimum threshold 0.7 as suggested in the literature (Hair et al. 2006; Nunnally, 1978). The validity of the study has been worked out with extensive literature review and discussion with professionals.

Table 1. Cronbach's Alpha coefficient values

Construct Scale	Cronbach's Alpha
Customer Experience (CX)	0.918
Brand Resonance (BR)	0.957

The data was first subjected to an Exploratory Factor Analysis (EFA) to reduce the number of variables. Results of the EFA demonstrated that in customer experience scale items were loaded into all five factors and for brand resonance scale two clear factors emerged that had items with high primary loadings (higher than .60) and low cross loadings (lower than .35).

Table 2: Factors identified by Principal component factor analysis and reliability test

Factor Name	Variable	Factor loadings	Cronbach's alpha
Customer experience			.918
1.Sensory	1. My Smart Phone (SP) makes a strong impression on my visual and other senses like its colour, design, shape, looks, touch etc.	.806	.739
	2. I find my SP brand interesting in a sensory way (e.g. its touch and feel, sound quality, looks nice, visually warm etc).	.745	
	3. My SP brand does appeal to my senses.	.738	
2. Affective	4. My SP brand induces feelings and sentiments (you feel refreshed, inspired using this brand).	.930	.862
	5. I have a strong emotion for this SP brand.	.864	
	6. I am emotiona lly attached to my SP brand.	.863	
3. Behavioural	7. I engage in actions and behaviours when I use this SP brand (like frequently checking your phone).	.898	.760

	8. My SP brand is action oriented (you keep doing something on it).	.898	
4. Intellectual	9. It engages me into a lot of thinking (reminds me to use my imagination).	.858	.818
	10. My SP brand does make me think.	.853	
	11. My SP brand stimulates my curiosity and problem solving.	.859	
5. Relational	12. SP brand is a part of my social circle's choices.	.886	.783
	13. SP brand results in interactive experiences with other people.	.794	
	14. SP brand drives me to be leader	.829	
Brand Resonance			.964
	1. In future, I will be loyal to this smartphone brand.	.879	
	1. I will buy from this SP b rand again.	.872	
	2. My smartphone brand will be my first choice in future.	.895	
	3. I will not buy other brand if this SP brand is available.	.780	
	4. I will recommend this SP brand to others.	.681	
	5. I really love this SP brand.	.703	
	6. My SP brand is special to me.	.639	
	7. My SP brand is more than a product to me.	.708	
	8. I really identify with people who use the same SP brand that I use.	.804	

	9. I feel like I almost belong to a club with others users of this SP brand.	.811	
	10. My brand is a SP used by people like me.	.822	
	11. I feel a deep connection with others who use this SP brand.	.734	
	12. I really like to talk about this SP brand with others.	.609	
	13. I am always interested in learning more about my SP.	.636	
	14. I would be interested in learning about my SP	.850	
	15. I am proud to have others know I use this brand.	.858	
	16. I like to visit the website of my	.653	
	17. Compared to other people; I closely follow news about this SP brand.	.656	

Note: KMO Measures of Sampling Adequacy = .886; p = 0.000 ($p<0.05$); df = 528; Approx. Chi-Square = 4236.020

Multiple Regression Analysis

Further, multiple regression analysis is used for studying the causal effect of various factors of independent variable on dependent variable and test all the five hypotheses (H1, H2, H3, H4 and H5). Based on Table 5, the Tolerance Value was ranged between 0.378-.536, which were all more than 0.10, and the VIF value ranges from 1.866- 2.646 that are all less than 5 (Hair et al., 2006). These values are an indicator of no multicollinearity among all the variables that are independent. According to Table 5, the p-value for three independent variables is less than 0.05, indicating that sensory, affective and behavioural component had significant relationship with resonance whereas the other two variables has more than .005 p-value indicating no significant relationship. In other words, the finding from this research confirms that sensory, affective and behavioural component are positively related to the brand resonance. In conclusion, only three hypotheses are supported.

Table 3 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.854[a]	.729	.716	.511	.729	55.984	5	140	.000

a. Predictors: (Constant), relational, sensory, Intellectual, behavioural, affective

b. Dependent Variable: BR

Table 4 ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	73.212	5	14.642	55.984	.000[b]
	Residual	27.201	140	.262		
	Total	100.413	145			

a. Dependent Variable:BR

b. Predictors: (Constant), relational, sensory Intellectual, behavioural, affective

Table 5 Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1	(Constant)	1.175	.278		4.229	.000		
	Sensory	.114	.065	.122	1.743	.043	.536	1.866
	Affective	.357	.061	.478	5.806	.000	.385	2.597
	Intellectual	.018	.073	.021	.248	.804	.378	2.646
	Behavioural	.239	.069	.282	3.471	.001	.394	2.537
	Relational	.057	.056	.075	1.024	.308	.483	2.072

a. Dependent Variable:BR

Sensory, cognitive, behavioural, relational and affective dimensions were used in a multiple regression analysis to predict brand resonance. The prediction model contained three predictors. The model was statistically significant p < .001, and accounted for approximately 72.9 % of the variance of brand resonance (R2 = .729, Adjusted R2 = .716). The model is a highly significant predictor of brand resonance (F = 55.984; p< .000). Affective component received the strongest weight in the model followed by behavioural and sensorial components received the lowest of the five weights. A comparison across all statistics presented in Table 5 highlighted that affective was the strongest direct predictor of brand resonance. Affective obtained the largest beta weight (β= .478, p < .000), demonstrating that it made the largest contribution to the regression equation, while holding all other predictor variables constant.

It was found that sensory appeal has a positive and significant impact on brand resonance (=.122, p<0.043). The relation H1 generated signifies that sensory appeal can explain 12.2% of variance in brand resonance.

Further the analysis of regression coefficients reveals that affective (=0.478, p< 0.000) is a significant contributor towards increasing the brand resonance. H3 (relation between intellectual component and brand resonance) with =0.021, p<0.804, is not a significant contributor to brand resonance. The fourth hypothesis (relation between behavioural component and brand resonance) with =0.282, p<0.001, is significant contributor and explains 28.2 % of variance in brand resonance. The fifth dimension i.e. relational component again is not a significant contributor (=0.075 p< 0.308). The data suggested that out of the five dimensions of CX, only three dimensions are significant contributor in context of Indian customer and are significant predictor of brand resonance in case of smartphones.

Conclusion

The importance of customer brand resonance is critical to survive in this competitive world and creating customer experiences is one of the tools with firms to achieve it. This study has investigated as to how different dimensions of customer experience can be applied to achieve brand resonance. The present study has implored the relationships that exist between customer experience dimensions and their effect on brand resonance.

Result of this research is not completely in line with the previous researches in this context that concluded that all the dimensions of customer experience are strong predictors of brand resonance. Among the five customer experience dimensions, only three came out to be significant positive contributor. Therefore, smartphone firms can apply various strategies based on these three dimensions to improve customer experience with the brand. As far as the managers, the study gives an insight into the understanding that creating value by using customer experiences plays a crucial role for firms to gain sustainable edge over others. The affective dimension was the largest contributor therefore strategies have to be directed towards

experiences that generate the emotional connect of customer with the brand through its sensory and behavioural components. This can be attributed to the fact that smartphones have become a very important part of our day to day life therefore the need to have a strong appeal on customer's senses and engage them into action. Therefore, firms need to focus on strategies using a mix and match of all these dimensions.

Research Limitations

The study has concentrated on two smartphone brands namely Apple and Samsung. However, the relevance of the constructs under study can be analysed for other companies too.

- Data was collected from select city of Northern India; the results cannot be generalised over different geographical locations.
- Also the data was collected over a short period of time, so probably the findings do not account for the change in factors over a period of time.

Future Implications

This research study has also opened the door for future research in the allied areas. The future research may be extended in terms of its scope.

- The data collection for the present study was collected from smartphone users of Dehradun, therefore, it is suggested that the future researchers may go for data collection from other areas, states or nations.
- As this research study focuses on studying customer experience and brand resonance of select smartphone companies, further research may try to understand the relationship of these constructs across other product and service segments like Automobiles, FMCG, Consumer Durables, Electronics, Two-wheelers and so on.

In the present study, CE has been studied as antecedent to BR. However, there may be other variables having an impact on enhancing BR. Thus, other variables may be added to get a deeper understanding of BR behaviour.

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Corporate Governance and Financing Decisions during Subprime Crisis

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ABSTRACT

Corporate scam of any type increases the information asymmetry, monitoring cost as well funding costs in a market economy. Firms face challenges in raising funds from external sources and become more susceptible during crises. Empirically, researchers have provided evidences of positive impact of good governance practices on firm's financing decisions at different points of time except the subprime crisis period. In this paper an attempt has been made to further probe the impact of ownership structure and corporate governance practices on financing behaviour during subprime crisis.

Based on nine years annual reports of Indian private companies listed on BSE, it has been observed that Indian firms were highly leveraged during subprime crisis period as compared to pre- and post-crisis period. Widely held firms and firm's having foreign promoters and institutional investors were low leveraged. Firms having higher board activism, auditing standards and corporate disclosure level helped firms to raise more debt on favorable terms during crisis.

Keywords : Corporate Governance, Financial Leverage, Ownership Structure and Subprime Crises.

Introduction

The healthy corporate governance practices promote trust, encourage long term relationship between companies and its capital providers, and boost overall market confidence; whereas the weak governance leads to substantial diversion of assets by managers of firms, and the non-existence of external capital supply to firms (Shleifer & Vishny, 1997). Fair and transparent corporate governance promotes the development of strong financial systems, irrespective of the bank-based or market-based which in turn have a positive effect on economic growth and poverty reduction (Chakrabarti, 2005). A high level of trust and integrity between firm's stakeholders and management is the prerequisite of sound corporate governance and that can be built up through four pillars of corporate governance i.e. transparency, accountability, fairness and responsibility.

Corporate Governance and Financing Decision

The composition of capital structure (i.e proportion of debt and equity) reflects the

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ownership structure of a firm and allocation of power between internal and external investors. The financing decisions are important in competitive and dynamic environment that affects firm's value (Miao, 2005 and Abor, 2005).

The capital structure of a firm is influenced by aggregate corporate governance quality (Fama & Miller, 1972) & (Errol D'Souza, 2000) and Debt and Equity are the alternative instruments for controlling a firm (Williamson, 1988). Capital structure and corporate governance are related through their association with agency costs (Harford, et.al, 2012). Changes in corporate governance significantly affect the financing policy of a firm (Arping & Sautner-2010) where as the seminal work of Modigliani & Miller (1958) has confirmed that the market value of any firm is independent to its financial structure.

Firms generally follow a hierarchy of finance and give first preference to retained earnings during expansionary period followed by debt and at the last resort the firms go for equity. Investors consider this as a signal about the firm's future earning prospects. When firm issue debt, investors observe that the firm is confident about its prospects and able to serve higher debt payments.

Sometime this creates asymmetric information between the managers and external capital supplier regarding the firm's prospects. But, fair and transparent governance practices can reduce the information asymmetry which in turn, reduces management's need to use debt as a signaling device to inform market participants about firm's prospects.

Various studies such as Jensen & Meckling, (1976); Triantis & Daniels, (1995); Jiraporn & Gleason, (2007); Sarkar & Sarkar, (2008) and Harford, et.al, (2012) highlight that debt play an important role in disciplining opportunistic behaviour of management. Hiwt & Smart, (1995) said that debt worked as a disciplining force because highly leveraged firms are subject to severe performance problems. Firms have to improve the quality of their governance to raise external funds, (Wei-Peng et al., 2010).

Reduction in information asymmetry, agency problems and default risk also resulted in optimization of financing cost of debt as well as of equity (Mande et.al, 2010). Debt also alleviates the expropriation of minority shareholders, generates external monitoring, force firms to use the cash efficiently and induces managers to be accountable to the external capital market (Easterbrook, 1984).

Firms with weak corporate governance and industry competition are less intense and have greater leverage and vice versa (Fulghieri & Matti Suominen, 2012). Improvements in corporate governance standards may help the firm in reducing disciplining role of debt (Arping & Sautner, 2010).

The corporate governance has comparatively less impact on debt as compared to equity financing, (Park & Son, 2010). Contrary to turn, governance also helped the firms in raising debt from the market at competitive rate (Lorackisa & Ozkan, 2009). But, Park & Son, (2012) were of the view that effectively managed firms prefer equity over debt to reduce agency costs.

The board size, composition and CEO duality also have implication on leverage ratio. Abor (2007) and Berger et.al (1997) found that firms with larger board size, outside or non-executive directors and CEO duality have an edge to employ high debt whereas entrenched CEO employ lower debt in their capital structure to reduce performance pressure. Coleman & Biekpe, (2006) and Sheikh & Wang, (2012) noticed that the board size and outside directors are positively related with debt whereas directors remuneration and CEO duality is negatively related to debt.

But others have different view as Wen et.al (2002) stated that manager tends to pursue lower financial leverage when percentage of outside directors on the board is higher and tenure of the CEO is long. Heng et.al (2012), Azrbaijani & San (2012) and Upadhyay & Sriram (2011) suggest that the firms with large board size and presence of independent directors prefer less debt. Kumar & Singh (2013) found a negative association between board size and firm value. Similarly, firms with weak share holder rights use higher debt to reduce agency cost (Jiraporn & Gleason, 2007).

Despite the conflicting conclusions about the impact of corporate governance on financing decisions in previous studies, most of them have consensus over the fact that composition of board plays an important role in firm's capital structure decisions. Firms with weak corporate governance and share holders right have greater leverage whereas firms having larger board size, higher percentage of outside or non-executive directors and CEO duality tends to be low leveraged. Debt act as a disciplining force in the modern corporation because highly leveraged firms faced severe performance problems.

But a very high level of debt costs more especially during adverse business scenario and led firms towards financial distress and bankruptcy. So the firm must trade-off between benefits of debt and the costs of debt.

Ownership Structure and Corporate Governance

Ownership structure of a firm is also one important factor in its performance and corporate governance disclosures depends upon its' ownership structure (Bianco & Casavola-1999) and highly concentrated firms perform better than widely held firms as there exist a negative correlation between ownership concentration and profitability. Frank & Mayer (2001)

observed that ownership concentration is a major problem in emerging economies and is the root cause of principal-principal conflict. Lins (2003) was of the view that management control in excess of the ownership rights effects firm performance negatively and investors discount firms with managerial agency problems resulting from misaligned incentives and managerial entrenchment.

Shleifer & Vishny, (1986) observed that large share-holders have higher stakes in the firm so their incentive to collect information and to monitor management incites management to disclose reliable and relevant information. Concentrated ownership decreases the level of discretionary accruals and increases the voluntary disclosures made by managers (Yeo, Tan, & Chen, 2002). A possible reason for the improvement in disclosure quality can be that institutional investors have the incentive and ability to check the manager's self serving behaviour (Claessens, 2003).

In contrast, some studies show that earnings quality is poor for concentrated ownership (Donnelly & Lynch, 2002) and makes accounting numbers less credible (Bradbury et al., 2006).

Sarkar & Sarkar (2000), Kumar (2004) and Rao & Guha (2006) found a little role of institutional investors in monitoring Indian firms. As majority of Indian firms are controlled by promoters or family business groups so large shareholders' activism in corporate governance especially block holdings by directors and foreign investors, improve Firms' value.

Foreign ownership helped in reducing agency cost of equity financing and has positive effects on firm's performance (Chibber & Majumdar, 1999). The increased role of foreign institutional investors has a positive effect on corporate performance in terms of profitability (Patibandla-2006). Proportion of institutional ownership is considered good for implementing good governance practices as they are more proactive than individual investors in collecting, analysing and acting on firm related information (Samuel, 1996). Presence of state institutions as majority shareholders causes poor quality of financial information (Firth et al., 2007).

Board composition, CEO duality and leadership diversity have considerable influence of on firms' performance (Douma & Kabir, 2006 & Li et.al, 2006). As corporate governance practices are robustly affected by regulatory reforms, mainly for larger firms because they are subject to stricter rules and industry factors , so the firm size and its risk affect firms' governance structures. The larger and riskier firms tend to be better governed and firms adjust their governance structures gradually to cope with economic changes (Gillan, 2010).

Governance and Crises

Corporate governance failure is one of the main cause of the deepest financial crisis

(sub-prime crisis -2008) after the great depression of 1930 (Kirkpatrick, 2009 and Cheffins, 2009) that ruined the US real-estate market and delinquencies in mortgage backed assets (Essen, et al. 2013; Akbar, 2013). The different aspects of corporate governance i.e. risk management system, transparency and disclosure, board oversights practices and remuneration system, failed during this crisis (Bruner, 2011; Claessens, et al. 2010; Pirson & Turnbull, 2010 & Yeoh, 2010). The financial markets across the world were hampered significantly and ultimately resulted in squeezing of debt and equity capital financing available to businesses, and creates a severe recession in the U.S. and other parts of the world (Mizen & Paul, 2008).

Weak governance practices was one of the main cause of the Asian crisis (Glen & Singh, 2005) and existence of representatives of financial institutions on firms' boards of directors affected borrowing decisions during Asian crisis, (Stearns & Mizruchi, 1993). Companies with weak corporate governance structure faced severe agency problems during the crisis (Kim & Lee, 2003) and bank lending did not work well in disciplining corporate management during Asian crisis (Suto, 2003). But, presence of investment bankers helped firms during financial crisis in securing long-term funds (Linda & Mizruchi, 1993).

Firm-level differences in corporate governance measures have significant impact on firm's value during crisis (Jae et.al 2004) and CEO duality, quality of the legal system and creditor rights protection act improve firm's performance during subprime crisis (Essen et.al-2013).

But in certain studies large board size and presence of independent directors have been insignificant to save firms during crises due to their inability to make significant strategic decisions due to poor coordination and communication and ultimately resulted in lowering firm's value (Kumar & Singh, 2013). Erkens et.al (2012) found that firms having independent boards experienced worse stock returns during the subprime crisis period. Directors and executives behaved in unethical and even illegal ways during subprime crisis to pursuit their self interest (Giraldez & Hurtado, 2014). Gupta et.al (2012) have not found any significant benefits of good governance during a financial crisis.

Subprime crisis and Indian Economy

The subprime crisis has much more contagion effects on Indian market than the Asian crisis due to its more than two decade strong integration with the world markets. After record inflow of foreign capital, Indian markets experienced an impetuous trend reversal during subprime crisis and it affected the Indian economy through various channels. Indian stock markets which are heavily dependent on FII investments crashed after the shock (as BSE

dropped by 23.43 % from 20,873 on January 8th, 2008 to 16608 on February 12th, 2008), rupee depreciated by 23% in just 11 months and to contain deprecation RBI increased dollar liquidity leading to a reduction in its foreign exchange reserve and Indian companies found it difficult to raise funds from the international markets (Arora et.al 2010).

The impact of the subprime crisis has also been visible in financing behavior of Indian firms. As per the financing behaviour of the firms (sample firms) presented in Table-1, before crisis firms were raising more than 65% of their funds from external sources and debt contributes nearly 60% of the external funds. Debt ratio was nearly 35 to 38% in which bank borrowing was the main source. However, immediately after the crisis i.e. during 2009-10, the significant decline has been witnessed in the external sources as it reduced to 49% and more specifically bank borrowing squeezed from 24 percent to less than five percent.

Thus, the subprime crisis started in USA, turned into a global economic recession. Frauds in mortgaged loans due to weak governance mechanism lead to big corporate failure. Lack of transparency and irresponsible behaviour of the corporate boards disturbed the foundation of a society. Investors lose confidence on the markets as well as on the regulators and ultimately resulted in the virtual collapse of availability of external capital.

Table-1:Sources of Funds for Medium and Large Public Limited Companies

(As Percentage of Total Sources)

Sources of Funds	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**	**2011-12**
Period	Pre-Subprime Crisis		Subprime Crisis	Post-Subprime Crisis		
Average no of Co.'s	3016	3114	3192	3352	3485	3041
Internal sources	**33.1**	**35.5**	**31.7**	**51.0**	**36.4**	**38.3**
-Paid-up capital	0.6	0.4	0.3	0.8	0.5	0.1
-Reserves and surplus	23.5	23.1	20	30	22.5	21.5
Provisions	9	12	11.3	20	13.4	16.7
External Sources	**66.9**	**64.5**	**68.3**	**49**	**63.6**	**61.7**
O/w: **Share premium**	**12.7**	**15.1**	**14.7**	**17.3**	**12.3**	**3.4**
Borrowing	**34.0**	**30.3**	**38.1**	**17.7**	**27.7**	**29.7**
-Debenture	-0.4	0.6	6.1	4.2	2.7	2.3
-from banks	22.1	20.7	24.2	**4.9**	17.9	15.3
-from other FIs	10.6	4.8	5.8	5.1	4.8	7.6
-from other	1.6	2.7	1.3	2.8	2.5	3.9
Trade dues and other current liabilities	**20.2**	**19.1**	**16.6**	**14.1**	**23.6**	**28.5**
Total	**100**	**100**	**100**	**100**	**100**	**100**

Source: R.B.I monthly bulletin

Need of the Study

Past studies conducted so far have made it clear that competitive global business

environment, various financial failures and scams since two decades have increased the importance of the codes of best governance practices in the world. The board size and its composition (i.e presence of independent and non-executive directors, their number, qualifications, age and shareholdings) have evident impact on firm's financing decisions and building investors' confidence.

The sound governance and disclosure norms helped the firms during crises and their dependence on equity generally increases. Any improvement in governance practices play a significant role in reducing asymmetric information and agency cost as a result the decrease in the cost of outside equity financing.

Though researchers at national and international level has establishes the significant impact of corporate governance on firms' financing decision at different point of time, yet the role of good governance during global financial crisis is not clear. Hence, an attempt has been made to crystallize the impact of corporate governance on firm's financing decisions during 2008 subprime crisis in India.

Scope of the Study

The study is limited to the analyses of the annual reports of the 121 private sector companies and covered only one crisis i.e. sub-prime crisis 2008 because the main cause of this crisis was the flaws in corporate governance (Kirkpatrick, 2009 and Cheffins, 2009). To observe the changes in corporate governance practices and financial performance of the sample companies, nine years time span (i.e. 2004-2005 to 2012-2013) has been divided in three parts i.e. pre-subprime crisis period (2004-05 to 2007-08), subprime crisis period (2008-09) and the post- subprime crisis period (2009-10 to 2012-13).

Sampling Design

All the private sector Indian companies have been taken as the universe out of which 792 Companies listed in Bombay Stock Exchange on September 2nd, 2013 have been taken as population. Out of these companies, Public sector undertakings, Banking companies and Non-Banking Financial Companies (NBFCs) have not been considered as these companies are different from those governed by the companies act (Garg, 2007 and Saravanan, 2012). Beside this non-debt companies are also excluded and finally 679 (consisting of 67 large cap, 184 mid Cap and 428 small cap) companies formed the sampling frame. The systematic random sampling technique has been applied to select the firms for analysis to control the distribution of the sample by spreading it throughout the sampling frame at equal intervals. All the 679 companies were first arranged in descending order on the basis of their capitalization on September 2nd, 2013 and every fifth company has been considered and finally 121 firms

(consisting of 21 Large Cap, 36 Mid Cap and 64 Small Cap) formed the sample for the study. Nine years, (i.e. 2004-05 to 2012-13) annual reports of these sample firms have been excerpted from the "PROWESS" a database maintained by Centre for Monitoring Indian Economy (CMIE).

Research Variables

Three leverage ratios, i.e. debt equity ratio, total debt ratio and long term debt ratio have been taken as proxy variables to measure the changes in capital structure. The ownership structure and Corporate Governance Indices have been used as explanatory variables in the study. An un-weighted corporate governance index, based on various items given in corporate governance reports, has been developed to measure the quality of governance as has been done by Cooke (1989); Gompers et.al (2001); Bhagat & Bolton (2008) Hossain & Hammami, (2009) and Sarkar et.al (2012). The advantage of assigning un-weighted scores is to treat all attributes of the sub index equally without considering the subjective opinion on the relative importance of each attribute.

Tangible fixed assets/total assets ratio has been used as proxy variable for firm's collateral value as a control variable because firm's with more fixed assets reduce the default risk of lenders and find it easier to raise funds from debentures or borrow (Rajan & Zingales-1995).

Natural logarithm of total asset has been taken as proxy of corporate size to control the positive impact of firms' size on its leverage (Sheikh and Wang-2012). As larger firms disclose more information than smaller firms that lower monitoring costs, less volatility in their cash flows and have easier access to credit. Depreciation and amortization/total asset ratio as a proxy for non-debt tax shield to control the taxation affects on financing decisions because inverse relationship exist between non-debt tax shields and leverage (De Anglo and Masulis-1980)

The current ratio has been used as proxy for liquidity to counter the inverse relationship between liquidity and leverage (Titman & Wesssels 1988; Friend & Lang 1988; Rajan & Zingales 1995; Bevan & Danbolt, 2002 and Mazur, 2007).

The Regression Model

The impact of ownership structure and corporate governance mechanism on firms' capital structure during the pre-subprime crisis, subprime crisis and post-subprime crisis periods has been analyzed by using following multiple regression OLS model;

$$DER_{it} = \beta_0 + \beta_1 IP_{it} + \beta_2 FP_{it} + \beta_3 NPBFI_{it} + \beta_4 NPFII_{it} + \beta_5 NPNI_{it} + \beta_6 BSI_{it} + \beta_7 CD_{it} + \beta_8 BAI_{it} + \beta_9 AI_{it} + \beta_{10} RI_{it} + \beta_{11} SGI_{it} + \beta_{12} SRI_{it} + \beta_{13} DI_{it} + \beta_{14} CV_{it} + \beta_{15} CS_{it} + \beta_{16} PROF_{it} + \beta_{16} NDTS_{it} + \beta_{16} LIQ_{it} + \varepsilon_{it}$$

DERit - Debt equity ratio (as proxy of capital structure) of the firm i at time t as dependent variable.

In the ownership structure IP is Indian promoters, FP is foreign promoters, NPBFI is non-promoters banking and insurance, NPFII is non-promoter foreign institutional Investors and NPNI is non-promoter non-institutional investors of firm i at time t.

In corporate governance, BSI is board structure index, CD is the CEO duality, BAI is a board activism index , AI is auditor index, RI is a remuneration index , SGI is a shareholder grievance index, SRI is shareholder right index and DI is disclosure index of firm i at time t.

In firm characteristics, CV is collateral value, CS is corporate size , NDTS is non-debt tax shield , LIQ is liquidity of firm i at time t, β0 is common y- intercept, β1- β16 are the coefficients of concerned explanatory variables and ε is error term of firm i at time t.

The assumptions of multicollinearity, autocorrelation, normality and heteroskedasticity have been tested as violation of these assumptions can affect the parameters of regression model (Malhotra, 2008; Hair et.al, (2006); Field, A. (2009) and Gujarati, D. N. 2012).

The Karl Pearson's coefficient of correlation has been computed to check the problem of multicollinearity in the explanatory variables and the results given in table-2 reflects no serious concern for multi co-linearity problems as the correlation between explanatory variables do not exceed 0.8.

Table-2

Table-2 Correlation Matrix for Variables

Variable	DER	TDR	LDR	CV	CS	PORF	NDTS	LIQ	IP	FP	NPBI	NPFII	NPNI	BSI	CD	BAI	AI	RI	SGI	SRI	DTI
DER	1																				
TDR	.767**	1																			
LDR	.670**	.891**	1																		
CV	.074	.212**	.208**	1																	
CS	-.084	-.149**	-.025	-.121**	1																
PORF	-.202**	-.173**	-.136**	.562**	.029	1															
NDTS	.352**	.444**	.381**	.209**	-.294**	.110*	1														
LIQ	-.065	.052	.132**	-.055	.003	-.050	-.137**	1													
IP	.205**	.220**	.120**	.082	-.234**	.002	.067	-.058	1												
FP	-.270**	-.283**	-.231**	-.068	.011	.094*	-.033	-.072*	-.595**	1											
NPBFI	-.106*	-.127**	-.049	-.034	.431**	.038	-.035	-.050	-.364**	.056	1										
NPFII	-.212**	-.201**	-.117**	.044	.481**	.124**	-.230**	.170**	-.261**	-.016	.177**	1									
NPNI	.151**	.167**	.131**	-.039	-.271**	-.170**	.152**	.114*	-.321**	-.160**	-.044	-.318**	1								
BSI	.157**	.282**	.268**	.106*	-.079	.104*	.236**	.036	.126**	-.129**	-.005	-.035	.054	1							
CD	-.102*	-.051	.033	.066	.103*	.077	-.037	.073	-.286**	.088	.207**	.181**	.094*	.068	1						
BAI	.186**	-.205**	-.205**	.000	.120**	.152**	-.097*	-.102*	.029	.010	.086	.177**	-.120**	-.046	.056	1					
AI	.182**	.289**	.276**	.083	.023	.078	.058	.018	.086	-.153**	.094*	-.015	.021	.094*	.102*	-.007	1				
RI	-.029	-.070	.015	-.059	.277**	.079	-.116*	.089*	-.154**	-.029	.107	.204**	.015	.001	.008	.109*	-.022	1			
SGI	-.033	-.056	-.023	-.061	.187**	.038	-.139**	.122**	-.100*	.042	-.071	.231**	-.016	-.131**	.026	.054	.038	.182**	1		
SRI	-.266**	-.279**	-.234**	.034	.322**	.238**	-.166**	-.050	-.067	.097*	.209**	.193**	-.156**	.012	.089*	.318**	-.020	.119**	.216**	1	
DTI	.150**	.198**	.182**	.061	.080	.010	.000	-.059	.021	-.142**	-.030	.166**	.056	.134**	.162**	.018	.317**	.037	.076	.189**	1

In order to check the Co-linearity Variance Inflation Factor (VIF) has also been evaluated for each variable. The VIF measures the degree to which each independent variable is explained by the other explanatory variables. If the value of VIF is more than 10 it means that there is a problem of co-linearity (Neter, Wasserman, & Kutner, 1983 and Myers, 1990).

Tolerance is the percentage of variance in a given predictor that cannot be explained by the other predictors, higher is the percentage of tolerance better is the predicting power of a variable and vice versa. A tolerance value less than 0.10 reflect the high degree of multicollinearity (Menard, 2000). As per the result given in table-3, the VIF of the predicting variable varies from 1.130 to 6.59 and tolerance rate is higher than 0.10 and comparatively very high in case of IP, FP and NPNI. This indicates that the problem of multicollinearity does not exist among the independent valuables.

Table-3

Co-linearity Statistics over the Different Period

Variables	Pre Subprime Crisis		Subprime Crisis		Post Subprime Crisis	
	Tolerance	VIF	Tolerance	VIF	Tolerance	VIF
CV	.609	1.642	.675	1.483	.825	1.212
CS	.518	1.929	.372	2.689	.436	2.293
PROF	.578	1.731	.696	1.437	.767	1.304
NDTS	.789	1.268	.675	1.481	.662	1.510
LIQ	.861	1.161	.846	1.182	.879	1.138
IP	.186	5.382	.124	6.050	.158	6.330
FP	.282	3.549	.152	6.590	.173	5.767
NPBFI	.584	1.712	.449	2.226	.513	1.951
NPFII	.424	2.356	.382	2.614	.419	2.386
NPNI	.330	3.029	.217	4.606	.279	3.578
BSI	.868	1.152	.861	1.161	.885	1.130
CD	.841	1.189	.788	1.269	.862	1.161
BAI	.831	1.204	.809	1.236	.860	1.163
AI	.823	1.216	.680	1.470	.700	1.429
RI	.856	1.168	.823	1.215	.808	1.237
SGI	.828	1.207	.765	1.307	.875	1.142
SRI	.692	1.445	.748	1.338	.731	1.368
DI	.765	1.307	.677	1.476	.719	1.391

The Durbin-Watson test has been applied to test the autocorrelation among the independent variables and its value falls in between 1 to 3 (Table-4) so the problem of autocorrelation does not exist. If Durbin-Watson statistic value is below 1 or above 3 than the

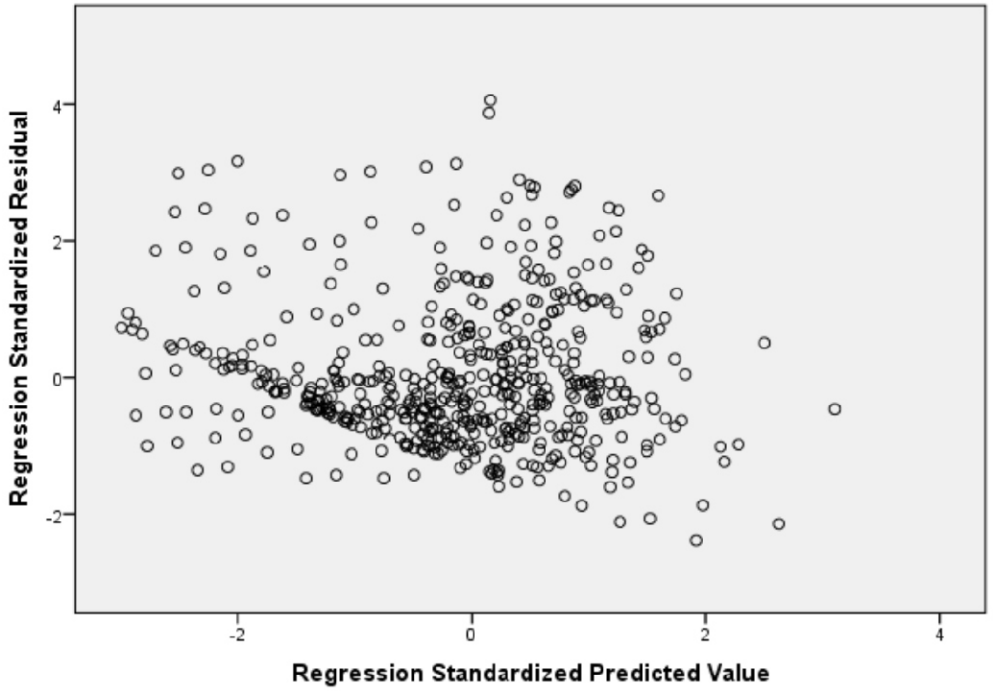
problems of autocorrelation exist (Field, 2000).

Table-4
Durbin-Watson Statistics

Periods	D
Pre-Subprime Crisis Period	1.134
Subprime Crisis Period	2.107
Post-Subprime Crisis Period	1.117

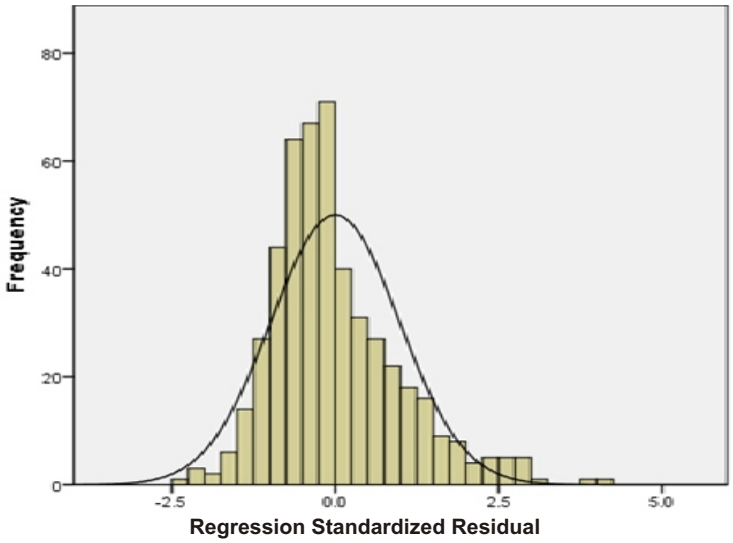
In addition, scatter plots have been used to check the problems of heteroskedasticity and Figure-1 shows non existence of heteroskedasticity in the model because the residuals of a regression model does not follow a certain trend instead of having a constant variance.

Figure-1 Debt Equity Ratio



The assumption of normality of data has been tested with the help of histograms and is given in Figure-2

Figure-2 : Debt Equity in Pre-Subprime Crisis



The selection of the best equation has been made using values of adjusted R2 (i.e. adjusted coefficient of determination) rather than R2 because it includes all the important explanatory variables to determine the value of the dependent variable. Moreover R2 may increase with the addition of variables but the adjusted R2 may decrease because of the effect on the number of degrees of freedom. Thus the data met the all the requisition of OLS regression model and can be used to generalize beyond the sample.

Descriptive Analysis

The year wise descriptive statistics of capital structure i.e. debt equity, total debt and long term debt ratios of the sample firms are given in Table-5 and are subsequently presented in Figure-3.

The mean values of debt equity ratio of the sample companies are 0.86, 1.1903 and 0.6366 percent during pre-subprime crisis, subprime crisis and post-subprime crisis periods respectively are quiet high and proved that Indian companies are highly leveraged. Empirically, similar results have been observed and Indian companies are generally highly leveraged as compared to firms in G-7 and developing countries i.e. United Kingdom, Canada, United States, Brazil, Mexico, Jordan, Malaysia, Pakistan, Thailand, Turkey and Zimbabwe (Booth et al., 2001).

The temporal variation of the ratio reflects that debt equity ratio was nearly 80% before crisis and jumped to more than 100% i.e. 119.03 during crisis period then followed by a declining trend. This means that firms tend to raise more debt during crisis period. The reason for raising more debt during crisis is the increase in the cost of equity (Sarkar & Dash 2013) or due to overall downward trend in the equity market which causes a wealth transfer from existing equity holders to debt holders (Kashyap et al., 2008). Moreover, considering pecking order theory, the equity issuance during crisis period may further lead to rise in information asymmetry that sends a

negative signal to the market that there are more losses to come (Myers & Majluf, 1984).

The declining trend during post sub-prime crisis may be because of the stringent norms adopted by the RBI in the form of increase in various lending rates. Furthermore, as firms have exhaustive maximum debt during crisis period, the interest burden also restricts the firms to raise more debt.

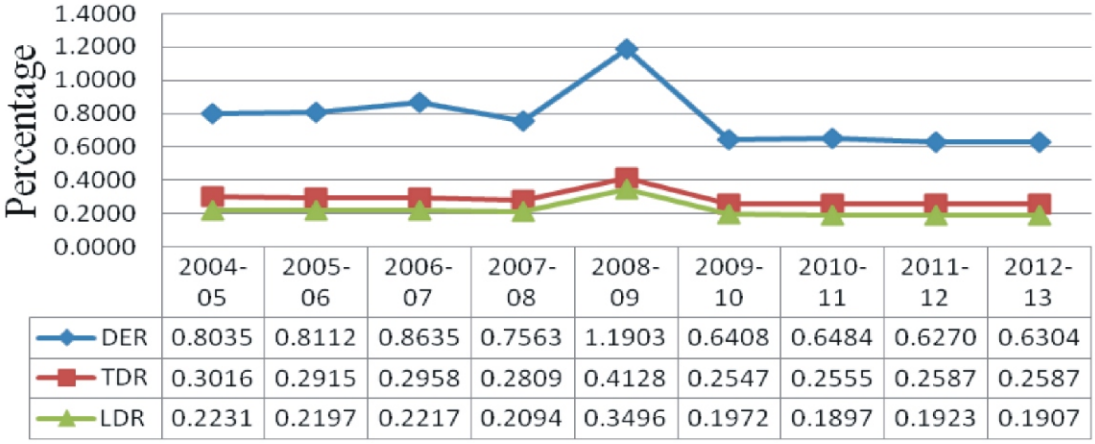
Firms with higher total debt to total assets ratio are at higher risk because during crisis, firms experience a declining trend in their cash inflows due to weak demand and will not be able to pay back their committed obligations. In sample firms the proportion of firm's assets that are being financed through debt is .2924, .4128 and .2569 (total debt ratio) during pre-subprime crisis, subprime crisis and post-subprime crisis periods respectively. The total debt ratio was nearly 30% before the subprime crisis, but increased to more than 40% during crisis period and then declines nearly to 25%.

Firms are employing only 21.84, 34.96 and 19.24 percent as long term debt to finance their assets during pre-subprime crisis, subprime crisis and post-subprime crisis periods respectively, meaning that major portion of the long term debt has been employed in assets. But after crisis firms have been using more of short term debt to finance their assets as the ratio has declined to 19.24%.

Table-5 Descriptive Statistics of Leverage Ratios

Variable	Pre-Crises Period				Pre-Crises Period	Crises Period	Post-Crises Period				Post-Crises Period
	2004-05	2005-06	2006-07	2007-08	Average	2008-09	2009-10	2010-11	2011-12	2012-13	Average
Debt Equity Ratio(DER) i.e. Debt to Equity											
Mean	.8035	.8112	.8635	.7563	.8086	1.1903	.6408	.6484	.6270	.6304	.6366
Median	.6500	.6200	.6900	.6000	.6500	1.1700	.6000	.5800	.5600	.5200	.5600
Std. Deviation	.6912	.7006	.7257	.6020	.6804	.8346	.5136	.5492	.5076	.5384	.5259
Minimum	.0200	.0100	.0100	.0100	.0100	.0100	.0100	.0100	.0100	.0100	.0100
Maximum	2.9400	2.6800	3.1400	2.2100	3.1400	3.1200	1.9100	2.1400	2.1800	2.2600	2.260
Total Debt Ratio (TDR) i.e. Total Debt to Total Assets											
Mean	.3016	.2915	.2958	.2809	.2924	.4128	.2547	.2555	.2587	.2587	.2569
Median	.2962	.2907	.2898	.2845	.2902	.4528	.2404	.2623	.2594	.2493	.2544
Std. Deviation	.1905	.1860	.1873	.1937	.1889	.2059	.1844	.1760	.1668	.1774	.1757
Minimum	.0069	.0035	.0059	.0015	.0015	.0055	.0014	.0011	.0025	.0022	.0011
Maximum	.6961	.6721	.6907	.6492	.6961	.9289	.7258	.6566	.6447	.7093	.7258
Long term Debt Ratio (LDR) i.e. Long t erm Debt to Total Assets											
Mean	.2231	.2197	.2217	.2094	.2184	.3496	.1972	.1897	.1923	.1907	.1924
Median	.1818	.1708	.2014	.2038	.1872	.3830	.1942	.1769	.1828	.1827	.1825
Std. Deviation	.1722	.1664	.1664	.1612	.1661	.1830	.1575	.1459	.1403	.1490	.1478
Minimum	.0012	.0019	.0016	.0015	.0012	.0024	.0014	.0011	.0017	.0011	.0011
Maximum	.6485	.6657	.5894	.6104	.6657	.8129	.6306	.6149	.5827	.5902	.6306
Long term Debt to Fixed Assets											
Mean	1.2316	.9800	1.1351	1.0868	1.1084	1.0173	1.0588	.8660	.8920	1.0277	.9611
Median	.5533	.5701	.5813	.6155	.5774	.5783	.5069	.5542	.5795	.5326	.5339
Std. Deviation	4.1547	2.7800	3.9457	2.7580	3.4606	2.10408	3.3415	1.777	1.6877	2.3679	2.3805
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	35.09	30.22	42.94	22.69	42.94	16.13	33.38	11.75	11.63	18.57	33.38

Figure - 3 : Leverage Ratios during study Period 2004-05 to 2012-13



	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
DER	0.8035	0.8112	0.8635	0.7563	1.1903	0.6408	0.6484	0.6270	0.6304
TDR	0.3016	0.2915	0.2958	0.2809	0.4128	0.2547	0.2555	0.2587	0.2587
LDR	0.2231	0.2197	0.2217	0.2094	0.3496	0.1972	0.1897	0.1923	0.1907

A remarkable increase in all the leverage ratios has been observed during the crises period (2008-09) followed by a declining trend thereafter meaning that firms faced credit crunch after the crises and are forced to opt other mode of financing than debt.

Impact of Corporate Governance on Financing Decisions

The results of ordinary least square regression model depicting the relationship between debt equity ratio with attributes of ownership structure and corporate governance during different time period have been presented in the Table-6. During pre-subprime crisis period the value of multiple regression coefficient (R) is 0.593 (R2 0.351) and the adjusted R2 is 0.327 denotes that more than 30% of the variation in debt equity ratio can be explained from the selected independent variables. Similarly during Subprime crisis and post-subprime crisis period more than 40% of the variation in debt equity has been explained by the selected independent variables. The F- statistics prove the validity of the estimated models.

Table-6 : Model Summary of Ownership & Corporate Governance Index using Total Debt/Equity Ratio as a Dependent Variable over the Three Periods

Model	R	R^2	Adjusted R^2	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	Df 1	Df 2	Sig. F Change
Pre-Subprime Crisis Period	.593	.351	.327	.558361	.351	14.234	18	473	.000
Subprime Crisis Period	.723	.522	.439	.624945	.522	6.310	18	104	.000
Post Subprime Crisis Period	.681	.463	.443	.392511	.463	22.694	18	473	.000

The summarize results of the impact of corporate governance on debt equity ratio (Table-7) shows that the model has significant F statistics at 5% level for all the three different period and is able to predict the financing behaviour of the firms.

A significant negative relationship between debt financing and ownership structure i.e Foreign promoters (FP), non promoter's foreign institution investors (NPFII) and Shareholder right index (SRI) has been observed over the three different period of time. Non promoter non institution investors (NPNII) during crisis period and Non promoter banks and financial institutions (NPBFI) during post crisis has shown significant negative relationship with debts.

Whereas, in case of Audit index (AI) during post crisis, Board activism index (BAI) during and post crisis and Disclosure index (DI) during all the periods have shown significant positive relation with Debt.

Table-7 : Regression Coefficients of Ownership & Corporate Governance Index using Total Debt Equity Ratio as a Dependent Variable over the Three Different Periods

	Pre-Crisis Period				Crisis Period				Post Crisis Period			
Variables	Coeff.	Std. error	T Statistic	Sig.	Coeff.	Std. error	T Statistic	Sig.	Coeff.	Std. error	T statistic	Sig.
Constant	-.136	.352	-.386	.700	1.600	.959	1.668	.098	.269	.286	.943	.346
CV	.164	.048	3.391**	.001	.113	.068	1.678	.096	-.033	.047	-.699	.485
CS	.085	.022	3.804**	.000	-.029	.060	-.482	.631	.082	.017	4.743**	.000
PORF	-1.223	.241	-5.07**	.000	-2.456	.600	-4.09**	.000	-1.251	.176	-7.11**	.000
NDTS	7.241	.991	7.308**	.000	14.824	2.592	5.720**	.000	6.058	.641	9.446**	.000
LIQ	-.017	.022	-.792	.429	-.077	.070	-1.096	.276	-.050	.021	-2.387*	.017
IP	.001	.002	.317	.751	-.011	.007	-1.587	.116	-.002	.002	-.935	.350
FP	-.006	.003	-2.230*	.026	-.016	.007	-2.215*	.029	-.005	.002	-2.358*	.019
NPBFI	-.006	.005	-1.232	.218	-.007	.012	-.544	.587	-.013	.004	-3.32**	.001
NPFII	-.014	.004	-3.20**	.001	-.025	.010	-2.483*	.015	-.010	.003	-3.43**	.001
NPNI	.000	.003	.085	.932	-.023	.008	-2.733*	.007	-.003	.002	-1.052	.293
BSI	.003	.002	1.751	.081	.003	.004	.846	.400	.002	.001	1.483	.139
CD	-.068	.056	-1.225	.221	-.176	.128	-1.369	.174	-.050	.038	-1.304	.193
BAI	.003	.003	1.278	.202	.014	.004	3.585*	.001	.004	.002	2.494*	.013
AI	.002	.002	1.261	.208	-.001	.004	.244	.808	.004	.001	3.807**	.000
RI	.001	.001	.929	.354	.000	.003	.049	.961	-.001	.001	-.835	.404
SGI	.003	.002	1.901*	.058	.004	.004	1.085	.280	.001	.001	1.010	.313
SRI	-.009	.002	-4.24**	.000	-.016	.005	-3.595*	.000	-.006	.001	-4.14**	.000
DI	.005	.001	3.368**	.001	.011	.004	2.631**	.010	.002	.001	2.001*	.046

*** Regression coefficient is significant at 0.01and * significant at 0.05 levels*

Foreign promoters (FP) holding found to be negatively associated with the debt equity ratio for all three different periods, i.e. Pre-subprime crisis, subprime crisis and post-subprime crisis. This indicates that the firms having high proportions of foreign promoters are comparatively less leveraged than others. It can be due to the fact that foreign promoters have not only large resources and technology but also have good management and governance practices which reduce the firms' dependency on debt. But on the other hand agency theory suggests that the greater the level of debt, the greater the amount of lender monitoring; therefore firms' performance will be better (Jensen and Meckling 1976).

In India such principal-agent concept has been reversed because in spite of the presence of a large quantity of debt, the lack of monitoring of government owned lenders have permitted industrialist to earn large rent on low personal investments (Donaldson, 1991) and there have been no incentive to attain superior performance. Thus the higher share holding of foreign promoter is expected to be negatively related to the debt equity ratio.

Non promoter non institution investors' (NPNI) or retail investors has maintained distance from highly leveraged firms during crisis as a negative association has been observed with the debt during this period. The companies having dispersed shareholders are found to be low leveraged during crisis. The reason for this may be risk averseness of retail investors and these investors prefer companies with lower debt equity ratio. During economic crises companies face credit crunch and being having high amount of debt it become more difficult for them to repay their committed obligations and ultimately leads to default risk (Ruckes, 2004).

Furthermore, the argument behind the negative relation is that in case of dispersed shareholding, screening and monitoring by the shareholders is less and managerial discretion is more. Hence entrenched managers motivated by self-interest would like to avoid or prevent monitoring by creditors as well, and therefore, would prefer internal funding over debt financing (Ganguli, 2013).

Non promoter banks and financial institution's (NPBFI) stake holdings have established negative relationships with debt equity ratio over the three different periods. But it significantly affects debt equity ratio during post-subprime crisis period. This means that banks and financial institutions have played safely after the subprime crisis by funding low leverage companies because during crisis financial leverage works inversely and chances of firm bankruptcy or failure are more.

Financial institutions play an important role in monitoring firm's performance that helped in reducing firms' information asymmetry. In the agency cost framework, institutional investor

serves as an external disciplinary mechanism for management, lessening the need for disciplinary mechanism such as debt. Therefore, by reducing information asymmetry problems, firms are more likely to issue equity and inducing firms to reduce leverage (Mande et al, 2012).

Shareholder Rights Index (SRI) has a significant negative relationship with debt equity ratio and signifies that firms with weak shareholder rights hold comparatively more debt. It is consistent with the agency theory and firms having weak shareholder rights tend to bear higher agency costs as managers can easily put their self interest ahead of shareholders' interests by exploiting restricted shareholder rights.

Board Activism Index (BAI) has significant positive impact on leverage ratio during subprime and post-subprime periods which means that board activism plays an important role in raising more debt during crisis. Firms having active board tend to be highly leveraged during crisis and post crisis periods. As per resource dependence theory, a highly active board monitors firm effectively and serves as a means to obtain support from the external environment and can take more debt on favorable terms.

The Audit Index (AI) has significant positive impact on debt during post-subprime period and it signifies the importance of higher audit standards in raising more debt during crisis. The higher auditing standards also helps in reducing debt monitoring cost, enhancing the credibility of financial statements and finally in reducing information asymmetry as well as lowering borrowing costs.

The Disclosure Index (DI) has also been found positively related with leverage ratio that reflects the higher disclosure level of leveraged firms during crisis. Leveraged firms are usually under greater scrutiny of creditors to ensure that firms are not infringing debt contracts. The creditor expects more comprehensive information of items, especially those relating to debt contracts (Jaggi & Low, 2000 and Sengupta, 1998). Lenders, credit rating agencies as well as underwrites use firm's disclosure quality to assess the default risk. Firms that provides fair, accurate timely and detail information are rated better than other and are rewarded in terms of lowering borrowing costs. Moreover, the dependence on disclosures increases when the market uncertainty surrounding the firm is high.

Conclusion

Corporate scam of any type increase the information asymmetry, monitoring cost as well funding costs in a market economy. The situation becomes more susceptible during crises and firms face staid challenges in raising funds from external source. Under these environments, the good governance practices extend helping hand to the firms to perform better in a responsible

manner and to win the investors' confidence. Empirically, researchers have provided the evidences of positive impact of good governance practices on firm's financing decisions at different points of time except subprime crisis period. In this paper an attempt has been made to further probe the impact of ownership structure and corporate governance practices on financing behaviour during subprime crisis.

Based on nine years annual reports of 121 Indian companies (excluding public sector undertakings, banking companies and non-banking financial companies) listed on BSE, the study concluded that most of the Indian firms rely on debt financing as compare to equity financing. The reasons may be that Indian firms are highly concentrated and family dominated promoters do not want to lose their controlling rights or voting rights by issuing equity shares to the public hence they prefer debt over equity. The results reveal that during subprime crisis period, Indian firms use more debt as compare to pre-and post-crisis period. Fall in the equity prices during to subprime crisis is another factor leading to high debt ratio during subprime crisis period. This became valid reason because regulations follow stringent credit policies during crisis and that create credit constrains to the firms in raising funds from debt.

The firms having high proportions as foreign promoters are comparatively less leveraged than others because presence of foreign promoters induces firms to follow good management and governance practices which reduce the firms' dependency on debt.

Widely held firms are comparatively low leveraged than closely held firms and validate the risk averseness of retail investors as they prefer low leveraged companies. The Non promoting banks and financial institutions also played safe by preferring investment in low leveraged firms after the crises. During crisis financial leverage works inversely because firms experience declining returns, face cash crunch and it become more difficult for highly leveraged firms to mature their committed obligations and ultimately leads to bankruptcy or failure.

Board activism and higher auditing standards establish credibility of financial statements, reduce debt related monitoring cost as well as information asymmetry and help firms in raising extra debt on favorable terms during crisis.

The firms in which shareholder rights are weak found to be highly leveraged during the study period. This evidence is consistent with the agency theory. The promoters got the opportunity to increase their ownership in the firm where other shareholders are weak.

Corporate disclosure and debt equity ratio is found to be positively correlated meaning that high levels of disclosure practices are rated favorably by financial analysts for the degree of detail, timeliness and clarity of disclosures, are perceived to have a lower default risk and are rewarded with a lower cost of borrowing, tend to be highly leveraged. Further, lenders reliance on

transparent disclosures increases when the market uncertainty is high during crises.

Limitations and Scope for Further Research

The scope of the study is limited to listed Indian private sector companies only, so the results cannot be applicable to PSUs, banking companies and unlisted companies. Similar research can be extended by incorporating all type of companies across the country. Only subprime crisis has been considered but results can be more reliable by studying various crises. In the present study, the book value measure of capital structure has been used which is effected by accounting choices made over time and hence the calculation may not be absolutely accurate. Corporate Governance is a qualitative concept and quantification of the subject was done by the calculations of scores. The matter might have subjectivity in terms of selection of governance parameters which can have further scope for research.

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An Impact Analysis of Emotions, Travel Motivations and Memorable Tourism Experiences of Adventure Travellers

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ABSTRACT

Tourism industry witnesses the presence of emotional and motivational factors at all stages of travel. These emotional and motivational factors play a major role in determining the tourists' behaviours and experiences, substantial evidences of which can be found in the previous literature. They influence the tourists' decisions to purchase tourism services and subsequently in the creation of memorable experiences with participation in new and interesting activities at the destination. With the immense glorification of adventure tourism in recent years, the adventure travel market has received increased attention and constant efforts are being made to understand the behaviour of adventure tourists. The concept of adventure tourism mainly revolves around the overall experience of the tourists participating in the various adventure activities while on a vacation and an understanding of what constitutes and prompts a memorable experience of an adventure tourist is an important consideration. The present study is, therefore, an attempt towards exploring the impact of emotions and travel motivations on memory recollection and creation of memorable tourism experiences.

Keywords : Emotions, Travel Motivations, Memorable Tourism Experiences, Adventure Tourists

Introduction

The global economy has become highly experience-based in the recent times. Businesses today are extensively focusing on staging experiences that act as memorable events for their customers. In today's environment of ever more sophisticated consumers, those who deliver memorable experiences efficiently create competitive advantage and an admirable value over those who don't. The importance of delivering memorable experiences has been efficiently documented in the previous literature (Kozak, 2001; Lehto, O'Leary, & Morrision, 2004; Wirtz et al., 2003).

The statistics from the United Nations' World Tourism Organization highlight a phenomenal growth and competition that tourism industry has experienced since the 1950s. With this rising competitiveness, investigating the travel behaviour and preferences of various

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segments has become critical for the tourism providers in order to create and deliver versatile products that are capable of delivering unique experiences within this highly competitive market (Wang, 2016, Waitt, 2000; Ooi, 2002). Since tourism is an industry that markets experiences, tourism providers at the destination recognise that engaging tourists through experiences and transforming them into unique and unforgettable feelings is of utmost importance (Kim et al., 2012). These exciting and cheerful experiences not only accelerate their revenues, but also influence tourists' satisfaction, their behavioural intentions and evaluations of specific services (Du Plessis & De Vries 2016; Kim, 2010). However, these experiences are valuable only when they are kept and remembered through a process of recollection (Scott & Harmon, 2016). Memory is the most important personal source of information which dictates the revisit intentions of tourists. Memorable tourism experiences are thus those experiences that are recollected and remembered after the occurrence of the event (Kim et al., 2012). They are selectively constructed experiences, based on an individual's judgements and assessments, thereby contributing in consolidation and recollection of memories at the destination (Kim et al., 2012; Ritchie & Ritchie, 1998). Providing tourists with satisfactory and memorable experiences is, therefore, essential for achieving success and competitive advantage in today's highly competitive marketplace (Milman & Tasci, 2017).

The concept of memorable experiences hold high relevance in case of adventure tourism, which revolves around the overall experience of the tourists' participation in the various adventure activities while on a vacation. The better the experience provided by the adventure tourism operators, the higher are the chances of tourists being satisfied, spreading a positive word of mouth and revisiting the destination (Tapar, Dhaigude & Jawed, 2017). Adventure tourism sector is being recognised as "one of the newest and fastest growing sectors of the tourism industry" (Cater, 2006). UNWTO (2016) reports that there is a 65% increase in adventure tourism since 2005 and a growth of 4.4% in tourist arrivals, which depicts the trending popularity of adventure tourism amongst both domestic and international travellers. Adventure tourism consumers are mostly young, knowledgeable, affluent and enthusiastic thrill lovers, who readily spend large amount of money while undertaking the adventure activities (Tsui, 2000). They undertake travel to destinations previously undiscovered. This allows for new destinations to market themselves as truly unique, appealing to those travellers looking for rare, incomparable experiences. Adventure tourism is a major niche area within the travel sector and therefore an understanding of what motivates adventure tourists to undertake travel and what constitutes their memorable experiences is an important consideration for the operators and destinations in

order to provide new itineraries and improved experiences for their consumers.

However, emotions too play a vital role in constructing adventure tourism experiences (Carnicelli-Filho et al., 2010). Muller & Cleaver (2000) state that “Adventure tourism is characterized by its ability to provide the tourist with relatively high levels of sensory stimulation, usually achieved by including physically challenging experiential components”. Recollection of past travel experiences is facilitated due to the strong emotions associated with them, which reduces the possibility of errors during recollection. The significance of emotions in adventure tourism and the search for risk, thrills, joy, and fear in adventure-driven activities has been emphasized by several researchers at the conceptual level (e.g. Beedie & Hudson, 2003; Carnicelli-Filho et al., 2010; Pomfret, 2006; Williams & Soutar, 2009). Although few researches have studied the role of emotions and travel motivations in creating memorable experience, no study in the Indian context has been found that explores the impact of the same in creating memorable experiences.

Objectives

1. To evaluate the impact of Emotions on Memorable Tourism Experiences of adventure tourists.
2. To study the significance of Travel Motivations on Memorable Tourism Experiences of adventure tourists.
3. To propose measures to improve Tourism Experiences of adventure tourists.

Literature Review

Emotions are described as 'biological, cognitive and behavioural' subjective responses to important life events, which manifest themselves as feelings of contentment and discontentment (Parrott, 2004). Emotions such as joy and fear may be the core benefit sought in a product/experience, and it is likely that different consumers experience and evaluate those emotions in different ways (Carú & Cova, 2003; Hirschmann & Holbrook, 1982). Researchers have explored the roles of emotions in consumer behaviours and experiences (Grappi & Montanari, 2011; Ma et al., 2013; Nawijn et al., 2013; Zins, 2002), specifically in adventure tourism (Faullant, Matzler & Mooradian, 2011). Psychologists have found that different factors play an integral role in the formation of autobiographical memories, such as emotion and familiarity (Rubin, 2005; Wood & Conway, 2006; Zimmerman & Kelley, 2010). Memory researchers have consistently reported that when people are asked to recollect previous experiences from their lives, the experiences recalled most frequently are those that are emotional in nature (e.g., Davis & Schwartz, 1987; Dudycha & Dudycha, 1933; Kihlstrom &

Harackiewicz, 1982; Waldfogel,1948). Researchers have also suggested that the pleasantness and the emotionality of personal events assist in the recall of these events (e.g., McGaugh, 2004; Wood & Conway, 2006).

Kim, Ritchie & Tung (2010) define memorable tourism experience as “a tourism experience remembered and recalled after the event has occurred”. Tsai (2016) regards memorable tourism experiences as 'a tourism experience involving positive memories that is generated after an individual undergoes special and surprising tourism activities or events in person. Kim et al.'s study (2012) suggests that tourists who perceive a tourism experience as memorable are likely to often recall the seven experiential dimensions that are: hedonism, novelty, local culture, refreshment, meaningfulness, involvement and knowledge.

Memorable tourism experiences are popularly defined as experiences that are positively remembered and recalled after undertaking the trip (Kim, Ritchie & McCormick, 2012). They are the selectively constructed memories of the trip which are in accord to the personal evaluations, drawn through emotions of an individual (Pizam, 2010). Servidio & Ruffolo (2016) emphasised in their study that memorable tourism experiences involve a range of emotions which encourage tourists to perform new and interesting activities at the destination. Many researchers have explored the existing relationships between emotions and tourism experiences (Hosany, 2012; Hosany & Gilbert, 2010; Houge Mackenzie & Kerry, 2013; Kim et al., 2012; Li & Cai, 2012; Morgan, Lugosi & Ritchie, 2010; Nawijn, Mitas, Lin & Kerstetter, 2013; Nicoletta & Servidio, 2012; Servidio, 2015), effectively portraying tourists' emotional reactions as the elementary factor determining their post travel behaviours (Prayag, Hosany & Odeh, 2013). Tourism researchers who studied post-tourism experiences revealed that although tourists could not clearly recall experiences such as where they went and when they returned home but they remember emotional feelings of their trip (Larsen & Jenssen, 2004; Wirtz, Kruger, Scollon, & Diener, 2003).

Adventure tourism is quite popular in today's era as a niche form of nature based tourism as it involves travelling to several exotic destinations in exploration of authentic experiences and performing activities involving perceived risk along with personal challenges (Morrison and Sung, 2000). Muller and Cleaver (2000) advocate that adventure tourism is the achievement of high levels of sensory stimulation through physically challenging experiential activities, performed by the tourists. Thus, adventure tourism is considered by its capability to offer the tourist with relatively high levels of sensory motivation, generally achieved by including physically demanding experimental components. Researches popularly argue that intensive

experiential consumption like adventure activities provide a variety of strong and differential emotional experiences as core benefits sought from a product and these experiences are likely to be evaluated differently by the different consumers. Any form of adventure participation results in individuals experiencing contrasting emotions (Swarbrooke et al., 2003). The importance of emotions in adventure tourism and the search for risk, thrills, joy, and fear in adventure-based activities has been emphasized by several researchers at a conceptual level (e.g. Beedie & Hudson, 2003; Carnicelli-Filho et al. 2009; Pomfret, 2006; Williams & Soutar, 2009), but the roles of specific emotions in high-intensity, experiential consumption and the role of individual differences in shaping those consumption-related emotions have not been adequately investigated and have not been tested empirically.

Bently & Page (2008) define adventure tourism as travelling to a particular destination for participating in various adventure activities, which is related to top level activities and are mostly performed outdoors. Priest (1992) categorized adventure tourism on the basis of four criteria: (1) taking part in the adventure activities voluntary by the interested individuals, (2) the activity must be conducted in a natural environment, (3) danger should be attached when the activity in the natural environment is performed, and (4) the activity should consist an element of uncertainty, impacted by the conditions of the risk and a tourist's level of capability.

H1: Emotions have an impact on Memorable Tourism Experiences.

H2: Travel Motivations positively influence Memorable Tourism Experiences.

Research Methodology

Sampling Technique

According to study conducted by Nielsen (2016) on the adventure tourism market in India, annual estimates of adventure tourist visits in the state of Uttrakhand was approximately 10 lacs which was the highest among the other states of the country. The tourists who visited Uttrakhand to undertake adventure tourism were therefore selected as the respondents for the present study.

Sampling Unit : Adventure Tourists

Sampling Method : Random Sampling

Sample Size : 384 (According to Krejcie and Morgan, 1970), out of which 255 usable responses were collected leading to 66% response rate.

Sample Area : Uttrakhand

Scale Development

The data was collected with the help of a structured questionnaire consisting of five sections. The survey questions covered the respondents' Travel Motivations; Emotions and their

Memorable Tourism Experiences. The respondents' demographic characteristics were also included in the questionnaire. The last section was for any remarks or conclusions of the respondents. The variables of the study were measured on a scale that ranged from 1 to 5, with 1 being strongly disagree and 5 being strongly agree. The questionnaire was distributed among 384 tourists who visited Uttrakhand to undertake an adventure trip, out of which 255 usable responses were collected leading to 66% response rate. Various journals, books and magazines were referred during the study.

Constructs	Sources
1. Travel Motivations	Ewert, Alan & Gilbertson, Ken (2006)
2. Emotions	Faullant et al. (2011)
3. Memorable Tourism Experiences	Kim et al. (2012)

Analysis and Findings

TABLE 1 - Demographic Profile of the Respondents

N = 255

S.No.	Demographic variable	N	Percentage
1	Gender		
	Male	150	59%
	Female	105	41%
2	Age		
	Below 20	43	17%
	20-40	192	75%
	40-60	20	8%
	Above 60	-	-
3	Marital Status		
	Single	195	76%
	Married	60	24%
4	Travel Arrangement		
	Self Arranged	163	64%
	Travel Agency	57	22%
	Others	35	14%
5	Level of Expertise		
	Beginner	114	45%
	Moderate	91	35%
	Expert	50	20%
6	Travel Pattern		
	Individual	72	28%
	Family/Friends	149	58%
	Adventure Groups	34	14%

A profile of the respondents is depicted in Table 1. Out of the total of 255 respondents, 59% are males and 41% are females, 75% of respondents of the present study lies in the age group of 20-40 yrs followed by 17% of the respondents under the age slab below 20 and 8% of the respondents falling in between 40-60 years. Almost 76% of the respondents having the adventure trip are single where rest 24% of the respondents are married. 64% of the respondents self arranged their trip while 22% have booked through travel agents and 14% through other mediums respectively. As far as level of expertise is concerned, 45% of the respondents are beginners, 35% are moderate and 20% are expert in having these kind of adventure trips. With respect to travel pattern, 58% of the individuals are travelling with friends, 28% are travelling alone and rest 14% are travelling in the form of adventure groups.

TABLE 2 : Dimension Wise Score of Travel Motivations

S.No.	Statements	Mean	S.D.
1	For the joy/ happiness	3.95	1.09
2	For the sense of accomplishment	3.72	0.98
3	To face the risk and danger	3.57	1.20
4	To be physically and emotionally challenged	3.60	1.19
5	To be part of a group or team	3.77	1.18
6	For the friendship(s)	3.77	1.16
7	To have a close interaction with other people	3.79	1.13
8	To be able to do something outside my normal routine	3.78	1.07
9	To be known as an Adventurer	3.71	1.18
10	To show others that I can perform them	3.60	1.24
11	To develop my adventure skills	3.81	1.10
12	Because it allows me to reach a variety of goals I have for myself	3.83	1.03
13	To test myself/ my abilities	3.84	1.05
14	For the close interaction with a natural environment	3.95	1.01
15	To satisfy my personal needs	3.84	1.03

16	To experience a change from my normal life/ routine	**4.04**	1.02
17	To use my equipment	3.48	1.31
18	For self-expression	3.76	1.03
19	To be in control and make decisions	3.74	1.07
20	For spiritual development	3.72	1.08
21	Because I am good at it	3.65	1.08
22	It makes me feel good about myself	3.84	1.05
23	I enjoy associating with other adventure participants	3.73	1.00
24	I enjoy pushing myself to the "edge"	3.83	1.07

The Travel Motivation index in Table 2 represents that the highest observed values are shown by the statement 'To experience a change from my normal life/ routine' (mean 4.04). Whereas the lowest values are observed by the statement 'to use my equipment' (mean 3.48).

TABLE 3 - Dimension Score of Emotions.

S. No.	Statements	Mean	S.D.
1	I felt proud during my adventure trip	3.96	1.04
2	I felt enthusiastic during my trip	3.93	1.05
3	I felt excited while performing the adventure activity	**4.00**	1.04
4	I was scared while performing the adventure activity	3.50	1.15
5	I felt nervous during the trip	3.55	1.13
6	I felt stressed while performing the adventure activity	3.31	1.21
7	I felt afraid during my trip	3.33	1.26

The Emotions index in Table 3 represents that the highest observed values are shown by the statement 'I felt excited while performing the adventure activity' (mean 4.00),Whereas the lowest values are observed by the statement 'I felt stressed while performing the adventure activity' (mean 3.31).

TABLE 4 - Dimension Wise Score of Memorable Tourism Experiences

S.No.	Statements	Mean	S.D.
1	I was thrilled about having a new experience	4.02	1.06
2	I indulged in the activities	3.94	1.08
3	I really enjoyed this tourism experience	4.01	1.08
4	It was exciting	**4.04**	1.00
5	It was once-in-a lifetime experience	3.09	1.05
6	It was unique	3.98	1.02
7	It was different from previous experiences	3.96	0.94
8	I experienced something new	3.90	1.08
9	I had good impressions about the local people	3.82	1.03
10	I closely experienced the local culture	3.70	1.17
11	Local people in a destination were friendly	3.91	1.07
12	It was liberating	3.75	1.03
13	I enjoyed sense of freedom	3.93	0.94
14	It was refreshing	4.01	0.96
15	I was revitalized	4.02	0.96
16	I did something meaningful	3.90	1.01
17	I did something important	3.90	1.01
18	I learned about myself	3.81	1.04
19	I visited a place where I really wanted to go	3.85	1.04
20	I enjoyed activities, which I really wanted to do	3.91	1.03
21	I was interested in the main activities of this tourism experience	3.98	1.05
22	The experience was exploratory	3.87	1.00
23	I gained knowledge from the experience	3.95	0.99
24	I experienced new culture	3.87	0.98

The Memorable Tourism Experiences index in Table 4 represents that the highest observed values are shown by the statement 'It was exciting' (mean 4.04). Whereas the lowest values are observed by the statement 'It was once-in-a lifetime experience' (mean 3.09).

TABLE 5 - Representing Regression Between Travel Motivation (TM) and Memorable Travel Experiences (MTES)

Multiple R	0.719
R Square	**0.518**
Adjusted R	0.516
Standard Deviation	0.484

Table 5 depicts the strength of association between Travel Motivation (X) and Memorable Tourism Experiences (Y). Here, the coefficient of determination, R Square = 0.518. This implies that 52 % of the variation in the Memorable Tourism Experiences of Tourists is explained by the Travel Motivation and the remaining 48% of the variation needs to be identified. Hence, 52% of the Travel Motivation affects the Memorable Tourism Experiences and the regression equation is as under:

Memorable Tourism Experiences = 1.322 + 0.69 (Travel Motivation)

The β value of To Travel Motivation is 0.56 which is statistically significant at 5 percent level of significance.

TABLE 6 - Representing Regression Between Emotions and Memorable Tourism Experiences (MTES)

Multiple R	0.604
R Square	**0.364**
Adjusted R	0.362
Standard Deviation	0.555

Source: Self Study

Table 6 depicts the strength of association between Emotions (X) and Memorable Tourism Experiences (Y). Here, the coefficient of determination, R Square = 0.364. This implies that 36 % of the variation in the Memorable Tourism Experiences of Tourists is explained by the Emotions and the remaining 64% of the variation needs to be identified. Hence, 36% of the Emotions affect the Memorable Tourism Experiences and the regression equation is as under:

Memorable Tourism Experiences = 1.96 + 0.536 (Travel Motivation)

The β value of Emotions Memorable Tourism Experiences is 0.71 which is statistically significant at 5 percent level of significance.

TABLE 7 - Correlation Analysis of Travel Motivations and Memorable Travel Experiences (MTEs)

	Emotions	Memorable Tourism Experiences (MTEs)
Travel Motivations	1	
Memorable Tourism Experiences (MTEs)	**0.7199**	1

Source : Self Study

Coefficient of Correlation, r = 0.7199

Here 'r' has a positive sign and is more than the desired value of 0.5 which indicates that the direction of relationship between the dependent variable Memorable Tourism Experiences and independent variable Travel Motivation, is significant. It further implies that the Memorable Tourism Experiences of the tourists depend upon their Travel Motivations.

TABLE 8 - Correlation Analysis of Emotions and Memorable Travel Experiences (MTEs)

	Travel Motivations	Memorable Tourism Experiences (MTEs)
Travel Motivations	1	
Memorable Tourism Experiences (MTEs)	**0.7199**	1

	Emotions	Memorable Tourism Experiences (MTEs)
Emotions	1	
Memorable Tourism Experiences (MTEs)	**0.604**	1

Source: Self Study

Coefficient of Correlation, r = 0.604

Here 'r' has a positive sign and is more than the desired value of 0.5 which indicates that the direction of relationship between the dependent variable Memorable Tourism Experiences and independent variable Emotions, is significant. It further implies that the Memorable Tourism Experiences of the tourists depend upon the emotions of the tourists undertaking adventure activities.

Results and Conclusion

According to results, it can be concluded that males and females are almost equally motivated as far as the adventure trips are concerned. If the adventure motivation of the tourists is considered on the basis of age, it has been seen that the tourists lying in the age group of 20 40 are the most adventurous ones, who wanted to be the part of adventure trips. It has been found in

the study that there is a positive correlation between the travel motivations and Memorable Travel Experiences (72%) of the tourists where as there is positive correlation between emotions and Memorable Travel Experiences as well which comes to be as 60%. Through regression analysis, it has been proved that 52% of the travel motivation affects the Memorable Travel Experiences (MTEs) and 36% of the emotions affect the Memorable Travel Experiences of the tourists undertaking adventure trips.

Future Relevance

This piece of research aims at studying the impact of travel motivations and emotions on memorable tourism experiences of the tourists undertaking adventure travel in the state of Uttarakhand. Destinations today are constantly aiming towards marketing themselves as truly unique, appealing travellers who are looking for rare, incomparable and memorable experiences. Long term competitiveness and the increased glorification of adventure tourism calls for research in other destinations with similar topography such as Himachal Pradesh, Jammu and Kashmir etc. Adventure tourism is mainly/primarily divided under two categories one is soft adventure travellers and the other is hardcore adventure travellers. In future studies, these criteria can be taken into consideration while undertaking research on adventure travellers as in the present study only general adventure activities have been taken into account. Moreover, a comparison of destinations with similar topography can be taken in future as well.

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ARTS AND HUMANITIES

योगवासिष्ठ महारामायण में मृत्यु विचार

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सारांश

योगवासिष्ठ महारामायण (छठी शताब्दी ई०) दशरथपुत्र श्रीरामचन्द्र की जीवनी नहीं, प्रत्युत महर्षि वसिष्ठ द्वारा श्रीरामचन्द्र को दिये गये आध्यात्मिक उपदेशों से परिपूर्ण केवल ब्रह्मवाद का प्रतिपादक ग्रन्थ है।[1] इसके सिद्धान्तानुसार एक मात्र चेतनतत्त्व परब्रह्म के अतिरिक्त कोई अन्य वस्तु नहीं है।[2] जैसे समुद्र में असंख्य तरङ्गें उठती और उसी में विलीन होती रहती हैं, वे समुद्र से भिन्न नहीं हैं, इसी प्रकार नित्य समरूप, अनादि, अनन्त, सच्चिदानन्दघन परमात्म चैतन्यरूप समुद्र में नाना प्रकार के अनन्त ब्रह्माण्डों की उत्पत्ति, स्थिति और विनाश की लीला-तरङ्गें दीखती रहती हैं। चित्त या अहङ्कार, जो वास्तव में चेतन ब्रह्म से अभिन्न तथा ब्रह्मरूप ही है - इस दृश्य प्रपंच का, सृष्टि-स्थिति-विनाश का, कारण है।[3] तत्त्व ज्ञान द्वारा अहङ्कार का नाश होते ही केवल एक चैतन्य ब्रह्म ही रह जाता है । इसी एक सत्य तत्त्व का प्रतिपादन विभिन्न आख्यानों, इतिहासों एवं कथाओं के द्वारा इस बृहद् ग्रन्थ में किया गया है । पाठकों के हृदय में अद्वैत सिद्धान्त को दृढ़तापूर्वक जमा देने के लिए 32 सहस्र श्लोकों में बार-बार विभिन्न रूपों में एक-सी ही युक्तियों तथा उपमाओं का उल्लेख किया गया है।[4] जगत् या सृष्टि न कभी हुई है, न है - एक मात्र ब्रह्म ही है।[5] यह दृश्यमान जगत् ब्रह्म का बृंहण मात्र है ।[6]

उपर्युक्त दार्शनिक विषयों के प्रतिपादन के साथ अन्य जिन विषयों का इस ग्रन्थ में उल्लेख हुआ है, उनमें 'मृत्यु' भी एक है। प्रस्तुत शोधपत्र में योगवासिष्ठ में उपलब्ध 'मृत्यु' विषयक विचारों का वैदिक एवं पौराणिक मान्यताओं की पृष्ठभूमि में प्रतिपादन करने का प्रयास किया जा रहा है ।

बीज शब्द :- योगवासिष्ठ, मृत्यु, जातस्य हि ध्रुवो मृत्युः, जीवन्मुक्ति, पुनर्जन्म, परब्रह्म ।

इस महाग्रन्थ में परम ब्रह्म, जगत्, जगत् का मिथ्यातत्व, बन्धन और मोक्ष, मोक्ष प्राप्ति के साधन, जीवन की दुःखमयता, दुःखनिवृत्ति के उपाय, पुरुषार्थ महत्त्व, अद्वैत तत्त्व, मन, परमानन्द, ज्ञानप्राप्ति के साधन, कर्म-बन्धन से मुक्ति, जीवन्मुक्ति आदि दार्शनिक विषयों का प्रतिपादन हुआ है । ज्ञानदृष्टि से यह ग्रन्थ प्रधानतया अद्वैतब्रह्मवाद का प्रतिपादक तथा जगत् का निषेधक है । लेखक ने इसमें अन्य दार्शनिक ग्रन्थों की भांति रूक्ष एवं सूत्रमयी भाषा का प्रयोग न कर रसमय काव्यमयी भाषा में उपाख्यानों और दृष्टान्तों द्वारा उच्च से उच्च तथा गूढ से गूढ़तर दार्शनिक सिद्धान्तों का प्रतिपादन किया है ।

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१. 'जातस्य हि ध्रुवो मृत्युः' –

संसार में जो जीव जन्म लेता है, उसकी मृत्यु ध्रुव सत्य है। मानव जीवन में मृत्यु ऐसी वस्तु है, जो निश्चित है । गीता में मृत्यु की अनिवार्यता को प्रकट करते हुए कहा गया है कि – जो उत्पन्न हुआ है, उसकी मृत्यु (नाश) अवश्यंभावी है और जिसकी मृत्यु हुई है, उसका जन्म लेना भी उतना ही सत्य है।[7] इस सत्य से सुपरिचित विवेकशील पुरुष भी मृत्यु के स्मरण मात्र से कम्पित होने लगते हैं। मृत्यु शब्द का साधारण अर्थ है – जिस शरीर को धारण कर जीव शारीरिक क्रिया करता है उस शरीर से जीव (आत्मा) का अलग हो जाना अर्थात् शरीर से प्राणों का निकल जाना ।

मृत्यु शब्द 'मृङ्' प्राणत्यागे (प्राणों का निकलना) धातु से त्युक् प्रत्यय लगने से बना है।[8] भारतीय मान्यता के अनुसार चेतन आत्मा का शरीर, इन्द्रियों और मन से अलग होने को मृत्यु कहते हैं।

शास्त्रों एवं पुराणों में कहा गया है कि मनुष्य की आयु जब क्षीण हो जाती है, तो वह किसी न किसी कारण मृत्यु को प्राप्त हो जाता है। अग्नि पुराण में कहा गया है कि –

आयुषोऽन्ते नरः प्राणैरनिच्छन्नपि मुच्यते।।

जलमग्निर्विषं शस्त्रं क्षुद्व्याधि पतनं गिरेः।

निमित्तं किंचिदासाद्य देही प्राणै र्विमुच्यते।।[9]

अर्थात् अपनी आयु समाप्त हाने पर शरीर पानी, आग, विष, शस्त्र, भूख, रोग एवं पर्वत से पतन आदि किसी कारण से उसकी इच्छा के विपरीत ही मर जाता है। बारहवीं शताब्दी ई० के कश्मीरी कवि लोष्टक ने अपने स्तोत्र काव्य 'दीना क्रन्दक स्तोत्र' में मृत्यु समय की दशा का वर्णन करते हुए लिख है कि – ''मृत्यु के समय दशों इन्द्रियाँ अपने-अपने कर्मों से विरत हो जाती हैं, मन की गति रुक जाती है और प्राण टूट जाते हैं।[10] अथर्ववेद में कहा गया है कि दो पैर वाले और चार पैर वाले एवं रेंगने वाले सब प्राणियों पर मृत्यु का शासन है। सब मृत्यु के वश में हैं। हे मानव, मैं तुम्हे मृत्यु से ऊपर उठाता हूँ, तूँ डर मत।[11]

२. मृत्यु जीवन का अन्त है अथवा मृत्यु के पश्चात् पुनर्जन्म होता है ?

मृत्यु के विषय में दो भिन्न मन्न मत प्रचिलत हैं – सामान्यतः अनुभव होता है कि मृत्यु से जीवधारी के जीवन का अन्त हो जाता है, परन्तु द्वितीय मत में मृत्यु के पश्चात् भी कोई दूसरा जीवन प्राप्त होता है।

प्रथम मत को मानने वाले लोग शरीर को ही सब कुछ मानते हैं। भारतीय दर्शनों में चार्वाक दर्शन इसी मत को माने वाला है। इसके अनुसार मृत्यु के द्वारा जब शरीर का सर्वनाश हो गया तो कुछ शेष नहीं बचता। सुख-दुःख, पाप-पुण्य इसी जीवन की बातें हैं, शरीर ही जब नष्ट हो गया तो फिर बाकी ही क्या रहा?[12] भौतिकवादी पश्चिमी देशों के अधिकतर लोग मृत्यु का अर्थ जीवन का सर्वनाश ही समझते हैं।

योगवासिष्ठ ब्रह्मवाद का प्रतिपादक ग्रन्थ होने के कारण आत्मा को अजर और अमर मानता है, परन्तु यहाँ भी मृत्यु को जीवन का अन्त मानने वाले विचार मिलते हैं। ग्रन्थ के निर्वाण प्रकरण में मृत्यु को जीवन के आत्यन्तिक नाश का

हेतु बताते हुए कहा गया है कि - यदि मृत्यु से प्राणी का सर्वथा नाश हो जाता हो और मृत्यु के पश्चात् किसी प्रकार का जीवन शेष न रहता हो तो शरीर में होने वाले सभी रोग, कष्ट आदि से भी समझो छुटकारा मिल गया सभी प्रकार की व्याधियों, दुःखों से भी सहज ही मुक्ति का लाभ मिल गया। तब न 'होने' और 'न होने', लेने और देने के ज्वर की भी शान्ति हो गई। ऐसी मृत्यु ही तो सच्चा जीवन है, क्योंकि इसके बाद न सुख है और न दुःख।[13]

३. मृत्यु के बाद भी जीवन है और जीव का पुनर्जन्म होता है -

मृत्यु से शरीर के नाश के साथ ही जीवन का सर्वनाश मानने वाले प्रकृतिवादियों नास्तिकों के उपर्युक्त मत के विरुद्ध दूसरे मत के अनुयायियों का मानना है कि शरीर तो केवल आत्मा का निवास-स्थान है, और मृत्यु से केवल शरीर का ही नाश होता है। शरीर के नष्ट हो जाने पर भी आत्मा या जीव का नाश नहीं होता।[14] वह तो एक शरीर के नष्ट हो जाने पर दूसरे शरीर में प्रवेश कर लेता है।[15] हमारे वैदिक दर्शन इसी मत के पोषक हैं। योगवासिष्ठकार का भी मृत्यु एवं जीवात्मा के सम्बन्ध में यही मत है -

४. आत्मा का न जन्म होता है न मृत्यु -

चेतन पुरुष (आत्मा) का न कभी जन्म होता है न मरण। अज्ञान अथवा भ्रम के कारण केवल स्वप्न की भांति इन सब बातों (जन्म-मरण) का अनुभव करता है। वह तो चेतना मात्र है, भला उसका नाश कब और कैसे हो सकता है। लाखों शरीर नष्ट होते रहते हैं, परन्तु चेतन आत्मा तो अक्षय रूप में स्थित रहता है। कौन ऐसा जीव आज तक मरा है, जिसकी चेतना किसी प्रकार नष्ट हो गई हो ?[16] वासनाओं का नानारूपों में परिर्वतन का नाम ही जीवन और मरण है। जीव न तो मरता है, न उत्पन्न होता है, वह तो केवल अपनी वासना रूपी भंवर के गढ्ढे में पड़कर लोट-पोट होता रहता है।[17] शुद्ध चेतन पुरुष तो नित्य है, उसका न तो कभी उदय होता है और न शमन होता है।[18] यह अभिनाशी एवं अनुच्छित्तिधर्मा है।

५. मृत्यु के पश्चात् पुनः देहलाभ उत्सव का विशय -

योगवासिष्ठकार जीवात्मा के द्वारा मृत्यु के पश्चात् नवीन देहलाभ को महान् उत्सव का विषय मानते हैं। क्योंकि इस रूप में मृत्यु का अर्थ हुआ केवल पुराने जीर्ण-शीर्ण शरीर मात्र का त्याग। ऐसा होने पर तो जीवात्मा को दुःखी होने के स्थान पर परम सुखी होना चाहिए।[19] मृत्यु के बाद एक शरीर को छोड़कर यदि दूसरा नवीन शरीर मिलता है तो यह अत्यधिक खुशी का विषय है, ऐसी मृत्यु पर तो आनन्द मनाना चाहिए, विषाद नहीं।[20]

६. मृत्यु क्या है ?

योगवासिष्ठ के अनुसार मृत्यु जीव का सर्वनाश नहीं है। सर्वनाश करने वाली मृत्यु होती ही नहीं।[21] मृत प्राणी को नष्ट मानना असत्य है। वस्तुतः वह मरने पर दूसरे देश और काल में दूसरी सृष्टि का अनुभव करने लगता है।[22] अपने संकल्प के भीतर स्थिर हो जाने का नाम मृत्यु है।[23] जीवात्मा अपनी वासनाओं के आधार पर पुराना शरीर त्याग कर दूसरे देश और काल में इसी प्रकार पुनः जन्म लेता है,[24] जैसे वानर जङ्गल के एक वृक्ष को छोड़कर दूसरे में जा

बैठता है।[25] वासना के कारण ही जीव इधर-उधर विचरण करता है।[26] जैसे स्वप्न का अनुभव करने वाले जीव की स्वप्न-संसार में मृत्यु हो जाती है और वह जाग्रत-संसार में आकर जाग्रत-रूपी अन्य स्वप्न देखने लगता है,[27] ठीक उसी प्रकार जीव इस लोक में मर कर दूसरे जगत् में जाग जाता है। वहाँ पर जागने पर यह लोक उसको एक स्वप्न-सा प्रतीत होता है।[28] मिथ्या मृत्यु की मूर्च्छा का कुछ समय तक अनुभव करके पूर्व अवस्था को भूल कर जीव दूसरी अवस्था का अनुभव करने लगता है।[29] जैसे आँख मींजते ही नाना प्रकार की स्वप्न सृष्टि का अनुभव होने लगता है, वैसे ही मृत्यु की मूर्च्छा आते ही दूसरे संसार का अनुभव उदय हो जाता है।[30] मौत की मूर्च्छा आते ही झटिति तीनों लोक की विचित्र सृष्टि पुनः अनुंभव में आने लगती है।[31] कल्प के अन्त तक स्थिर रहने वाले अनेक जगत् अपने-अपने देश, काल, आकाश, धर्म और कर्म सहित दिखलाई पड़ने लगते हैं।[32] मृत्यु के पश्चात् झटिति ही देश, काल, क्रिया, द्रव्य, मन, बुद्धि, इन्द्रिय आदि का अनुभव ऐसे होने लगता है जैसा कि जीव को युवावस्था में होता था।[33]

७. मृत्यु दशा का अनुभव –

योगवासिष्ठ में मृत्यु की अवस्था का भी बड़ा स्वाभाविक एवं दार्शनिक वर्णन यत्र तत्र उपलब्ध होता है। इसमें एक स्थान पर कहा गया है कि जब रोगों के कारण नाड़ियों में संकोच और विकास होता है, तब शरीरस्थ प्राण की गति अव्यवस्थित हो जाती है। भीतर गया हुआ श्वास कठिनाई से बाहर निकलता है और बाहर निकलकर भीतर नहीं जाता। नाड़ियों की गति में त्रुटि के कारण श्वास-प्रश्वास में अवरोध उत्पन्न हो जाये तो कहा जाता है कि प्राणी की मृत्यु हो गई।[34] नाड़ियों में प्राण-संचार की गति न होने पर प्राणी की चेतना शान्त हो जाती है। प्राण-वायु के रुक जाने पर प्राणी की सब चेष्टाएँ रुक जाती हैं तब उसे मृत कहते हैं। शरीर के इस प्रकार 'शव' में परिवर्तित हो जाने पर और प्राणी के प्राण बाहर निकल कर महावायु का रूप धारण कर लेने पर वासनायुक्त चेतना आत्मा में स्थित रहती है। उस अणु रूप में विद्यमान वासनाओं से युक्त चेतना का नाम 'जीव' है।[35] पुरुष के मर जाने पर उसके शरीर से निकला हुआ प्राण वायुमण्डल में मिल जाता है।[36]

वायुमण्डल में प्रेतों (मृतात्माओं) के प्राण और उन प्राणों के भीतर उनके मन और मनों के भीतर अनेक जगत् इस प्रकार स्थित हैं जैसे तिलों के भीतर तेल विद्यमान है।[37] जीव जब इस दृश्य जगत् को छोड़कर दूसरे में प्रवेश करता है तो उसे ऐसा अनुभव होता है कि यह जगत् स्वप्न अथवा संकल्प था। जिस स्थान पर जीव के शरीर का नाश होता है, उसी स्थान पर उसे पूर्व दृश्ट जगत् की भांति दूसरे जगत् का अनुभव होने लगता है।[38] मृत्यु की मूर्च्छा के समाप्त होते ही उसे दूसरे शरीर का अनुभव होने लगता है। जो जीव मोक्ष प्राप्त किये बिना मर जाते हैं, वे सब इसी प्रकार वायु मण्डल में स्थित होकर अपने-अपने लोकों का अनुभव करते हैं।[39]

८. आत्मज्ञान हो जाने पर जन्ममरण के चक्र में फंसना नहीं पड़ता –

अज्ञानी जीव जब तक अपने शुद्ध आत्मा का दर्शन नहीं कर पाते तभी तक वे इस संसार में जल में भँवरों की भांति चक्कर काटते रहते हैं। आत्मा का दर्शन करके, असत्य का त्याग करके, सत्य ज्ञान को पाकर, काल क्रम में परम

पदको प्राप्त कर जीव इस संसार में पुनर्जन्म नहीं लेता।[40]

६. मृत्यु के पश्चात् जीवनमुक्त की गति –

सांसारिक जीवन में रहते हुए भी मुक्त अवस्था का अनुभव करने वाला जीवनमुक्त पुरुष मृत्यु के पश्चात् दूसरा जन्म प्राप्त नहीं करता। वह (जीवनमुक्त) मरकर विदेहमुक्त हो जाता है। भुना हुआ बीज जिस प्रकार नहीं उगता उसी प्रकार जीवनमुक्त की शुद्ध वासनाएँ उसके जन्म का कारण नहीं बनतीं।[41] विदेह की न वृद्धि होती है न अपक्षय होता है, नही उसका नाश होता है, न वह सत् है, न असत् (न व्यक्त है न अव्यक्त), न 'मैं' है और न 'दूसरा'।[42]

१०. कर्मानुसार जीव को शुभाशुभ फल प्राप्ति –

भारत के प्रायः सभी दर्शन कर्मवाद को स्वीकार करते हैं। कर्मवाद के अनुसार हमारा वर्तमान जीवन अतीत के कर्मों के अनुसार चलता है और भविष्य जीवन वर्तमान के कर्मों के अनुरूप होगा। मनुष्य जो भी शुभाशुभ करता है उसका फल नष्ट नहीं होता और बिना किये कर्म का उसे फल नहीं मिलता। डेनमार्क के प्रसिद्ध दार्शनिक 'हेराल्डहेफडिंग' ने भी धर्म की परिभाषा करते हुए कहा है कि 'मनुष्य के अच्छे या बुरे कर्मों का फल नष्ट नहीं होता, ऐसे विधान में विश्वास का नाम ही धर्म है'।[43]

योग भूमियों के अभ्यासियों को होने वाले फल का वर्णन करते हुए योगवासिष्ठकार ने लिखा है – जिस जीव में वैराग्य के उदय होने पर योग भूमिका का उदय हो जाता है उसके सांसारिक पाप नष्ट हो जाते हैं। और यदि योग की दो अथवा तीन भूमिकाओं में आरुढ़ योगियों की मृत्यु हो जाती है तो वे मरने के पश्चात् सुन्दर स्त्रियों के साथ देव लोक के विमानों में बैठकर, इन्द्रादि लोकपालों के नगरों में रहकर और सुमेरु पर्वत के उपवन के शीतल कुंजों में अप्सराओं के साथ रमण करते हुए अनेक प्रकार के सुखों का उपभोग करते हैं। जब इस प्रकार के अनेक भोग भोगने पर उनके पूर्वकाल के शुभकर्म क्षीण हो जाते हैं, और पाप कर्म उदय होते हैं तो वे इस संसार में गुणशील, धनवान् एवं पवित्र आचरण वाले सज्जनों के घर जन्म लेते हैं। इस जन्म में भी वे योग मार्ग का आश्रय लेते हुए, पूर्वजन्म में जिन योग भूमियों का अभ्यास कर लिया था उनका शीघ्र स्मरण करके उनसे ऊँची योग-भूमिकाओं का अभ्यास आरम्भ कर देते हैं, और क्रम से उच्च से उच्चतर योग-भूमिकाओं में चढ़ते जाते हैं।[44]

मृत्यु सम्बन्धी उपर्युक्त विचारों के अतिरिक्त योगवासिष्ठ में मृत्यु के विषय में निम्नलिखित तथ्यों का भी वर्णन उपलब्ध होता है –

१. मृत्यु के समय ज्ञानी पुरुषों का सुखपूर्वक देह त्याग एवं अज्ञानी पुरुष का शरीर त्याग के समय होने वाले विविध कष्टों का,[45]
२. मृत्युपश्चात् जीव को होने वाले अनुभवों का,[46]
३. अज्ञानी पुरुष का पुनर्जन्म के लिए पिता के वीर्य के माध्यम से माता की योनि में प्रवेश करना, पूर्वकृत शुभाशुभ कर्मों के अनुसार सुरूप अथवा कुरूप शिशु के रूप में जन्म लेकर समयानुसार बालक, युवा एवं वृद्ध अवस्था को प्राप्त

होकर मर जाना एवं कर्मानुसार जन्म-मरण के चक्र में फंस कर जब तक मुक्ति नहीं मिलती तब तक जीवों के बार-बार एक जन्म से दूसरे जन्म में जाने के अनुभवों का,[47]

४. पक्षियों का एक वृक्ष को छोड़कर दूसरे वृक्ष में जा बैठने के समान वासनायुक्त जीवों का एक शरीर को छोड़कर दूसरे शरीर में जाने का,[48]

५. अज्ञानी पुरुष का मृत्यु के बाद शुद्ध आत्मा के दर्शन न होने तक संसाररूपी जल के भंवर (जलावर्त) में चक्कर काटते रहने का,[49]

६. कर्मों की शुद्धि अथवा अशुद्धि की आयु की अल्पता अथवा दीर्घता में तथा मनुष्य की मृत्यु में उसके कर्मों की कारणता का,[50]

७. पाप-वासनावालों, मानसिक रोगियों, चिन्ता की अग्नि में जलने वालों, राग-द्वेष से पूर्ण लोभियों, विवेकहीन क्रोधियों, कामदग्धों एवं चंचल मन वाले मनुष्यों का ही मृत्यु के वश में रहने जैसे दार्शनिक विषयों का वर्णन यहाँ-वहाँ सुन्दर काव्यशैली में किया गया है।

निष्कर्ष – मूलतः ब्रह्मवाद के प्रतिपादक, अधिकतर काव्यशैली में लिखे गये ३२ हजार श्लोकों वाले इस महाग्रन्थ में दार्शनिक विषयों के साथ-साथ कई पौराणिक एवं सांसारिक विषयों का भी विवेचन हुआ है। प्रस्तुत लेख में मृत्यु को जीवन का अन्त मानने वाले शुद्ध प्रकृतिवादी मत के साथ मृत्यु को केवल शरीर का नाश मानने वाले दार्शनिक मत को दिखाते हुए आत्मा के अजर-अमर स्वरूप का वर्णन कर, शरीर त्याग के पश्चात् जीवों के पुनर्जन्म, मृत्यु के बाद पुनः देहलाभ के उत्सव का, मृत्यु के स्वरूप का, मृत्यु दशा का, ज्ञानी पुरुष के सुखपूर्वक देह त्याग का, अज्ञानियों के सकष्ट देहत्याग का, जीव के शरीर परिवर्तन का, जीवात्मा का मातृ-योनि में प्रवेश का, मुक्ति न मिलने तक जीव का जन्म-मरण के चक्र में फंसे रहने का, मनुष्य के आयुर्निर्धारण में उसके कर्मों की शुद्धता-अशुद्धता का, विविध क्षुद्र वासना वालों का मृत्यु के वश में रहने का एवं मृत्यु सम्बन्धी कतिपय अन्य तथ्यों पर विचार किया गया है।

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झटित्येव मृतेरन्ते वपुः पश्यति यौवने।। वही, ३.२०.४८

34. यदा व्यथावशान्नाड्यः स्वसंकोचविकासनैः।
गृह्णन्ति मारुतो देहे तदोज्झति निजां स्थितिम्।।
प्रविष्टा न विनिर्यान्ति गताः संप्रविशन्ति नो।
यदा वाता विनाडीत्वात्तदाऽस्पन्दात्मृतिर्भवेत्।।
न विशत्येव वातो न निर्याति पवनो यदा।
शरीरनाडीवैधुर्यान्मृत इत्युच्यते तदा।। योगवासिष्ठ, ३.५४.५६-६१

35. नाडीप्रवाहे विधुरे यदा वातविसंस्थितिम्।
जन्तुः प्राप्नोति हि तदा शाम्यतीवास्य चेतना।।
केवलं वातसंरोधाद् यदा स्पन्दः प्रशाम्यति।
मृत इत्युच्यते देहस्तदासौ जडनामकः।।
तस्मिन् देहे शवीभूते वाते चानिलतांगते।
चेतनं वासनायुक्तं स्वात्मतत्त्वेऽवतिष्ठति।।
जीव इत्युच्यते तस्य नामाणोर्वासनावतः। वही, ३.५५.२-६

36. मृते पुंसि तमोवातैर्मिलन्ति प्राणवायवः।। वही, ६ (उत्तरार्ध). १८.६

37. खवातेऽन्तर्मृतप्राणाः प्राणानामन्तरे मनः।
मनसोऽन्तर्जगद् विद्धि तिले तैलमिव स्थितम्।। वही, ६ (उत्तरार्ध). १८.१०

38. इदं दृश्यं परित्यज्य यदास्ते दर्शनान्तरे।

स स्वप्न इव संकल्प इव नामा कृतिस्तदा।।
तस्मिन्नेव प्रदेशेऽन्तः पूर्ववत् स्मृतिमान् भवेत्।
तदैव मृतिमूर्च्छान्ते पश्यत्यन्यशरीरकम्।। योगवासिष्ठ, ३.५५.८-९

39. यावन्तो ये मृताः केचिज्जीवा मोक्षविवर्जिताः।
स्थितास्ते तत्र तावन्तः संसाराः पृथगक्षयाः।। वही, ६ (उत्तरार्ध). ६३.३२

40. तावद्भ्रमन्ति संसारे वारिण्यावर्तराशयः।
यावन्मूढा न पश्यन्ति स्वमात्मानमनिन्दितम्।।
दृष्ट्वात्मानमसत्त्यक्त्वा सत्यमासाद्य संविदम्।
कालेन पदमागत्य जायन्ते नेह ते पुनः।। वही, ४.४३.२८-२९

41. सैव देहक्षये राम पुनर्जननवर्जिता।
विदेहमुक्तता प्रोक्ता तत्स्था नायान्ति दृश्यताम्।।
भ्रष्टबीजोपमा भूयो जन्माङ्कुरविवर्जिता।
हृदि जीवन्मुक्तपदं त्यक्त्वा देहे कालवशीकृते।। वही, ५.४२.१३-१४

42. विदेहमुक्तो नोदेति नास्तमेति न शाम्यति।
न सन्नासन्न दूरस्थो न चाहं न च नेतरः।। वही,

43. दृष्टव्य, भारतीय दर्शन, श्री सतीशचन्द्र एवं श्री धरेन्द्रमोहन दत्त द्वारा रचित (श्रीहरिमोहन झा एवं श्री नित्यानन्द मिश्र द्वारा अनुदित), द्वितीय संस्करण, पृष्ठ १०

44. योगभूमिकयोत्क्रान्तजीवितस्य शरीरिणः।
भूमिकांशानुसारेण क्षीयते पूर्वदुष्कृतम्।।
ततः सुविमानेषु लोकपालपुरेषु च।
मेरूपवनकुंजेषु रमते रमणीसखः।।
ततः सुकृतसंभारे दुष्कृते च पुराकृते।
भोगजाले परिक्षीणे जायन्ते योगिनो भुवि।।
शुचीनां श्रीमतां गेहे गुप्ते गुणवतां सताम्।
जनित्वा योगमेवैते सेवन्ते योगवासिताः।।
तत्र प्राग्भावनाभ्यस्तयोगभूमिक्रमं बुधाः।
स्मृत्वा परिपतन्त्युच्चैरुत्तरं भूमिकाक्रमम्।। योगवासिष्ठ, ६ (पूर्वार्ध),. १२६.४७-५१

द्रष्टव्यः- पापियों एवं पुण्यकर्मियों की कर्मानुसार कैसे फल मिलते हैं, इसका वर्णन योगवासिष्ठ के उत्पत्ति प्रकरण

में विस्तार से मिलता है। वही, ३.५५.११-३७

45. वही, ३.५४.३६-५३

46. यज्ञेगवासिष्ठ, ३.४०.३१-४८; ३.५५.११-३५

47. वही, ३.५५.३८-४३

48. (क) आशा-पाश-शताबद्धा वासनाभावधारिणः।
कायात्कायमुपायान्ति वृक्षाद्वृक्षमिवाण्डजाः।। वही, ४.४३.३६
(ख) काले काले चिताजीवस्त्वन्योऽन्यो भवति स्वयम्।
भाविताकारवानन्तर्वासना कलिकोदयात्।। वही, ६ (पूर्वार्ध). ५१.३६

49. वही, ४.४.२८-२६

50. वही, ३.५४.३०-३२; ३.२.१०

51. वही,

ਕਾਮਾਗਾਟਾਮਾਰੂ ਦਾ ਸੰਘਰਸ਼: ਇਤਿਹਾਸਕ ਪਰਿਪੇਖ

ਰਾਜਬੀਰ ਸਿੰਘ ਸੋਢੀ

ਸਾਰ

ਵਿਹਵੀਂ ਸਦੀ ਦੇ ਦੂਜੇ ਦਹਾਕੇ ਵਿਚ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਤ੍ਰਾਸਦੀ ਵਾਪਰੀ, ਇਸ ਤ੍ਰਾਸਦੀ ਦੇ ਜ਼ਿੰਮੇਵਾਰ ਜਿੰਨੇ ਅੰਗ੍ਰੇਜ਼ ਸਨ ਉਨੇ ਹੀ ਭਾਰਤੀ ਅਤੇ ਕੈਨੇਡਾ ਦੀ ਤੱਤਕਾਲੀਨ ਸਰਕਾਰ ਵੀ ਸੀ। ਇਸ ਘਟਨਾ ਨੂੰ ਕੈਨੇਡਾ ਦੇ ਮੌਜੂਦਾ ਪ੍ਰਧਾਨ ਮੰਤਰੀ ਜਸਟਿਨ ਟਰੂਡੋ ਨੇ ਕੈਨੇਡਾ ਦੇ ਇਤਿਹਾਸ ਦਾ ਕਾਲਾ ਪੰਨਾ ਕਹਿਕੇ ਪੰਜਾਬੀ ਕੋਮ ਤੋਂ ਮਾਫ਼ੀ ਮੰਗੀ ਹੈ। ਇਹ ਉਸ ਸੰਘਰਸ਼ ਦੀ ਹੀ ਪ੍ਰਾਪਤੀ ਹੈ ਕਿ ਅੱਜ ਭਾਰਤ ਸਾਮਰਾਜੀ ਤਾਕਤਾਂ ਦੇ ਹੱਥੋਂ ਆਜ਼ਾਦ ਵੀ ਹੈ ਤੇ ਕੈਨੇਡਾ ਵਰਗੇ ਦੇਸ਼ ਵਿਚ ਅੱਜ ਮਲਟੀ ਕਲਚਰ ਲਾਅ ਕਰਕੇ ਪੰਜਾਬੀ ਭਾਈਚਾਰੇ ਅਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਸਥਿਤੀ ਬਹੁਤ ਸੰਤੋਖ ਜਨਕ ਹੈ।

ਮੂਲ ਸ਼ਬਦ: ਪਰਵਾਸ, ਬੇਰੋਜ਼ਗਾਰੀ, ਕਾਮੇ, ਇਮੀਗਰੇਸ਼ਨ, ਡਾਇਸਪੁਰਾ, ਗੁਫ਼ਤਗੂਹ, ਨੀਤੀ ।

ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਪਾਨੀ ਭਾਸ਼ਾ ਦਾ ਸ਼ਬਦ ਹੈ, ਜਿਸ ਦਾ ਅਰਥ ਹੈ 'ਆਜ਼ਾਦੀ'। ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਜਪਾਨ ਦਾ ਸੀ ਜੋ Shinyei Kisen Goshi Kaisha ਨੇ 1890 ਵਿਚ ਬਣਾਇਆ ਸੀ। 1890 ਦੇ ਵਿਚ ਜਰਮਨ ਦੇ S.S. Stubbenhuk ਨੇ ਸਮੁੰਦਰੀ ਸਫ਼ਰ ਲਈ S.S. Stubbenhuk ਨਾਂ ਹੇਠ ਜਹਾਜ਼ ਕੰਪਨੀ ਬਣਾਈ ਅਤੇ 1894 ਵਿਚ ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਨੂੰ ਜਰਮਨ ਦੇ Hamburg America Line ਨੇ ਖਰੀਦਿਆ ਤੇ ਇਸ ਜਹਾਜ਼ ਦਾ ਨਾਂ S.S. Sicilia ਰੱਖਿਆ। 1913 ਵਿਚ ਚਾਰਪੰਜ ਬੰਦਿਆਂ ਨੇ ਮਿਲ ਕੇ Shinyei Kisen Goshi Kaisha ਕੰਪਨੀ ਖਰੀਦੀ ਤੇ ਜਹਾਜ਼ ਦਾ ਨਾਂ ਕਾਮਾਗਾਟਾਮਾਰੂ ਰੱਖਿਆ ਗਿਆ। 1914 ਵਿਚ ਸ· ਗੁਰਦਿੱਤ ਸਿੰਘ ਨੇ ਜਹਾਜ਼ ਜਪਾਨੀ ਕੰਪਨੀ ਤੋਂ ਕਿਰਾਏ 'ਤੇ ਲਿਆ ਅਤੇ 'ਪਹਿਲਾਂ ਜਹਾਜ਼ ਵਿਚ ਗੁਰੂ ਗ੍ਰੰਥ ਸਾਹਿਬ ਦੀ ਬੀੜ ਦਾ ਪ੍ਰਕਾਸ਼ ਕੀਤਾ ਗਿਆ, ਪਾਠ ਕੀਤਾ ਗਿਆ, ਅਰਦਾਸ ਕੀਤੀ ਗਈ ਅਤੇ ਇਸ ਦਾ ਨਾਂ 'ਗੁਰੂ ਨਾਨਕ ਜਹਾਜ਼' ਰੱਖਿਆ ਗਿਆ ਅਤੇ ਫਿਰ ਸਫ਼ਰ ਦੀ ਸ਼ੁਰੂ ਕੀਤਾ ਗਈ। ਜਹਾਜ਼ ਕੰਪਨੀ ਬਣਾਉਣ ਲਈ 80 ਲੱਖ ਰੁਪਏ ਦਾ ਇਕਰਾਰ ਹੋ ਗਿਆ ਅਤੇ ਕੰਪਨੀ ਦਾ ਨਾਂ 'ਗਰੂ ਨਾਨਕ ਨੈਵੀਗੇਸ਼ਨ ਕੰਪਨੀ' ਰੱਖਿਆ ਗਿਆ। 1914 ਤੱਕ ਇਹ ਜਹਾਜ਼ ਕੋਇਲੇ ਲਾਦੂ ਬੇੜਾ ਸੀ ਅਤੇ 1914 ਵਿਚ ਸ· ਗੁਰਦਿੱਤ ਸਿੰਘ ਨੇ ਇਸ ਜਹਾਜ਼ ਨੂੰ ਮੁਸਾਫ਼ਰ ਜਹਾਜ਼ ਬਣਾਇਆ ਸੀ, ਅਤੇ ਜਹਾਜ਼ ਵਿਚ ਲਕੜੀ ਦੇ ਪ੩੩ ਬੈਂਡ ਬਣਾਏ ਗਏ ਸਨ। 1924 ਵਿਚ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦਾ ਨਾਂ Heian Maru ਰੱਖਿਆ ਗਿਆ ਅਤੇ 11 ਫ਼ਰਵਰੀ 1926 ਵਿਚ Heian Maru ਨਾਂ ਹੇਠ ਹੀ Cape Sayidmar, Hokkaido, Japan ਵਿਚ ਟੁੱਟ ਕੇ ਤਬਾਹ ਹੋ ਗਿਆ।

ਸਿੱਖਾਂ ਦਾ ਪਹਿਲਾ ਬੈਚ ਜੋ ਕੈਨੇਡਾ ਗਿਆ, ਉਸ ਵਿਚ ਫ਼ੌਜੀ ਸਨ ਜੋ 1897 ਵਿਚ ਲੰਦਨ ਵਿਖੇ ਮਹਾਰਾਣੀ ਵਿਕਟੋਰੀਆ ਦੀ ਗੋਲਡਨ ਜੁਬਲੀ ਦੇ ਜਸ਼ਨਾਂ ਤੋਂ ਬਾਦ ਉਥੇ ਗਏ ਸਨ। ਬਰਤਾਨੀਆਂ ਅੰਦਰ ਸ਼ਾਇਦ ਹੀ ਇਸ ਤਰ੍ਹਾਂ ਦਾ ਜਸ਼ਨ ਪਹਿਲਾਂ ਕਦੇ ਹੋਇਆ ਹੋਵੇਗਾ। ਭਾਰਤ ਦੀ 26 ਜਨਵਰੀ ਵਾਂਗੂੰ ਹੀ ਇਹ ਮਨਾਈ ਜਾਂਦੀ ਸੀ, ਬੜੇ ਜੋਸ਼-ਓਖਰੋਸ਼

ਖੋਜਾਰਥੀ, ਪੰਜਾਬੀ ਵਿਭਾਗ, ਜੰਮੂ ਯੂਨੀਵਰਸਿਟੀ, ਜੰਮੂ।

ਨਾਲ। ਗੋਲਡਨ ਜੁਬਲੀ ਦੇ ਖ਼ਤਮ ਹੋਣ ਤੋਂ ਬਾਦ ਸਿੱਖ ਫ਼ੌਜਾਂ ਨੂੰ ਸਿੱਧੇ ਰਸਤੇ ਨਹੀਂ ਭੇਜਿਆ ਗਿਆ ਭਾਵ ਸੁਏਜ਼ ਨਹਿਰ ਦੇ ਰਸਤੇ ਨਹੀ ਭੇਜਿਆ ਗਿਆ ਬਲਕਿ ਜਹਾਜ਼ ਨੂੰ ਕੈਨੇਡਾ ਦੇ ਪੂਰਬੀ ਸਾਹਿਲ ਤੇ ਸਿਥਤ ਕਿਊਬੇਕ ਸੂਬੇ ਦੀ ਮੋਂਟਰੀਅਲ ਬੰਦਰਗਾਹ ਤੇ ਜਾ ਉਤਾਰਿਆ ਇੰਨੇ ਲੰਮੇ ਸਫ਼ਰ ਦਾ ਫ਼ਾਇਦਾ ਸਿੱਖ ਫ਼ੌਜ ਨੂੰ ਇਹ ਹੋਇਆ ਕਿ ਉਨ੍ਹਾਂ ਨੇ ਕੈਨੇਡਾ ਦੀ ਸੈਂਕੜੇ ਮੀਲ ਗ਼ੈਰ ਆਬਾਦ ਜਗਾ ਵੇਖੀ ਅਤੇ ਉਥੋਂ ਦੀ ਆਬਓਹੱਵਾ ਵੀ ਪੰਜਾਬ ਵਰਗੀ ਲੱਗੀ ਜੋ ਕਿ ਕਿਸਾਨੀ ਜੀਵਨ ਦੇ ਅਨੁਕੂਲ ਸੀ, ਇਨ੍ਹਾਂ ਦੋਵਾਂ ਕਾਰਨਾਂ ਦੇ ਕਰ ਕੇ ਸਿੱਖ ਫ਼ੌਜ ਵਿਚੋਂ ਕਈਆਂ ਨੇ ਕੈਨੇਡਾ ਰਹਿਣ ਦਾ ਸੋਚ ਲਿਆ। ਇਸੇ ਕਰਕੇ ਜਿਹੜਾ ਬੰਦਾ ਪਹਿਲਾਂ ਵੈਨਕੂਵਰ ਰਹਿਣ ਲਈ 1897 ਵਿਚ ਗਿਆ ਉਹ ਵੀ ਇਕ ਫ਼ੌਜੀ ਸੀ,ਜਿਸ ਦਾ ਨਾਂ ਕੇਸਰ ਸਿੰਘ ਸੀ। ਸ਼ੁਰੂਆਤ ਵਿਚ ਹਿੰਦੁਸਤਾਨੀ ਨੂੰ ਕੈਨੇਡਾ ਵਿਚ ਬੜੀ ਮੁਸ਼ਕਲਾਤਾਂ ਦਾ ਸਾਮ੍ਹਣਾ ਕਰਨਾ ਪਿਆ ਅਤੇ ਉਨ੍ਹਾਂ ਨੂੰ ਭਾਸ਼ਾ, ਖਾਣ ਪੀਣ, ਰਹਿਣ ਸਹਿਣ ਆਦਿ ਵਿਚ ਬੜੀ ਪਰੇਸ਼ਾਨੀਆਂ ਦਾ ਸਾਮ੍ਹਣਾ ਕਰਨਾ ਪਿਆ। ਭਾਸ਼ਾ ਸੱਭ ਤੋਂ ਵੱਡੀ ਸਮੱਸਿਆ ਸੀ, ਕਿਉਂਕਿ ਕੈਨੇਡਾ ਦੇ ਲੋਕਾਂ ਨੂੰ ਪੰਜਾਬੀ/ਹਿੰਦੀ ਸਮਝ ਨਹੀਂ ਆਉਂਦੀ ਸੀ ਅਤੇ ਹਿੰਦੁਸਤਾਨੀਆਂ ਨੂੰ ਉਥੋਂ ਦੀ ਭਾਸ਼ਾ ਸਮਝ ਨਹੀਂ ਆਉਂਦੀ ਸੀ। ਇਸੇ ਲਈ ਹਿੰਦੂਆਂ ਨੂੰ ਉਹੀ ਕੰਮ ਦਿੱਤਾ ਜਾਂਦਾ ਸੀ ਜਿਸ ਵਿਚ ਸਮਝਾਣ ਦੀ ਜ਼ਿਆਦਾ ਜ਼ਰੂਰਤ ਨਹੀਂ ਹੁੰਦੀ ਕਿਉਂਕਿ ਉਨ੍ਹਾਂ ਨੂੰ ਕੰਮ ਸਮਝਾਉਣ ਵਾਲਾ ਕੋਈ ਨਹੀਂ ਸੀ। ਇਸੇ ਕਰਕੇ ਇਨ੍ਹਾਂ ਨੂੰ 'ਆਰਾ ਮਿੱਲਾਂ ਦਾ ਕੰਮ, ਰੇਲਵੇ ਲਾਇਨਾਂ ਵਿਛਾਉਣ, ਜੰਗਲ ਸਾਫ਼ ਕਰ ਕੇ ਬਾਗ਼ਬਾਨੀ' ਆਦਿ ਦਾ ਕੰਮ ਦਿੱਤਾ ਜਾਂਦਾ ਸੀ। ਇਨ੍ਹਾਂ ਕੰਮਾਂ ਵਿਚ ਜ਼ਿਆਦਾਤਰ ਤਾਕਤ ਦਾ ਇਸਤੇਮਾਲ ਹੁੰਦਾ ਸੀ ਅਤੇ ਦਿਮਾਗ ਦਾ ਬਹੁਤ ਘੱਟ। ਕੈਨੇਡਾ ਵਿਚ ਇਨ੍ਹਾਂ ਹਿੰਦੁਸਤਾਨੀਆਂ ਨੇ ਆਪਣੇ ਰਿਸ਼ਤੇਦਾਰਾਂ ਨੂੰ ਵੀ ਬੁਲਾਉਣਾ ਸ਼ੁਰੂ ਕਰ ਦਿੱਤਾ, ਜਿਸ ਦਾ ਪੱਤਾ 1900 ਈ· ਦੀ ਮੁਰਦਮ ਸ਼ੁਮਾਰੀ ਤੋਂ ਸਪੱਸ਼ਟ ਹੋ ਜਾਂਦਾ ਹੈ ਕਿ 2000 ਹਿੰਦੁਸਤਾਨੀ ਸਨ ਕੈਨੇਡਾ ਵਿਚ, ਜਿਨ੍ਹਾਂ ਵਿਚ ਬਹੁਗਿਣਤੀ ਸਿੱਖਾਂ ਦੀ ਸੀ। ਇਸ ਤੋਂ ਇਹ ਵੀ ਸਪੱਸ਼ਟ ਹੋ ਜਾਂਦਾ ਹੈ ਕਿ 1097-1900 ਈ· ਤਕ ਕੈਨੇਡਾ ਵਿਚ 2000 ਭਾਰਤੀ ਆਏ ਸਨ ਰੋਜ਼ੀ ਰੋਟੀ ਕਮਾਉਣ ਲਈ।

ਹਿੰਦੁਸਤਾਨ ਦੇ ਵਿਚ ਅੰਗਰੇਜ਼ੀ ਸਰਕਾਰ ਦਾ ਵਤੀਰਾ ਠੀਕ ਨਹੀਂ ਸੀ, ਅੰਗਰੇਜ਼ ਸਰਕਾਰ ਤਾਂ ਕਿਸਾਨ ਨੂੰ ਕੰਗਾਲ ਹੋਣ ਅਤੇ ਨੌਜਵਾਨਾਂ ਨੂੰ ਬੇਰੋਜ਼ਗਾਰੀ ਹੋਣ ਤੇ ਤੁਲੀ ਸੀ, ਇਨ੍ਹਾਂ ਦੋਵਾਂ ਨਾਲ ਅੰਗਰੇਜ਼ੀ ਫ਼ੌਜ ਵਿਚ ਨੌਕਰੀ ਕਰਨ ਨੂੰ ਤਿਆਰ ਹੋ ਜਾਂਦੇ ਅਤੇ ਬਾਕੀਆਂ ਦੇ ਵਿਚ ਆਪਣੀ ਪੁਰਖਾਂ ਦੀ ਜ਼ਮੀਨ ਜਾਇਦਾਦ ਵੇਚ ਕੇ ਪਰਵਾਸ ਕਰਨ ਦੀ ਸੋਚ ਰਹੇ ਸਨ। ਜੋ ਪਿਆਰਾ ਸਿੰਘ ਪੱਦਮ ਦੇ ਹਵਾਲੇ ਤੋਂ ਸਪੱਸ਼ਟ ਹੋ ਜਾਂਦਾ ਹੈ।

'1901 ਤੱਕ 4 ਲੱਖ 13 ਹਜ਼ਾਰ ਏਕੜ ਜ਼ਮੀਨ ਵਿਕ ਚੁੱਕੀ ਸੀ ਅਤੇ 1901 ਤੋਂ 1909 ਤੱਕ ਢਾਈ ਕਰੋੜ ਏਕੜ ਤੋਂ ਵੱਧ ਜ਼ਮੀਨ ਗਹਿਣੇ ਪੈ ਚੁੱਕੀ ਸੀ'। ਇਸ ਤੋਂ ਇਹ ਵੀ ਸਪੱਸ਼ਟ ਹੁੰਦਾ ਹੈ ਕਿ ਹਿੰਦੁਸਤਾਨੀ ਅੰਗਰੇਜ਼ੀ ਫ਼ੌਜ ਵਿਚ ਨੌਕਰੀ ਕਰਨ ਜਾਂ ਫਿਰ ਪਰਵਾਸ ਕਰਨ ਦੋਵਾਂ ਵਿਚ ਫ਼ਾਇਦਾ ਅੰਗਰੇਜ਼ ਸਰਕਾਰ ਨੂੰ ਹੀ ਹੁੰਦਾ ਸੀ । 'ਸੋਹਣ ਸਿੰਘ ਜੋਸ਼ ਨੇ 1905 ਤੋਂ 1908 ਤਕ 5179 ਭਾਰਤੀ ਕੈਨੇਡਾ ਗਏ ਦੱਸੇ ਹਨ। 1907 ਈ· ਦੀ ਇਕ ਸਰਕਾਰੀ ਰਿਪੋਰਟ ਅਨੁਸਾਰ ਉਥੋਂ (ਕੈਨੇਡਾ) ਦੇ ਕਈ ਮਿਲ ਮਾਲਕਾਂ ਨੇ ਸਸਤੇ ਮਜ਼ਦੂਰ ਜੁਟਾਉਣ ਲਈ ਪੰਜਾਬ ਦੀਆਂ ਅਖ਼ਬਾਰਾਂ ਵਿਚ ਇਸ਼ਤਿਹਾਰ ਵੀ ਕਢਵਾਏ, ਜਿਸ ਰਾਹੀਂ ਪਰਵਾਸ ਲਈ ਪੰਜਾਬੀਆਂ ਨੂੰ ਉਤਸਾਹਿਤ ਕੀਤਾ ਗਿਆ। ਸਿੱਟੇ ਵਜੋਂ 1908 ਵਿਚ ਕੈਨੇਡਾ ਪਹੁੰਚੇ ਹਿੰਦੁਸਤਾਨੀਆਂ ਦੀ ਗਿਣਤੀ ਸਾਲ ਕੁ ਅੰਦਰ 500 ਤੋਂ ਵੱਧ ਕੇ 6000 ਤੱਕ ਪਹੁੰਚ ਗਈ।

ਵੈਨਕੂਵਰ ਦੇ ਵਿਚ ਸਿੱਖਾਂ ਨੇ ਮਿਹਨਤ ਮੁੱਸ਼ਕਤ ਨਾਲ ਕਮਾਈ ਕੀਤੀ ਅਤੇ ਉਸੇ ਕਮਾਈ ਵਿਚੋਂ ਕੁਝ ਡਾਲਰ ਬਚਾ ਵੀ ਲੈਂਦੇ ਸਨ, ਇਸ ਕਮਾਈ ਦੇ ਵਿਚੋਂ ਹੀ ਉਨ੍ਹਾਂ ਨੇ 1907 ਵਿਚ ਖ਼ਾਲਸਾ ਦੀਵਾਨ ਸੋਸਾਇਟੀ ਬਣਾਈ ਅਤੇ ਇਸੇ ਖ਼ਾਲਸਾ ਦੀਵਾਨ ਸੁਸਾਇਟੀ ਦਾ ਹੀ ਨਤੀਜਾ ਸੀ ਕਿ 1909 ਵਿਚ ਵੈਨਕੂਵਰ ਵਿਚ ਸਿੱਖਾਂ ਦਾ ਪਹਿਲਾ ਗੁਰਦੁਆਰਾ

ਬਣਿਆ। ਇਹ ਗੁਰਦੁਆਰਾ ਸਿਰਫ਼ ਸਿੱਖਾਂ ਦਾ ਧਾਰਮਿਕ ਅਸਥਾਨ ਹੀ ਨਹੀਂ ਸੀ ਸਗੋਂ ਵੈਨਕੂਵਰ ਸ਼ਹਿਰ ਦੇ ਵਿਚ ਰਹਿੰਦੇ ਸਿੱਖਾਂ, ਮੁਸਲਮਾਨਾਂ ਅਤੇ ਹਿੰਦੂਆਂ ਲਈ ਇਕੱਤਰ ਹੋਣ ਦਾ ਅਸਥਾਨ ਵੀ ਸੀ। ਹਿੰਦੁਸਤਾਨੀ ਜਿੰਨੇ ਵੀ ਫ਼ੈਸਲੇ,ਗੁਪਤ ਸਮਾਰੋਹ ਅਤੇ ਗੁਫ਼ਤਗੂਹ ਕਰਦੇ ਸਨ ਸਾਰੇ ਇਸੇ ਗੁਰਦੁਆਰੇ ਵਿਚ ਹੁੰਦੇ ਸਨ। ਖ਼ਾਲਸਾ ਦੀਵਾਨ ਸੁਸਾਇਟੀ ਦਾ ਪਹਿਲਾ ਪ੍ਰਧਾਨ ਭਾਈ ਭਾਗ ਸਿੰਘ ਨੂੰ ਨਿਯੁਕਤ ਕੀਤਾ ਗਿਆ ਅਤੇ ਵੈਨਕੂਵਰ ਗੁਰਦੁਆਰੇ ਦਾ ਪਹਿਲਾ ਗ੍ਰੰਥੀ ਭਾਈ ਬਲਵੰਤ ਸਿੰਘ ਨੂੰ ਬਣਾਇਆ ਗਿਆ। 1909 ਈ· ਦੇ ਵਿਚ 29 ਭਾਰਤੀਆਂ ਨੂੰ ਕੈਨੇਡਾ ਆਉਣ ਦੀ ਇਜਾਜ਼ਤ ਦਿੱਤੀ ਗਈ, ਜੋ ਕਿ ਆਟੇ ਦੇ ਵਿਚ ਨਮਕ ਦੇ ਬਰਾਬਰ ਹੀ ਸਮਝਿਆ ਜਾ ਸਕਦਾ ਹੈ। 1911 ਈ· ਦਾ ਹਾਲ ਤਾਂ ਸਭ ਤੋਂ ਜ਼ਿਆਦਾ ਮਾੜਾ ਸੀ, ਬਾਕੀ ਸਾਲਾਂ ਕੋਲੋਂ 1911 ਦੇ ਵਿਚ ਕੈਨੇਡਾ ਦੀ ਧਰਤੀ ਤੇ ਸੱਭ ਤੋਂ ਜ਼ਿਆਦਾ ਚੀਨੀ 11932 ਬੰਦੇ ਗਏ ਸਨ ਉਸ ਤੋਂ ਬਾਅਦ ਜਾਪਾਨੀ 2906 ਬੰਦੇ ਗਏ ਅਤੇ ਸਿਰਫ਼ 1 ਭਾਰਤੀ ਨੂੰ ਕੈਨੇਡਾ ਜਾਣ ਦਿੱਤਾ ਗਿਆ। ਇਸ ਦਾ ਕਾਰਨ ਸਿੱਖਾਂ ਦੀ ਆਪਣੀ ਵੱਖਰੀ ਪਛਾਣ ਵੀ ਹੋ ਸਕਦੀ ਹੈ ਜੋ ਦਸਮ ਪਾਤਸ਼ਾਹ ਨੇ ਸਿੱਖਾਂ ਨੂੰ ਬਖ਼ਸ਼ੀ ਹੈ, ਜਿਸ ਦੇ ਕਰਕੇ ਸਿੱਖ ਲੱਖਾਂ ਦੀ ਗਿਣਤੀ ਤੋਂ ਪਛਾਣਿਆ ਜਾਂਦਾ ਹੈ। ਜਦੋਂ ਵੈਨਕੂਵਰ ਦੇ ਵਿਚ ਪੰਜ, ਛੇ ਹਜ਼ਾਰ ਸਿੱਖ ਕਾਮੇ ਲਈ ਆਏ ਤਾਂ ਗੋਰਿਆਂ ਨੇ ਇਨ੍ਹਾਂ ਦੀ ਗਿਣਤੀ ਜ਼ਿਆਦਾ ਸਮਝੀ ਅਤੇ ਘੱਟ ਡਾਲਰ ਲੈਕੇ ਜਿਆਦਾ ਕਮ ਕਰਨਾ ਆਦਿ ਕਾਰਨਾ ਕਾਰਕੇ ਇਮੀਗਰੇਸ਼ਨ ਨੇ ਕੈਨੇਡਾ ਦੇ ਕਾਨੂੰਨ ਸਖ਼ਤ ਕੀਤੇ।

ਪਰ ਭਾਰਤੀਆਂ ਨੂੰ ਕੈਨੇਡਾ ਜਾਣ ਦੀ ਉਮੀਦ ਦੀ ਕਿਰਨ ਉਦੋਂ ਜਾਗੀ ਜਦੋਂ S.S. Panama Maru ਦੇ 39 ਮੁਸਾਫ਼ਰਾਂ ਨੇ ਕੈਨੇਡਾ ਦੀ ਧਰਤੀ ਤੇ ਉਤਰਨ ਦੀ ਇਜਾਜ਼ਤ ਸੁਪਰੀਮ ਕੋਰਟ ਦੇ ਚੀਫ਼ ਜਸਟਿਸ ਗੋਰਡੰਨ ਹੰਟਰ ਨੇ ਦਿੱਤੀ। ਹੰਟਰ ਨੇ ਫ਼ੈਸਲਾ 24 ਨਵੰਬਰ 1913 ਨੂੰ ਦਿੱਤਾ, ਜੋ ਇਸ ਪ੍ਰਕਾਰ ਸੀ''(ੳ) ਇਮੀਗਰੇਸ਼ਨ ਐਕਟ ਦੀਆਂ ਸ਼ਰਤਾਂ ਪੂਰੀਆਂ ਕਰਕੇ ਆਉਣ ਵਾਲੇ ਭਾਰਤੀਆਂ ਨੂੰ ਕੈਨੇਡਾ ਵਿਚ ਆਉਣੋਂ ਰੋਕਿਆ ਨਹੀਂ ਜਾ ਸਕਦਾ। (ਅ) ਕਿਸੇ ਵੀ ਬੰਦੇ ਨੂੰ ਜਹਾਜ਼ ਵਿਚ ਕੈਦ ਨਹੀਂ ਰੱਖਿਆ ਜਾ ਸਕਦਾ ਅਤੇ (ੲ) ਸ਼ੱਕੀ ਬੰਦਿਆਂ ਨੂੰ ਜਹਾਜ਼ ਉਤਾਰ ਕੇ ਜ਼ਮਾਨਤ 'ਤੇ ਛੱਡਿਆ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ ਅਤੇ ਤਫ਼ਤੀਸ਼ ਮਗਰੋ ਉਹਨਾਂ 'ਤੇ ਬਕਾਇਦਾ ਮੁਕੱਦਮਾ ਚਲਾਇਆ ਜਾਣਾ ਚਾਹੀਦਾ ਹੈ।'' ਜਸਟਿਸ ਹੰਟਰ ਦਾ ਇਹ ਫ਼ੈਸਲਾ ਹੱਵਾ ਵਾਂਗੂੰ ਆਇਆ ਤੇ ਅੱਗ ਵਾਂਗੂੰ ਭਾਰਤੀਆਂ ਵਿਚ ਫੈਲਿਆ। ਇਸ ਫ਼ੈਸਲੇ ਦੇ ਕਰਕੇ ਹੀ ਗੁਰਦਿੱਤ ਸਿੰਘ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਕਿਰਾਏ 'ਤੇ ਲੈ ਲਿਆ। ਜਸਟਿਸ ਹੰਟਰ ਦੇ ਫੈਸਲੇ ਪਿੱਛੋਂ ਆਰਡਰ ਇਨ ਕੌਂਸਲ 920 ਦੀਆਂ ਸਾਰੀਆਂ ਤ੍ਰੇੜਾਂ ਮੁੰਦ ਦਿੱਤੀਆਂ ਗਈਆਂ ਸਨ ਅਤੇ ਇਸ ਮੰਤਵ ਲਈ 31 ਮਾਰਚ 1914 ਨੂੰ ਇਕ ਹੋਰ ਹੁਕਮ ਰਾਹੀਂ ਕੈਨੇਡਾ ਦੀਆਂ 42 ਬੰਦਰਗਾਹਾਂ ਦੀ ਸੂਚੀ ਦੇਕੇ ਕਿਹਾ ਗਿਆ ਸੀ ਕਿ ਇਹਨਾਂ ਉੱਤੇ ਬਾਹਰੋਂ ਆਉਣ ਵਾਲਾ ਕੋਈ ਮਜ਼ਦੂਰ ਨਹੀਂ ਉਤਰ ਸਕਦਾ। ਕੈਨੇਡਾ ਵਿਚ ਰਹਿੰਦੇ ਹਿੰਦੁਸਤਾਨੀਆਂ ਨੇ ਆਪਣੀ ਆਵਾਜ਼ ਨੂੰ ਅਖ਼ਬਾਰਾਂ ਰਾਹੀਂ ਬੁਲੰਦ ਕੀਤਾ।ਅਖ਼ਬਾਰਾਂ ਜਾਂ ਪ੍ਰਿੰਟ ਮੀਡੀਆ ਦੇ ਕਰਕੇ ਇਨ੍ਹਾਂ ਲੋਕਾਂ ਦੀਆਂ ਸਮੱਸਿਆਵਾਂ ਬਾਕੀ ਦੇਸ਼ਾਂ ਵਿਚ ਰਹਿੰਦੇ ਭਾਰਤੀ ਭਾਈਚਾਰੇ ਨੂੰ ਪਤਾ ਚਲਦਾ ਸੀ। ਜਿੰਨੇ ਪੇਪਰ ਤੇ ਅਖ਼ਬਾਰ ਕੈਨੇਡਾ ਤੇ ਅਮਰੀਕਾ ਦੇਸ਼ਾਂ ਵਿਚ ਹਿੰਦੁਸਤਾਨੀਆਂ ਨੇ ਛਾਪੇ ਇਨ੍ਹਾਂ ਸਾਰਿਆਂ ਦਾ ਨਿਸ਼ਾਨਾ ਬਰਤਾਨਵੀ ਰਾਜ ਕੋਲੋਂ ਭਾਰਤੀਆਂ ਨੂੰ ਆਜ਼ਾਦ ਕਰਵਾਉਣਾ ਸੀ, ਇਹੋ ਇਨ੍ਹਾਂ ਅਖ਼ਬਾਰਾਂ ਦੀ ਮਨਸ਼ਾ ਤੇ ਨੀਤੀ ਸੀ।ਇਸੇ ਮਨਸ਼ਾ ਤੇ ਨੀਤੀ ਦੇ ਕਰਕੇ ਹੀ ਇਹੋ ਅਖ਼ਬਾਰਾਂ ਜ਼ਿਆਦਾ ਦੇਰ ਤੱਕ ਨਾ ਚਲ ਸਕੀਆਂ ਜਿਵੇਂ ਕਿ ਕੈਨੇਡਾ ਵਿਚ ਸੱਭ ਤੋਂ ਪਹਿਲੀ ਪੰਜਾਬੀ ਅਖ਼ਬਾਰ 'ਸਵਦੇਸ਼ੀ ਸੇਵਕ' 1909 ਵਿਚ ਬਾਬਾ ਹਰਨਾਮ ਸਿੰਘ ਕਾਹਰੀ ਸਾਹਰੀ ਅਤੇ ਪੰਡਤ ਰਾਮ ਚੰਦਰ ਬਾਜਵਾ ਨੇ ਪ੍ਰਕਾਸ਼ਤ ਕੀਤੀ ਪਰ 1911 ਦੇ ਵਿਚ ਇਹ ਅਖ਼ਬਾਰ ਬੰਦ ਹੋ ਗਈ। ਸਵਦੇਸੀ ਸੇਵਕ ਤੋਂ ਬਾਅਦ ਕਰਤਾਰ ਸਿੰਘ ਹੁੰਦਲ ਦੇ ਯਤਨ ਨਾਲ ਸਤੰਬਰ 1912 ਵਿਚ 'ਸੰਸਾਰ'ਦੀ ਸੰਪਾਦਨਾ ਕੀਤੀ, ਪਰ ਸਰਕਾਰ ਦੇ ਵਿਰੋਧ ਵਿਚ ਲਿਕਣ ਦਾ ਫ਼ਲ ਇਸ ਨੂੰ 1914 ਈ

ਦੇ ਵਿਚ ਭੁਗਤਨਾ ਪਿਆ। ਸੱਭ ਤੋਂ ਵੱਧ ਹੁੰਗਾਰਾ ਜਿਹੜੇ ਪੇਪਰ ਨੂੰ ਮਿਲਿਆ ਉਹ ਸੀ 'ਗ਼ਦਰ' ਜਿਸ ਦੇ ਨਾਂ ਤੋਂ ਹੀ ਇਸ ਦੇ ਇਰਾਦੇ ਸਪੱਸ਼ਟ ਹੋ ਜਾਂਦੇ ਹਨ। ਨਵੰਬਰ 1913 ਵਿਚ ਗ਼ਦਰ ਹਫ਼ਤਾਵਾਰ ਉਰਦੂ ਵਿਚ ਸ਼ਉਨ ਢਰਓਨਚਸਿਚੋ ਤੋਂ ਛਪੀ ਅਤੇ 9 ਦਿਸੰਬਰ 1913 ਵਿਚ ਇਹ ਪਹਿਲੀ ਵਾਰ ਪੰਜਾਬੀ ਵਿਚ ਛਪੀ। ਇਹ ਗ਼ਦਰ ਅਖ਼ਬਾਰ ਦਾ ਨਤੀਜਾ ਸੀ ਕਿ 'ਹਿੰਦੀ ਐਸੋਸੀਏਸ਼ਨ ਆਫ਼ ਪੈਸੀਫਿਕ ਕੋਸ਼ਟ' ਦਾ ਨਾਂ ਬਦਲ ਕੇ 'ਗ਼ਦਰ ਪਾਰਟੀ' ਰੱਖਿਆ ਗਿਆ। ਇਨ੍ਹਾਂ ਸਾਰੀਆਂ ਅਖ਼ਬਾਰਾਂ ਨੇ ਭਾਰਤੀਆਂ ਵਿਚ ਆਜ਼ਾਦੀ ਦੀ ਨਵੀਂ ਰੂਹ ਫੂਕ ਦਿੱਤੀ।

ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਪ੍ਰਾਪਤੀਆਂ ਇਸ ਤੋਂ ਹੀ ਸਪੱਸ਼ਟ ਹੋ ਜਾਂਦੀ ਹੈ ਕਿ ਵਰ੍ਹਾ 2014 ਵਿਚ ਭਾਰਤ ਅਤੇ ਸਮੁੰਦਰੋਂ ਪਾਰ ਇਸ ਦੇ 100 ਸਾਲ ਮਨਾਏ ਗਏ ਅਤੇ ਇਤਿਹਾਸ ਨੂੰ ਫਿਰ ਇਕ ਵਾਰੀ ਨਾਟਕਾਂ, ਸੈਮੀਨਾਰਾਂ ਅਤੇ ਕਾਨਫ਼ਰੰਸਾਂ ਰਾਹੀਂ ਦੋਹਰਾਇਆ ਗਿਆ ਅਤੇ ਉਨ੍ਹਾਂ 376 ਮੁਸਾਫ਼ਰਾਂ, ਬੱਜ ਬੱਜ ਘਾਟ ਦੇ ਸ਼ਹੀਦਾਂ ਨੂੰ ਯਾਦ ਕੀਤਾ ਗਿਆ। ਜਿਨ੍ਹਾਂ ਦੇ ਕਰਕੇ ਕੈਨੇਡਾ ਦੀ ਧਰਤੀ ਤੇ ਅੱਜ ਪੰਜਾਬੀ ਡਾਇਸਪੁਰਾ ਹੈ। ਇਹ ਉਨ੍ਹਾਂ ਬਜ਼ੁਰਗਾਂ ਦੇ ਕਰਕੇ ਹੀ ਸੰਭਵ ਹੈ ਕਿ ਕੈਨੇਡਾ ਦੇ ਵਿਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ, ਅੰਗਰੇਜ਼ੀ ਤੇ ਫਰੈਂਚ ਤੋਂ ਬਾਦ ਤੀਜੇ ਦਰਜੇ ਦਾ ਮੁਕਾਮ ਹਾਸਲ ਕਰ ਸਕੀ ਹੈ। ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਦੇ ਜਾਣ ਪਿੱਛੋਂ ਹੀ ਕੈਨੇਡਾ ਵਿਚ ਰੰਗ, ਨਸਲ, ਭੇਦਭਾਵ ਖ਼ਤਮ ਕਰਨ ਲਈ 'ਮਲਟੀ ਕਲਚਰ ਲਾਅ' ਪਾਸ ਕੀਤਾ ਗਿਆ। ਕੈਨੇਡਾ ਦੇ ਵਿਚ ਜਹਾਜ਼ ਨੂੰ ਵਾਪਸ ਭਾਰਤ ਭੇਜਣ ਵਿਚ ਐਮ·ਪੀ· ਮਿਸਟਰ ਸਟੀਵਨਜ਼ ਦਾ ਅਹਿਮ ਰੋਲ ਸੀ, ਉਨ੍ਹਾਂ ਦੇ ਇਸ਼ਾਰਿਆਂ 'ਤੇ ਹੀ ਰੀਡ ਮੁਸਾਫ਼ਰਾਂ ਨੂੰ ਪਰੇਸ਼ਾਨ ਕਰਦਾ ਸੀ, ਪਰ ਉਸੇ ਧਰਤੀ ਦੀ ਸੰਸਦ ਵਿਚ ਅੱਜ 17 ਐਮ·ਪੀ· ਪੰਜਾਬੀ ਨੇ ਅਤੇ ਜਿਸ ਮਿਲਟਰੀ (ਫ਼ੌਜ) ਦੀ ਸਹਾਇਤਾ ਨਾਲ ਕੈਨੇਡਾ ਦੇ ਇਮੀਗ੍ਰੇਸ਼ਨ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਨੂੰ ਸਮੁੰਦਰ ਵਿਚੋਂ ਵਾਪਸ ਮੋੜਿਆ ਸੀ ਅੱਜ ਉਸੇ ਦੇਸ਼ ਦਾ ਰੱਖਿਆ ਮੰਤਰੀ ਸ· ਹਰਸਜਨ ਸਿੰਘ ਹੈ। ਇਹ ਸਾਰਾ ਕੁਝ ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਦੀਆਂ ਪ੍ਰਾਪਤੀਆਂ ਹਨ, ਪਰ ਅਜੇ ਵੀ ਇਕ ਖੁਆਇਸ਼ ਪੰਜਾਬੀ ਭਾਈਚਾਰੇ ਵਿਚ ਹੈ ਕਿ ਆਉਣ ਵਾਲੇ ਸਮੇਂ ਵਿਚ ਕੈਨੇਡਾ ਦਾ ਪ੍ਰਧਾਨ ਮੰਤਰੀ ਪੰਜਾਬੀ ਹੋਵੇ।

ਕਾਮਾਗਾਟਾਮਾਰੂ ਨਾਟਕ ਨੂੰ ਸਭ ਤੋਂ ਪਹਿਲਾਂ 'ਸ਼ਾਨ ਪਾਲਕ' ਨੇ The Kamagatamaru Incident ਸਿਰਲੇਖ ਰਾਹੀਂ 1976 ਨੂੰ ਪੇਸ਼ ਕੀਤਾ। ਪੰਜਾਬੀ ਵਿਚ ਅਜਮੇਰ ਰੋਡੇ ਨੇ ਪਹਿਲੀ ਵਾਰ ਨਾਟਕ 1984 ਵਿਚ ਲਿਖਿਆ ਅਤੇ 1985 ਵਿਚ ਹਰਚਰਨ ਸਿੰਘ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਲਿਖਿਆ। ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ 75ਵੀਂ ਸ਼ਤਾਬਦੀ ਦੇ ਮੌਕੇ ਤੇ ਸਾਧੂ ਬੀਨਿੰਗ ਅਤੇ ਸੁਖਵੰਤ ਹੁੰਦਲ ਨੇ ਨਾਟਕ 'ਸਮੁੰਦਰੀ ਸ਼ੇਰ ਨਾਲ ਟੱਕਰ' ਲਿਖਿਆ। 2004 ਵਿਚ ਅਲੀ ਕਾਜ਼ਮੀ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਤੇ ਡਾਕੋਮੈਂਟਰੀ ਛੋਨਟਨ੍ਹਿਸ ਝੋਰਨਏ ਸਿਰਲੇਖ ਹੇਠ ਰਿਲੀਜ਼ ਕੀਤੀ, ਜਿਸ ਨੂੰ ਬਣਾਉਣ ਲਈ 8 ਸਾਲ ਦਾ ਕੀਮਤੀ ਸਮਾਂ ਲੱਗਿਆ ਅਤੇ ਇਸ ਡਾਕੋਮੈਂਟਰੀ ਨੂੰ 10 ਤੋਂ ਵੀ ਵੱਧ ਪੁਰਸਕਾਰ ਮਿਲੇ ਜਿਨ੍ਹਾਂ ਵਿਚੋਂ Doxa Vacouver 2005, ਅਤੇ 'ਗੋਲਡਨ ਕੋਨਚ' ਮੁੰਬਏ ਅੰਤਰਰਾਸ਼ਟੀ ਫਿਲਮ ਫੈਸਟੀਵਲ 2006, ਜ਼ਿਕਰ ਯੋਗ ਹਨ। 2012 ਈ· ਵਿਚ ਅਲੀ ਕਾਜ਼ਮੀ ਨੇ Undesirable: White Canada and the Kamagatamaru ਕਿਤਾਬ ਛਾਪੀ ਅਤੇ 2012 ਦੇ ਵਿਚ ਹੀ Simon Fraber University Library ਨੇ Website 'Kamagatamaru: Continuing the Journey' ਜਾਰੀ ਕੀਤੀ।

ਭਾਰਤ ਅਤੇ ਭਾਰਤ ਤੋਂ ਬਾਹਰੋਂ ਕਈ ਯੂਨੀਵਰਸਿਟੀਆਂ ਸੰਸਥਾਵਾਂ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਨੂੰ ਨਾਟਕਾਂ, ਸੈਮੀਨਾਰਾਂ ਅਤੇ ਕਾਨਫ਼ਰੰਸਾਂ ਰਾਹੀਂ ਯਾਦ ਕੀਤਾ, ਜਿਸ ਵਿਚ 2014 ਦੇ ਦਵਿੰਦਰ ਦਮਨ ਨੇ ਐਡਮਿੰਟਨ ਵਿਖੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਬਾਰੇ ਨਾਟਕ 'ਸਮੁੰਦਰਾਂ ਉੱਤੇ ਅੱਗ ਤੁਰਦੀ' ਵੈਨਕੂਵਰ ਦੇ ਕਲਾਕਾਰਾਂ ਨਾਲ ਖੇਡਿਆ। ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ ਨੇ ਅੱਠਵੀਂ ਸਰਭ ਭਾਰਤੀ ਪੰਜਾਬੀ ਕਾਨਫ਼ਰੰਸ 1 ਮਈ 2015 ਦਿਨ ਸ਼ੁੱਕਰਵਾਰ ਦੁਪਹਿਰ

ਨੂੰ ਵਿਸ਼ੇਸ਼ ਪੇਸ਼ਕਾਰੀ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਵਿਖਾਈ ਗਈ। ਜਿਸ ਦੀ ਨਿਰਦੇਸ਼ਨ ਡਾ· ਜਸਪਾਲ ਕੌਰ ਨੀ ਕੀਤੀ ਸੀ। 22 ਸਤੰਬਰ 2015 ਨੂੰ ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਨੇ ਨੈਸ਼ਨਲ ਸੈਮੀਨਾਰ ਕਰਵਾਇਆ, ਜਿਸ ਦਾ ਸਿਰਲੇਖ ਸੀ 'Kamagatamaru and Punjabi Diaspura Emerging Trends and Dimensions' ਇਸ ਸੈਮੀਨਾਰ ਵਿਚ ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਦੇ ਉਪਕੁਲਪਤੀ ਡਾ· ਜਸਪਾਲ ਸਿੰਘ, ਜੇ·ਐਨ·ਡੀ·ਯੂ· ਦੇ ਸਾਬਕਾ ਉਪਕੁਲਪਤੀ ਡਾ· ਐਸ·ਪੀ· ਸਿੰਘ ਅਤੇ ਸ· ਹਰਚੰਦ ਸਿੰਘ ਬੇਦੀ ਆਦਿ ਸ਼ਾਮਲ ਸਨ। ਇਸੇ ਤਰ੍ਹਾਂ Mount Royal University Calgary, Alberta ਨੇ 242014 ਨੂੰ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਯਾਦ ਵਿਚ 100 ਸਾਲ ਮਨਾਏ ਗਏ ਜਿਸ ਵਿਚ Hugh Johnston, Prof. Emeritus, Ali Kazmi ਆਦਿ ਸ਼ਾਮਲ ਸਨ।ਭਾਰਤ ਸਰਕਾਰ ਨੇ 99ਵੇਂ ਵਰੇ ਤੋਂ ਬਾਅਦ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੇ ਮੁਸਾਫ਼ਰਾਂ ਨੂੰ ਯਾਦ ਕੀਤਾ ਜਿਹੜੇ 2591914 ਨੂੰ ਬੈਗਾਲਾਂ ਦੇ ਰੇਲਵੇ ਸਟੇਸ਼ਨ 'ਤੇ ਪਹੁੰਚੇ ਸਨ ਜਿਸ ਨੂੰ ਇਤਿਹਾਸ ਬਜ ਬਜ ਘਾਟ ਦੇ ਸਾਕੇ ਕਰ ਕੇ ਜਾਣਦਾ ਹੈ। ਉਸੇ ਰੇਲਵੇ ਸਟੇਸ਼ਨ ਨੂੰ ਭਾਰਤ ਸਰਕਾਰ ਨੇ ੯ ਅਕਤੂਬਰ 2013 ਨੂੰ ਬੈਂਗਾਲਾ ਰੇਲਵੇ ਸਟੇਸ਼ਨ ਹਟਾ ਕੇ 'ਕਾਮਾਗਾਟਾਮਾਰੂ ਬਜ ਬਜ ਘਾਟ ਸਟੇਸ਼ਨ' ਰੱਖਿਆ।

ਕੈਨੇਡਾ ਸਰਕਾਰ ਵਲੋਂ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਯਾਦ ਵਿਚ ਪੋਸਟਲ ਸਟੈਂਪ 11 ਅਪ੍ਰੈਲ 2014 ਨੂੰ ਜਾਰੀ ਕੀਤੀ ਅਤੇ ਇਸ ਦੀਆਂ 250,000 ਪੋਸਟਲ ਸਟੈਂਪ ਬਣਾਈਆਂ ਗਈਆਂ। ਜਿਹੜੀਆਂ ਸਿਰਫ਼ ਤੇ ਸਿਰਫ਼ ਅੰਤਰਰਾਸ਼ਟਰੀ ਪੋਸਟਲ ਲਈ ਇਸਤੇਮਾਲ ਕੀਤੀਆਂ ਜਾ ਸਕਦੀਆਂ ਹਨ ਨਾ ਕਿ ਕੈਨੇਡਾ ਦੇ ਰਾਸ਼ਟਰ ਲਈ। ਭਾਰਤ ਸਰਕਾਰ ਵਲੋਂ 29 ਸਤੰਬਰ 2014 ਨੂੰ ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਦੇ ਨਾਇਕ (ਬਾਬਾ ਗੁਰਦਿੱਤ ਸਿੰਘ) ਦੀਆਂ ਪੋਤਰੀਆਂ ਹਰਭਜਨ ਕੌਰ, ਸਤਵੰਤ ਕੌਰ ਅਤੇ ਬਲਬੀਰ ਕੌਰ ਨੂੰ ਸਨਮਾਨਿਤ ਕੀਤਾ। ਇਸ ਮੌਕੇ ਤੇ ਭਾਰਤੀ ਸਭਿਆਚਾਰ ਦੇ ਮੰਤਰੀ ਸ੍ਰੀ ਪਟ ਨਾਇਕ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਯਾਦ ਵਿਚ 5 ਰੁਪਏ ਅਤੇ 100 ਰੁਪਏ ਦੇ ਸਿੱਕੇ ਜਾਰੀ ਕੀਤੇ । ਇਸ ਮੌਕੇ 'ਤੇ ਸ੍ਰੀਪਟ ਨਾਇਕ ਨੇ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਤਰਾਸਦੀ 'ਤੇ ਚਾਨਣਾ ਪਾਇਆ। ਕੈਨੇਡਾ ਦੇਸ਼ ਵਿਚ ਕਈ ਮਿਊਜ਼ੀਅਮਾਂ ਕਈ ਲਾਇਬ੍ਰੇਰੀਆਂ ਵਿਚ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀਆਂ ਪ੍ਰਦਰਸ਼ਨੀਆਂ ਲੱਗਦੀਆਂ ਹਨ। ਇਨ੍ਹਾਂ ਪ੍ਰਦਰਸ਼ਨੀਆਂ ਵਿਚ ਕਾਮਾਗਾਟਾਮਾਰੂ ਜਹਾਜ਼ ਦਾ ਇਤਿਹਾਸ ਸੰਭਾਲਿਆ ਹੋਇਆ ਹੈ। ਇਨ੍ਹਾਂ ਵਿਚੋਂ ਵੈਨਕੂਵਰ ਪਬਲਿਕ ਲਾਇਬ੍ਰੇਰੀ ਰੋਇਲ Ontario ਮਿਊਜ਼ੀਅਮ, ਸਿੱਖ ਹੈਰੀਟੇਜ ਮਿਊਜ਼ੀਅਮ ਅਤੇ ਮਿਊਜ਼ੀਅਮ ਆਫ਼ ਵੈਨਕੂਵਰ ਆਦਿ ਜ਼ਿਕਰ ਯੋਗ ਹਨ। ਇਨ੍ਹਾਂ ਮਿਊਜ਼ੀਅਮ ਵਿਚ ਸਾਲ ਦੀਆਂ ਕਈ ਪ੍ਰਦਰਸ਼ਨੀਆਂ ਲਾਈਆਂ ਜਾਂਦੀਆਂ ਹਨ ਜਿਸ ਨੂੰ ਦੇਖ ਕੇ ਪੰਜਾਬੀ ਨੌਜਵਾਨ ਆਪਣੇ ਇਤਿਹਾਸ ਤੋਂ ਵਾਕਫ਼ ਹੁੰਦੇ ਹਨ।

ਦਿੱਲੀ ਯੂਨੀਵਰਸਿਟੀ ਨੇ 'ਕਾਮਾਗਾਟਾਮਾਰੂ' ਨਾਟਕ ਅਜਮੇਰ ਰੋਡੇ ਦਾ ਬੀ·ਏ· ਦੇ ਪ੍ਰੋਗਰਾਮ ਵਿਚ ਵਰ੍ਹੇ 201516 ਵਿਚ ਲਗਾਇਆ ਹੈ। ਪੰਜਾਬੀ ਯੂਨੀਵਰਸਿਟੀ ਪਟਿਆਲਾ ਨੇ 'ਕਾਮਾਗਾਟਾਮਾਰੂ 1914 ਇਕ ਜ਼ੁਲਮੀ ਪ੍ਰਵਾਜ਼' ਜੋ 19 ਮਾਰਚ 2015, ਸ਼ਾਮ 6·30 ਵਜੇ ਨਇਉ ਟਾਊਨ ਹਾਲ, ਨਜ਼ਦੀਕ ਗਾਫ਼ ਗਰੋਵਡ ਦਾਨਾਬਾਦ ਵਿਚ ਪੇਸ਼ ਕੀਤਾ ਹੈ।ਜੂੰਮ ਯਨੀਵਰਸਿਟੀ ਨੇ 'ਕਾਮਾਗਾਟਾਮਾਰੂ' ਨਾਟਕ ਅਜਮੇਰ ਰੋਡੇ ਦਾ ਬੀ·ਏ· ਦੇ ਪ੍ਰੋਗਰਾਮ ਵਿਚ ਲਗਾਇਆ ਹੈ।ਪਰ ਅਜੇ ਵੀ ਬਹੋਤ ਕੁਜ ਕਰਨ ਦੀ ਲੋੜ ਹੈ ਤਾਂ ਕਿ ਕਾਮਾਗਾਟਾਮਾਰੂ ਦੀ ਤਰਾਸਦੀ ਨੂੰ ਲੋਕ ਜਾਣ ਸਕਣ।

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GUIDELINES

In the present scenario it has become pertinent for institutions of higher learning to provide a platform where all the disciplines are articulated in a manner where they have their own clearly demarcated space and yet have room for dialogue, collaboration, contestation, confirmation or negation across disciplines and this necessitates the multidisciplinary approach of the journal *Researcher*.

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RESEARCHER

A Multidisciplinary Journal

Vol. XIV No.1, 2018
ISSN 2278-9022

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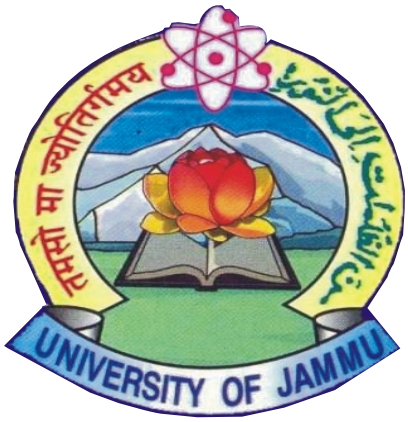
Published by
Publication Cell on behalf of the Registrar, University of Jammu, Jammu
Address
University of Jammu
Baba Saheb Ambedkar Road, Jammu-180006 (J&K)
E-mail : publication.ju@gmail.com

Editorial/Assistance : Sh. Parshotam Lal & Sh. Gulshan Pal Singh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