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Productivity and Role of ICT: A Case of Indian Manufacturing Sector

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India's remarkable performance in ICT sector may be inspirational for other Indian industries and more so for other countries in the south, the most important - question is how India has fared in terms of harnessing this technology for enhancing manufacturing productivity. This paper attempts to address this issue by analyzing organized and unorganized sector data set at the firm level and examining the impact of ICT investment and its use on productivity improvement at industry level. The analysis reflects that ICT investment and its use have a positive and significant impact on the output growth of both organized and unorganized manufacturing firms. In this context, where the policy makers are concerned with low levels of growth in manufacturing output, the institutional interventions towards promoting ICT investment and diffusion in the sector would give rich dividends.

Keywords: *ICT, Total factor productivity, Manufacturing sector, Unorganised manufacturing*

I. INTRODUCTION

Manufacturing sector has not played a pivotal role in India's growth as compared to most of the industrialized as well as some of the developing countries. This sector's contribution to GDP has increased from 9 per cent in 1950-51 to 15 per cent in 1979-80, peaked at 16.6 per cent in 1996-97, and continued to hover around 15 per cent during the last two decades. According to the Fisher-Clark-Kuznets (F-C-K) hypothesis, India's manufacturing share in GDP is out of line with international experience from cross- country evidences (ILO, 2015). It is much lower than the comparable Asian countries like China (39 per cent), Thailand (36 per cent), Malaysia (31 per cent) and Indonesia (25 per cent). For these countries the manufacturing sector has provided a great impetus to their GDP growth, which in case of India has been provided by the services sector.

The services sector played a key role in India's growth by contributing 57 per cent to GDP and 34 per cent to employment. Over the years, information and communication technology (ICT) sector has emerged as a 'growth engine' of the service sector. It is contributing 10 per cent to GDP, 23 per cent to total exports earnings, more 7 per cent to

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total foreign direct investment and providing employment to 4 million people directly and nearly 10 million people indirect (Mehta, 2018). This is the fastest growing sector of the economy with an average annual growth rate of more than 20 per cent during the last one and half decade. India has also emerged as one of the key destination for global sourcing of information technology and information technology enabled services during the same period, which accounted more than 55 per cent share in the global sourcing market during 2017-18. However, the services sector alone cannot provide the much needed sustained growth in output or in employment.

The manufacturing sector has immense potential to generate large scale employment for both unskilled and semi-skilled people, which contributes only 12 per cent to the total employment. For example, in South Korea, share of employment in manufacturing sector increased from 1.5 per cent in 1960 to 27 per cent in 1990 due to high manufacturing growth during the same period (Kapoor, 2018). India's manufacturing sector needs to grow at a much faster rate than the national GDP, and similarly, national manufacturing policy, 2012 also seeks to raise the share in GDP to 25 per cent by 2022 and create 220 million jobs by 2025.

It is argued that ICT services facilitate growth of manufacturing sector in terms of the growing demand for computer hardware, telecom equipment, electronic components and semi-conductor devices. This makes it a unique example of services sector leading to the growth of manufacturing sector (Mani, 2012; Mehta, 2018). It also has a strategic significance in India due to its export intensive nature, externalities and spill over characteristics. India's manufacturing sector's low contribution to GDP has been correlated with low productivity levels of firms compared to the countries like China, Malaysia, Thailand, Indonesia and Vietnam. It is argued that use of ICT can lead to increase in productivity and output of industries as experienced by many industrialized countries. Similarly, the ICT sector is expected to play a major role in revitalizing the Indian manufacturing sector and to bring it out of the low productivity-low value conundrum. However, ICT adoption in Indian manufacturing sector has significantly lagged behind its global peers and gained momentum only recently.

The government of India is already pushing the manufacturing sector and use of ICT through multiple initiatives such as Make in India, Digital India with high investments in the domestic manufacturing**.** On this issue, the debate is continuing among policy makers and others. However, there is no systematic study available on the topic to understand the role of ICT sector in enhancing manufacturing productivity particularly in the case of developing countries such as India. In this backdrop, the motivation of paper lies in the quest to understand the contribution and impact of use and investment in ICT in enhancing the productivity of manufacturing firms. This paper analysed both organized and unorganized manufacturing enterprises in order to understand the role of ICT in enhancing the productivity level of manufacturing sector.

II. REVIEW OF LITERATURE

The review covers studies particularly related with contribution of ICT and productivity of manufacturing firms and sector. The available literature shows that intense debate is in progress – both in the developed and developing worlds - on the contribution of ICT towards productivity and growth on the one hand and human welfare on the other. This debate started in the 1980s with a focus on ICT use and productivity enhancement as expressed by the famous economist Robert Solow (1987): "You can see the computer age everywhere but in the productivity statistics". Post nineties, the literature revealed that ICT emerged globally as a producer or supplier to meet the demands of growing world market such as goods and services, and, as a user of ICT goods and services, to improve the productivity and competitiveness of the key sectors of the economy (Wong, 1998; Moradi & Kebryaee, 2005; Roller & Waverman, 2001; Strassman, 1985; Baily, 1986; Roach, 1984, 1988).

Further, the impact of ICT on a firm's performance has been subject of many studies during the last two decades (Brynjolfsson et al., 2000, 2002; Oliner et al., 2000; Jorgenson, 2001, 2005; Baldwin and Sabourin, 2002; Oliner et al., 2000; Hempell , 2002; Timmer, et al., 2003, Leeuwen et al., 2003; Arvanitis, 2004; Gretton et al., 2004 ; Maliranta and Rouvinen, 2004; Bloom, Sadun and van Reenen, 2012). The earlier studies reflected mixed results; starting from the mid-nineties, studies found positive and significant returns to ICT investments. The scholars performed careful analysis of growing scale of ICT investment by using larger datasets and more sophisticated methodologies. Consequently, more studies have shown positive and significant impact on productivity with profits increasing substantially over time through ICT investments and its use at the firm and country level. However, most of these studies are based on firm and country level analysis in developed countries.

Few attempts were made to examine ICT sector's contribution in productivity enhancement of Indian manufacturing firms such as use of firm level data. Joseph and Abraham (2007) found that ICT investment intensity positively affects labour productivity. According to Gangopadhyay and Singh (2008), firms using ICT were more profitable and more productive than those who did not. Study conducted by Bloom et al. (2012), examined a controlled experiment with a sample of Indian textile firms, and showed that the productivity of treatment firms' (using ICT) improved by 17 per cent over the control group. Sharma and Singh (2012), using ICT investment data, observed that higher ICT investment is associated with higher level of output or value added. Navyashree and Bhat (2016) explains that ICT investment has positive growth effect on small and medium firms in food processing industry in India. Some other cross-cutting studies also found a positive and significant impact of ICT investment and infrastructure on output, total factor productivity and technical

efficiency (Roller & Waverman, 2005; Waverman et al. 2005; Joseph and Abraham, 2007; Kathuria et al., 2009; Sharma & Sehgal, 2010; Mitra et al, 2011). The ICT acts as an input and contributes in the increase of output, efficiency and productivity growth of the manufacturing sector (Banga & Goldar, 2007; Sharma & Sehgal, 2010; Yousefi, 2011; Gupta and Kumar, 2018).

The available literature shows that there have been differences in productivity enhancement by ICT use and investment in many countries. However, most of these studies just highlight the overall impact of ICT on productivity and limit themselves to organized manufacturing firms only. Hence, there is need to do a detailed study covering firms from both organized and unorganized sector to comprehensively understand the role played by ICT in productivity enhancement in developing countries like India, where unorganized sector continues to dominate.

This paper is organized as follows. Section I introduces the topic and context, Section II highlights the review of relevant literature Section III explains methodology and data sources, Section IV brings out the empirical findings and discussions, and finally the last section V concludes the paper with some key suggestions.

III. METHODOLOGY AND DATA

Methodology

The framework of the study focussed on three main points, i.e. the estimation of production elasticity with respect to ICT investment and measurement of the impact of ICT on labour intensity and labour productivity for organized sector. In addition, Malmquist Productivity Index (MPI) was used to measure the productivity of unorganized and organized enterprises.

(i) Output elasticity of ICT investment

In economic literature, productivity is measured by the production function, which is commonly referred as total factor productivity. The Cobb-Douglas production function is the most commonly form represented as $Y=AK^{\alpha}L^{\beta}$, where Y represents total output (Y) as a function of capital input (K), labour input (L). To estimate the impact of ICT on the firm's productivity, the Cobb-Douglas functional form was modified as given below,

$$Y_i = A*ICT_i^{\alpha}*NICT_i^{\beta}*L_i^{\Upsilon} \quad (1)$$

where for i^{th} firm output is gross value added (Υ) is produced from input consisting of ICT capital (ICT) and non-ICT capital (NICT) and labour (L). To estimate the parameters, α, β, and Υ, the nonlinear Cobb Douglas function must be linearized. This is possible, by taking the natural logarithms of the above equation, one obtained the following:

$$\log Y_i = \log A + \alpha \log ICT_i + \beta \log NICT_i + \Upsilon \log L_i \quad (2)$$

In other worlds, α is the output elasticity of ICT investment. If the value of α is greater than one, it means one per cent increase in ICT investment would lead to more than one per cent increase in output. In such a condition, increasing investment in the enterprises or firms would be very important for the growth of output or productivity of the firms. The importance of manufacturing sector growth as a whole or enterprises' productivity is explained by the level of ICT investment in firms. On the contrary, if one per cent increase in ICT investment generates less than one per cent increase in output, then comparison of α with β and Υ would ameliorate the analysis.

(ii) Impact of ICT investment on Labour Intensity and Labour Productivity

More ICT investment can increase the performance of enterprises by saving some indirect cost in labour and by higher labour productivity. It can also affect firm's direct inputs costs of information and inputs allocation. It can have both substitution and complementary effects. It is possible that increase in ICT investments can increase employment at firms' level and it could also lead to job reduction due to substitution between ICT investment and labour. It has some impact on labour productivity in both the conditions.

To assess the impact of ICT investment on labour intensity and labour productivity, Cobb-Douglas production function form of the equation (1) was modified as following:

$$\log(L_i/Y_i) = \log A + \alpha \log(K_i/Y_i) + \beta \log(ICT_i/K_i) \quad (3)$$

Where ICT/K is share of ICT investment in total investment and K/Y is investment or capital-output ratio as independent variables, and labour- output or gross value added ratio (L/Y) as dependent variable. This equation provides the basic relationship between labour productivity, labour intensity and ICT-capital intensity. If β is less than 0, ICT capital has a positive impact on labour productivity as labour intensity decreases. If ICT capital is more productive than other capital, it would lead to reduced labour intensity, *ceteris paribus.*

(iii) Firm Level Productivity (Malmquist Productivity Index)

There are different approaches for measuring the productivity, that is, parametric and nonparametric methods. Parametric methods make a set of assumptions regarding the functional form and the distribution that it follows. No such assumptions are made in the case of non-parametric models. Starting with the growth accounting approach, it examines how much of an observed rate of change of an industry's output can be explained by the rate of change of combined inputs.

It is based on various assumptions, such as production function that exhibits constant returns to scale, producers behave efficiently as they attempt to maximize profits, and markets are perfectly competitive. Production function and DEA approaches do not have assumptions of constant returns to scale and perfect competition. But, in case of former, that is, production functions approach, instead, assumptions about functional form and distribution are imposed while the latter is free from these assumptions. Thus, in addition to production function, Malmquist Productivity Index (MPI) is also used for measuring the productivity.

The Malmquist Index was first introduced in two papers by Caves, Chirstensen and Diewert (1982). Fare et al. (1994) decomposed the Malmquist total factor productivity (change into various components; including TC and efficiency change (Coelli & Rao, 2005). The MPI can be calculated using the distance functions. Distance function allows for representation of multiple input and multiple output technology without assuming any behavioural assumptions such as cost minimization or profit maximization. Distance functions are input- and output-oriented in nature. Malmquist productivity index (MPI) can be written as:

$$M_o(y_t, x_t, y_{t+1}, x_{t+1}) = \frac{d_0^{t+1}(y_{t+1}, x_{t+1})}{d_0^{t}(y_t, x_t)} * \left[\frac{d_0^{t}(y_{t+1}, x_{t+1})}{d_0^{t+1}(y_{t+1}, x_{t+1})} * \frac{d_0^{t}(y_t, x_t)}{d_0^{t+1}(y_t, x_t)} \right]^{1/2}$$

Where d is the distance term, x and y are input and output vectors, and t is time period.

The technical efficiency change (TEC) can be expressed as:

$$\frac{d_0^{t+1}(y_{t+1}, x_{t+1})}{d_0^{t}(y_t, x_t)}$$

It measures change in overall technical efficiency (TE) from period t to t+1 that is, moving closer to the frontier or catching up effect. TEC is further decomposed into pure TEC and scale efficiency (SE) change. Further, the technological change (TC) can be expressed as:

$$\left[\frac{d_0^{t}(y_{t+1}, x_{t+1})}{d_0^{t+1}(y_{t+1}, x_{t+1})} * \frac{d_0^{t}(y_t, x_t)}{d_0^{t+1}(y_t, x_t)} \right]^{1/2}$$

It represents change in technology, that is, a shift in the frontier from period t to period t+1. It is the geometric mean of two terms, one comparing period t technology to t+1 technology from the perspective of period t+1 data, and the other comparing the two technologies from the perspective of period t data. Value greater than one indicates positive total factor productivity growth (TFPG) in period t+1 and value less

than one shows that productivity has deteriorated over time. A value one indicates that no change has occurred in the level of productivity.

Data Sources and Definition

In this paper, data for organized manufacturing sector was used from Annual Survey of Industries (ASI). The survey covers manufacturing units at all India level annually, at 5 digit level. For unorganized sector, unorganized manufacturing sector data from national sample survey rounds was used. The firms in the unorganized sector are classified as Own Account Manufacturing Enterprises (OAMEs) and establishments. The period of study was 2001-02 to 2015-16, while the ICT investment and usage analysis was been done only for the recent years, i.e. 2010-11 and 2015-16 since ICT related data for unorganized manufacturing sector was not available for earlier period.

The original data on gross value added, gross capital formation or investment is available in current values and deflated using the wholesale price indices collected from official series on wholesale price indices prepared by the Office of the Economic Adviser (OEA), Ministry of Commerce & Industry, and Government of India.

The data set was a panel of 24 industries based on ISIC (International Standard Industrial Classification) codes. The introduction of a panel data dimension allows using both cross-sectional and time series information to test the relationship between ICT investment and productivity. The ICT investment refers to the annual investment in IT hardware for office machines, data processing equipment, data communications equipment, and of IT software and IT services, plus telecommunications equipment and services.

Broad Classification of Industries

The industries are classified as high technology, medium technology and low technology, which are identified as per the OECD (2005) given in UNIDO (2015) definition using NIC - 2008 classification at 2-digit level (Annex 8). Low technology industries include manufacturing of food products and beverages, manufacturing of tobacco products, textiles, manufacturing of wearing apparel, dressing and dyeing of fur, tanning and dressing of leather; luggage, handbags, saddler, harness and footwear, wood and wood products and cork except furniture, paper and paper products, publishing printing an reproduction of recorded media and furniture.

Medium technology industries include manufacturing of coke, refined petroleum products, rubber and plastic products, other non-metallic mineral products, basic metals, and fabricated metal products except machinery and equipment. High technology industries include manufacturing of chemicals and chemical products, machinery and equipment, electrical machinery and apparatus, radio, television and

communication equipment and apparatus, medical, precision and optical instruments, motor vehicles, trailers and semi-trailers and manufacturing of other transport equipment.

IV. Discussion

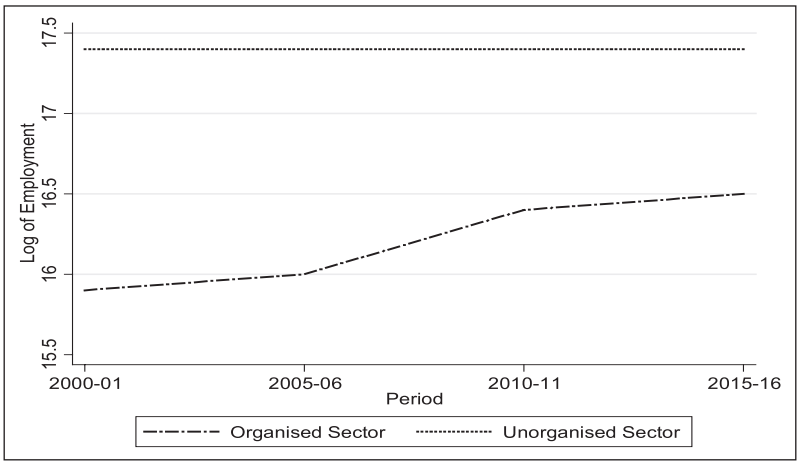
The Indian manufacturing sector has dualistic characteristics, which refers to the prevalence of formal/organized sector which coexists with a large 'unorganized sector'. The formal sector is statistically defined by the Factories Act which covers all factories employing 10 or more workers using power, or 20 or more workers without using power. The unorganized sector is divided into two sub categories namely, own account manufacturing enterprises (OAE) - household enterprises making use only of single family labour, and establishments- employing at least one wage or hired worker. The unorganized manufacturing sector, in particular the households sector, accounts for a disproportionally large share of enterprises and employment but a very small share of value added as illustrated in the subsequent sections.

Enterprises and Employment

India's manufacturing sector includes both organized and unorganized enterprises. In 2015-16, the unorganized enterprises dominated at 98.8 per-cent with organized enterprises sharing 1.2 per-cent only. The number in firms in both organized and unorganized manufacturing increased during the last one and half decade, where the firms in organized sector doubled from 0.13 million in 2000-01 to 0.23 million in 2015-16, while enterprises in the unorganized sector gone up from 17.0 million to 19.7 million during the same period (Annex. 1).

The employment in manufacturing sector has gone up from 44.8 million in 2000-01 to 50.3 million in 2015-16 with 1 per-cent annual growth rate (Annex. 2). It increased from 7.6 million to 14.3 million in organized manufacturing, while employment declined marginally from 37.1 million to 36.0 million during the last 15 years in the unorganized manufacturing (Fig. 1). The employment intensity as indicated by employee per enterprise revealed the real difference between organized (61 employees per enterprise) and unorganized manufacturing (2 employees per enterprises) enterprises employment generation capacity. In the unorganized sector, 85.5 per cent of the total enterprises were Own Account Enterprises (OAE) which run without any hired worker employed on a fairly regular basis, while the remaining 14.5 per cent of enterprises fall in the category of establishments which employed at least one hired worker fairly on regular basis. This confirms the poor employment generation by unorganized manufacturing enterprises when compared with the organized manufacturing.

Figure 1
Employment in Manufacturing: 2000-01 to 2015-16



Source: ASI and NSSO

Usage and Investment in ICT by Enterprises

To understand the presence of ICT, the enterprises in the unorganized sector was divided into ICT using and non-ICT using enterprises, whereas in absence of direct indicator of ICT usages, investment or capital formation in ICT was taken as a proxy for the division of ICT and non-ICT firms in organized sector. The enterprises using ICT in unorganized manufacturing increased from 4.5 million enterprises in 2010-11 to 5.5 million in 2015-16 with higher share among larger enterprises or establishments (81.2 per cent). Over the years, the share of smaller enterprises (OAEs) adopting use of ICT compared to establishments indicating a positive attitude of the smaller enterprises adopting use of ICT has increased (15.0 per cent in 2010-11 to 18.8 per cent in 2015-16) towards recognizing the benefits of ICT usage and gradually adopting it. In the organized sector, the ICT investment per enterprise almost doubled in real terms (at 2011-12 prices) from Rs 1797 million per enterprise to Rs 3301 million per enterprise during the same period.

In addition, the enterprises based on technology shows that low tech based establishments(53.1 per cent) comprise of a higher share of ICT usage compared to the other two categories i.e. medium (16.5 per cent) and high technology industries(30.4 per cent). On the other hand, in the organized sector, the ICT investment level is substantially higher in high tech (Rs 3.3 billion) firms compared to medium (Rs 2.7 billion) and low tech (Rs 2.3 billion) firms. The analysis shows that the usage of ICT and investment in ICT in both unorganised and organised enterprises has been rising, with larger enterprises in the unorganised manufacturing adopting ICT usage more,

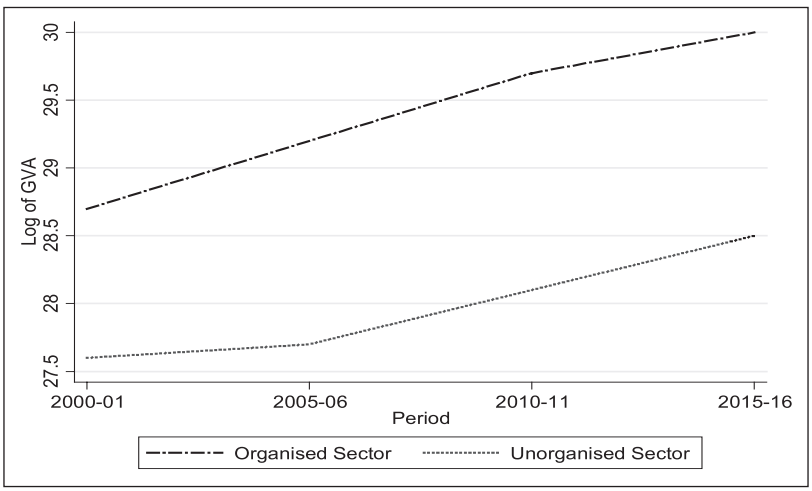
while high tech firms in the organized manufacturing investing more in ICT compared to the others.

Gross Value Added and Labour Productivity

The gross value added to manufacturing sector in real terms has increased more than 3 times during the last one and half decade (Rs 3.7 thousand billion in 2000-01 to 13.1 thousand billion in 2015-16 (Annex. 4 & Fig. 2). It has increased substantially more in the organized manufacturing (Rs. 2.8 thousand billion to 10.8 billion) than in the unorganized manufacturing sector (Rs.0.9 billion to 2.3 billion). The share of organized manufacturing GVA in total was 82.6 per cent, while unorganized manufacturing contributed only 17.4 per cent even after having 71.6 per cent share in the total manufacturing employment in 2015-16.

Figure 2

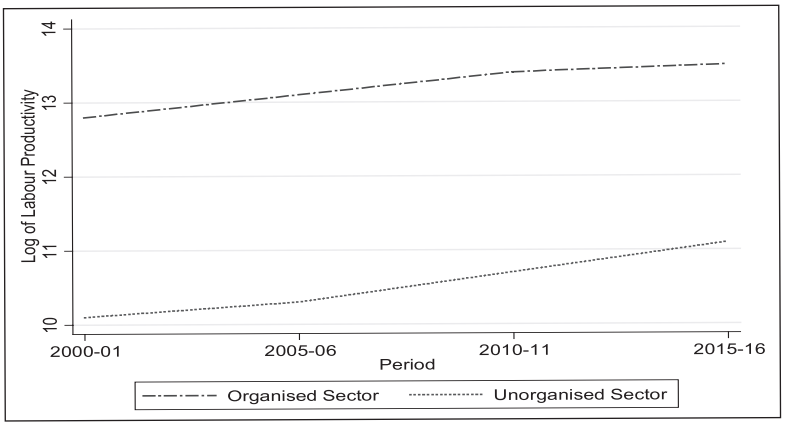
Real Gross Value Added in Manufacturing: 2000-01 to 2015-16



Source: ASI and NSSO

This is explained by the differences in productivity level (GVA per employee) between organized and unorganized manufacturing enterprises (Fig. 3). The labour productivity of organized sector (Rs. 754.9 thousand) was almost 12 times higher than the unorganized sector (Rs. 63.1 thousand) in 2015-16 (Annex 4). The labour productivity has been rising in both organized and unorganized manufacturing enterprises with relatively at a higher growth rate annually for the latter (6.4 per cent) compared to the former (5 per cent) during the last 15 years. This persistence of dualism over the years in both organized and unorganized sector has had significant welfare implications as the productivity in the unorganized sector has been significantly lower than the organized sector.

Figure 3
Labour Productivity in Manufacturing Sector: 2000-01 to 2015-16



Source: ASI and NSSO

Capital Investment in ICT and Labour Productivity for ICT using Enterprises

In the organized sector, the capital intensity (refer to GVA per unit) of ICT investment (Rs. 317) was 100 times more than the non-ICT investment (Rs. 3.2) in 2015-16. It reveals the relative advantage of ICT investment (Annex. 7). The capital intensity in ICT has increased over the years from Rs. 298 in 2010-11 to Rs. 317 in 2015-16. It was relatively higher in medium tech (Rs. 397) and high tech (Rs. 248) firms compared to low tech (Rs. 227) organized manufacturing firms. This indicates that ICT investment in the organized manufacturing by the firms is resulting in higher returns.

In the unorganized sector, the labour productivity for ICT-using enterprises (Rs. 183.3 thousand) was much higher than non-ICT enterprises (Rs. 53.5 thousand) in all the categories. This indicates that probably ICT usage by the enterprise is leading to higher labour productivity in such enterprises (Gupta and Kumar, 2018) (Annex. 5). It has increased over the years from Rs. 112.7 thousand in 2010-11 to Rs. 183.3 thousand in 2015-16 indicating a gradual adoption of ICT infrastructure, which may have resulted in rise in labour productivity and more so in the case of smaller unorganised enterprises. In particular, the labour productivity among high tech unorganized enterprises (Rs. 257.2 thousand) was significantly more than low tech (Rs. 141.6 thousand) and medium tech (Rs. 192.5 thousand) enterprises in 2015-16.

Further if we compare the labour productivity by the type of enterprises, there was almost 4 to 5 times difference between organised and unorganised medium-tech and high-tech industries (Annex. 6). So, increase in employment opportunities in medium and high-tech organised manufacturing industries with higher investment in ICT would be more gainful for labour as compared to low-tech and unorganised enterprises.

Output Elasticity of ICT investment in Organised Manufacturing

The output elasticity of ICT investment shows how ICT affects the firms' output or productivity. Production function approach was used to get the output elasticity as discussed in the methodology section. The dependent variable is real gross value added, while ICT investment, non-ICT investment and labour are independent variables. Both independent and dependent variables are expressed in logarithm form. R-Square and adjusted R-square values presented in Table 1 shows that the results are best fit. All the variables are positively related to output and labour is not statistically significant. Value added is most determined by non-ICT investment followed by ICT investment and least determined by the labour.

Table 1
Regression Results

	Coefficient	*t-value*
ICT investment	0.31***	(5.44)
Non-ICT investment	0.62***	(11.91)
Labour	0.07	(1.31)
Constant	5.62***	(6.50)
N		98
R^2		0.87
Adjusted R^2		0.86

Notes: Significance level: * p<0.05, ** p<0.01, *** p<0.001

The impact of labour in output is 0.07 which reveals that an increase of 10 per cent in the labour would lead to just 0.7 per cent increase in the output or productivity of the firms, which is not statistically significant. On the other hand, the impact of ICT investment on output is 0.31 indicating that an increase of 10 per cent in ICT investment would increase the output by 3.1 per cent. Similarly, non-ICT investment's impact on output is highest at 0.62 which shows that 10 per cent increase in non-ICT investment would increase the output by 6.2 per cent. Broadly speaking, total capital or investment is emerging as an important determinant of organized firm's output level in India with rising ICT investment in recent years. While earlier labour used to be the main factor and its role has minimized over the years. The regression result reveals that an increase of 10 per-cent in ICT investment and non-ICT would lead to more than 3 per-cent and 6 per cent increase in output respectively. In such a situation, increasing both non-ICT and ICT investment in the firms would be very useful for boosting the overall growth of organized manufacturing sector's output.

Labour Intensity and Labour Productivity of ICT investment in Organised Sector

The impact of ICT investment on labour intensity and labour productivity estimated by regression for the organized firms is given in Table 2. The dependent variable is

labour-output ratio, while share of ICT investment/capital in total investment, and investment-output or capital-output ratio are independent variables. Both independent and dependent variables are expressed in logarithm form. The R-Square and adjusted R-square values show that the results are moderately fit. All the variables are positively related to output and statistically significant. Labour-intensity is most determined by non both capital-output ratio and ICT investment.

Table 2
Regression Results

	Coefficient	*t-value*
Capital-Output ratio	0.94***	(4.73)
Share of ICT Capital	0.47***	(3.89)
Constant	-10.26***	(-14.54)
N		98
R^2		0.511
Adjusted R^2		0.506

Notes: Significance level* p<0.05, ** p<0.01, *** p<0.001

The value of ICT investment as a proportion of total investment has a positive impact on the labour intensity. The coefficient is 0.47 implying that if ICT investment intensity increases by 10 per cent, labour intensity would also increase by 4.7 per cent. This implies that the share of ICT-capital stock has a negative impact on the labour productivity as labour intensity increases. Hence, as the firms increase the share of ICT capital stock, labour intensity would increase and labour productivity would decrease. For a given output, increasing labour intensity implies an increase in the labour units and lowering of the labour productivity. The corresponding coefficient of capital-output ratio (0.94) is higher than the coefficient of share of ICT capital stock. Hence, the results show that an increase in the output of organised manufacturing sector due to investment in ICT augments employment growth through scale effect, which is more than the labour substitution effect of ICT. This situation can be explained further by the fact that ICT may not be well allocated among the firms' activities or utilised in a non-efficient way, which may differ across sub-sectors and does not reflect at overall level productivity. This needs to be understood in detail and is discussed in the subsequent section.

Firm Level Productivity in Organized and Unorganized Manufacturing

In the organized sector, ICT investment contribution to total factor productivity change (23 per cent) is higher than non-ICT investment (-7 per cent). Similarly, unorganized sector enterprises using ICT have increased and has higher total productivity change (23 per cent) when compared with non-ICT (13 per cent). The increase in total factor productivity level is attributed to the change in technical efficiency of the enterprises.

Table 3
Impact of ICT-Non ICT in Manufacturing Sector

Enterprise	*Organised*			*Unorganised*		
Type	*SE*	*TE*	*TFPC*	*SE*	*TE*	*TFPC*
ICT	0.95	1.33	1.23	1.02	1.30	1.33
Non-ICT	0.96	0.97	0.93	1.01	1.12	1.13

Note: SE: Scale efficiency; TE: Technical efficiency and TFPG: Total Factor Productivity change

Further, ICT investment has contributed to the growth of total factor productivity change in low, medium and high technology firms (Table 4). The highest productivity changes due to ICT investment has been experienced by high technology firms (10 per cent) compared to medium (8 per cent) and low tech firms (5 per cent) in the organised sector. In unorganized sector enterprises, ICT usage has benefited more change in productivity to high technology (26 per cent) compared to medium tech (24 per cent) and low tech (3 per cent) enterprises. Growth of unorganized enterprises in productivity change is relatively higher compared to firms benefited by ICT investment in the organized manufacturing. The firms in both organized and unorganized sector experiencing higher productivity change has benefited the most by an increase in the technical efficiency due to ICT usage and investment.

Table 4
Impact of ICT Investment in Organized and ICT use in Unorganized Manufacturing Firms by Type

Enterprise Type	*Organised*			*Unorganised*		
	SE	*TE*	*TFPC*	*SE*	*TE*	*TFPC*
Low Tech	1.00	0.98	1.05	0.91	1.13	1.03
Medium Tech	1.02	1.06	1.08	1.09	1.14	1.24
High Tech	1.05	1.08	1.10	1.00	1.17	1.26

Table 5 presents the productivity growth of organized manufacturing firms across broad categories over a period of 7 years from 2009-10 to 2015-16. The sub-sector wise result reveals that out of fourteen, seven sub-sectors have recorded productivity growth over the year. The total factor productivity change due to ICT investment was recorded mainly in modern sub-sectors. It is observed highest in other manufacturing (26 per cent) enterprises followed by transport equipment (23 per cent), chemical and chemical products (18 per cent), manufacturing of machinery and equipment (15 per cent), basic metals and fabricated metal products (8 per cent), rubber & plastic products (1 per-cent), and manufacturing of computer, electronics and optical products and electrical equipment (1 per cent).

Table 5
Firms wise Malmquist productivity Index in Organized Manufacturing Sector

Sub-Sectors	*TEC*	*TC*	*PTEC*	*SEC*	*TFPC*
Food Products, Beverages and Tobacco	0.89	1.05	0.96	0.93	0.93
Textiles, Textile Products, Leather and Footwear	0.92	1.06	0.93	0.99	0.97
Wood and Products of Wood, Furniture	0.88	1.07	0.95	0.93	0.94
Pulp, Paper, Paper Products, Printing and Publishing	0.89	1.05	1.00	0.89	0.93
Coke, Refined Petroleum Products and Nuclear Fuel	0.89	1.10	0.96	0.92	0.98
Chemicals and Chemical Products	1.03	1.15	1.02	1.01	1.18
Rubber and Plastic Products	0.92	1.09	0.99	0.93	1.01
Other Non-Metallic Mineral Products	0.90	1.09	0.97	0.93	0.98
Basic Metals and Fabricated Metal Products	0.96	1.12	1.02	0.94	1.08
Manufacture of computer, electronics & optical products	0.94	1.07	0.95	0.99	1.01
Electrical Equipment	0.90	1.11	0.96	0.94	1.01
Manufacturing of machinery & equipment nec	0.90	1.28	0.96	0.93	1.15
Transport Equipment	0.98	1.25	1.00	0.98	1.23
Other Manufacturing	1.02	1.23	1.04	0.98	1.26
Mean	0.93	1.12	0.98	0.95	1.04

Note: TEC: Technical Efficiency Change; TC: Technological Change; PTEC: Pure Technical Efficiency Change; SEC: Scale Efficiency Change; TFPC=Total Factor Productivity Change

On the other hand, most of the traditional manufacturing sub-sectors such as food products, beverages and tobacco (-7 per cent), pulp, paper, paper products, printing and publishing (-7 per cent), wood and products of wood (-6 per cent) and textiles, textile products, leather and footwear (-3 per cent) and others have shown negative productivity growth. These manufacturing sub-sectors are showing growth in their productivity mainly due to technological change and innovation. So, it can be concluded that on an average, productivity growth in selected manufacturing sub-sectors is facilitated by investment in ICT along with an improvement in technical change or innovation effect and catching up with technical efficiency.

V. CONCLUSION AND SUGGESTIONS

This paper extends the existing evidence on the debate of impact of ICT on productivity on overall Indian manufacturing sector (both organised and unorganised sector) over the period 2009-2015. Estimates of efficiency at industry level using panel data confirm a positive and significant impact of ICT on improvement in productivity especially modern sub-sector of organised and unorganised manufacturing firms. This is confirming the previous findings in the context of developed and a few middle-

income developing countries. This paper makes a number of contributions to our understanding of ICT impact on firms' productivity. Although ICT and productivity is not a new area of research, there has been little research dedicated to investigate the ICT impact in developing countries. As such, this paper adds an international dimension to the investigation, extending beyond the context of industrialized countries since developing countries may have very different economic and regulatory environments.

In addition, the analysis in this paper employed more recent data and performed decomposition exercise to study the firm's productivity at sub-sectors level. The analysis reveals that investment in ICT is resulting in an increase in the technical efficiency and productivity of modern manufacturing sub-sectors, while the traditional sub-sectors are still lagging behind in the ICT use as reflected from their low or declining change in the productivity level.

Therefore, an important policy implication for India and other developing countries is to encourage enterprises for an efficient use of ICT or to invest more in it to enhance the productivity level and return in both the organised as well as the unorganised manufacturing enterprises. This needs to be accompanied with skill up gradation of the human capital and recruitment of highly skilled manpower.

References

Arvanitis, S. (2004), 'Information Technology, Workplace Organisation, Human Capital and Firm Productivity: Evidence for the Swiss Economy', in: OECD , The Economic Impact of ICT – Measurement, Evidence and Implications, OECD, Paris.

Baily, M.N. (1986), 'What Has Happened to Productivity Growth?', *Science*, Vol. 234, pp. 443-451

Baldwin, J. R. and D. Sabourin (2002), 'Impact of the Adoption of Advanced Information and Communication Technologies on Firm Performance in the Canadian Manufacturing Sector', STI Working Paper 2002/1, OECD, Paris.

Baldwin, J. R. and D. Sabourin (2002), 'Advanced Technology Use and Firm Performance in Canadian Manufacturing in the 1990s', *Industrial and Corporate Change*, Vol. 11, No. 4, pp.761-789.

Banga R. and B. Goldar, (2004), 'Contribution of services to output growth and Productivity in Indian manufacturing: pre and post reforms'', Working paper, No. 139, ICRIER, New Delhi.

Bloom, N., R. Sadun and J. V. Reenen (2012), 'Americans Do IT Better: US Multinationals and the Productivity Miracle', American *Economic Review*, Vol. 102 No. 1, pp. 167–201.

Brynjolfsson, E. and L. Hitt, (2000), 'Beyond Computation: Information Technology, Organizational Transformation and Business Performance', *Journal of Economic Perspectives*, Vol. 14, pp. 23-48.

Brynjolfsson, E. and L. Hitt, (2002), 'Computing Productivity: Firm Level Evidence, Philadelphia: Mimeo, The Wharton School, University of Pennsylvania.

Caves, D. W., L.R. Christensen, and W.E. Diewert (1982), 'The Economic Theory of Index Numbers and the Measurement of Input, Output and Productivity', *Econometrical*, Vol. 50, No. 6, pp. 1393-1414.

Coelli T.J. and P. Rao (2005), 'An Introduction to Efficiency and Productivity Analysis', *Kluwer*

Academic Publishers, Boston

Fare, R., et.al., (1994), 'Productivity Growth, Technical Progress, and Efficiency Change in Industrialised Countries', *American Economic Review*, Vol. 84, No. 1, pp. 66-83.

Gangopadhyay, S., M. G. Singh and N. Singh (2008), 'Waiting To Connect: Indian IT Revolution By Passes the Domestic Industry', New Delhi: *Lexis-Nexis-Butterworth.*

Gretton, P., J. Gali and D. Parham (2004), 'The Effects of ICTs and Complementary Innovations on Australian Productivity Growth', in: OECD (2004), The Economic Impact of ICT – Measurement, Evidence and Implications, OECD, Paris.

Gupta, M. and M. Kumar (2018), 'The Indian Journal of Labour Economics, Vol. 61, No. 2, pp.411-425.

Hempell, T. (2002), 'Does Experience Matter? Productivity Effects of ICT in the German Service Sector', Discussion Paper No. 02-43, Centre for European Economic Research, Mannheim.

ILO (2015), 'Promoting Employment and Skill Development in the Manufacturing Sector in India, ILO and IHD 2014. Available at http://apskills.ilo.org/resources/promoting-employment-and-skills-development-in-the-manufacturing-sector-in-india

Jorgenson, D. W. (2005), 'Accounting for Growth in the Information Age', Harvard University working paper. Available at http://post.economics.harvard.edu/

Jorgenson, D.W. (2001), 'Information Technology and the US Economy', American *Economic Review*, Vol. 91, No. 1, pp. 1-32.

Joseph, K.J. and V. Abraham (2007), 'Information Technology and Productivity: Evidence from India's Manufacturing Sector', Working Paper 389, Centre for Development Studies, Trivandrum, Kerala, India.

Kapoor, R. (2018), 'Understanding the Performance of India's Manufacturing Sector: Evidence from Firm Level Data', CSE-Working Paper, 2018-2, Centre for Sustainable Development, Azim Premji University.

Leeuwen, G.V. and Wiel, H.P.V. (2003) 'Do ICT Spillovers Matter?' *Empirical Economy, New York: Morgan Stanley.*

Maliranta, M. and P. Rouvinen (2004), 'ICT and Business Productivity: Finnish Micro-level Evidence', in: OECD (2004), The Economic Impact of ICT – Measurement, Evidence and Implications, OECD, Paris, pp. 213-239.

Mani, S. (2012), 'A Compendium on the Indian Telecommunications Industry', *Economic and Political Weekly*, Vol. 47, No. 10, pp. 16-19.

Mehta, B. S. (2018), 'Employment in India's ICT Sector: Some Empirical Analysis, *International Journal of Social Science & Development Policy*, Vol. 4, No. 1, pp. 136-147

Gupta, M., and M. Kumar, (2018), 'Impact of ICT Usage on Productivity of Unorganised Manufacturing Enterprises in India, *The Indian Journal of Labour Economics, Springer; The Indian Society of Labour Economics (ISLE),* Vol. 61, No. 2, pp. 411-425.

Mitra, A., C. Sharma and M. V. Varoudakis, (2011), 'Total Factor Productivity and Technical Efficiency of Indian Manufacturing: The Role of Infrastructure and Information and Communication Technology', CERDI, Etudes et Documents, 2011.15.

Moradi, M. and Kebryaee, M. (2005), 'Impact of Information and Communication Technology on Economic Growth in Selected Islamic Countries. Available at: http://www.ecomod.org/files/papers/987.pdf

Navyashree G. R., S. Bhat., (2016), 'ICT Investments and Growth of Small and Medium 30 Firms: A Study of Food Processing Industry in India', Paper presented at the Forum for Global Knowledge Sharing, Indian Institute of Technology, Madras. Available at: http://fgks.in/images/pdf/conf/2016/Navyashree.pdf

Oliner, S. D., and Sichel, D. E. (2001), 'The Resurgence of Growth in the late 1990s: Is Information Technology the Story?' *Journal of Economic Perspectives*, Vol. 14, pp. 3-22.

Roach, S. (1988), 'White-collar Productivity: A Glimmer of Hope?' New York: *Morgan Stanley*.

Roach, S.S. (1984), 'Productivity, Investment, and the Information Economy', *Economic Perspectives*, Vol. 1, pp. 1–14.

Röller, L. H. and Waverman, L. (2001), 'Telecommunications Infrastructure and Economic Development: A Simultaneous Approach', *The American Economic Review*, Vol. 91, No. 4, pp. 909-23

Sharma, C., S. Sehgal, (2010), 'Impact of Infrastructure on Output, Productivity and Efficiency: Evidence from the Indian Manufacturing Industry', *Indian Growth and Development Review*, Vol. 3, No. 2, pp. 100 – 121.

Sharma, S. and N. Singh (2012), 'Information Technology and Productivity in Indian Manufacturing', Department of Economics, University of California.

Solow, R. (1987), 'We'd better watch out'. New York Times Book Review, (July 12): 26.

Strassmann, P.A. (1985), 'Information Payoff: The Transformation of Work in the Electronic Age', *Free Press*, New York.

Timmer, M., G. Ypma and B. Van Ark, (2003) 'IT in the European Union: Driving Productivity Divergence', Groningen Growth and Development Working Paper GD-67. Groningen.

UNIDO (2015), 'Industrial Development Report, 2015: The Role of Technology and Innovation in Inclusive and Sustainable Industrial Development'. Vienna.

Waverman, L., Meschi, M. and Fuss, M. (2005), 'The Impact of Telecoms on Economic Growth in Developing Countries', Working paper The Vodafone Policy Paper Series- 3, pp. 10-24.

Wong, P.K., (1998), 'Leveraging the Global Information Revolution for Economic Development: Singapore's Evolving Information Industry Strategy', *Information Systems Research,* Vol. 9, No. 4, pp. 323-41

Youselfi (2011), 'The Impact of Information and Communication Technology on Economic Growth: Evidence from Developed and Developing Countries. *Economics of Innovation and New Technology*, Vol. 20, No. 6

ANNEXURE

Table 1
Number of Enterprises (in million′) in Manufacturing Sector

Sector	*2000-01*	*2005-06*	*2010-11*	*2015-16*
Organised	0.13	0.14	0.21	0.23
Unorganised	17.02	17.07	17.21	19.67
Total	17.15	17.21	17.42	19.90

Source: ASI and NSSO

Table 2
Employment (in million′) in Manufacturing Sector

Sector	*2000-01*	*2005-06*	*2010-11*	*2015-16*
Organised	7.75	9.11	12.70	14.30
Unorganised	37.08	36.44	34.89	36.04
Total	44.83	45.56	47.58	50.34

Source: ASI and NSSO

Table 3
Gross Value Added (in Rs. 000′ Billion) in Manufacturing Sector

Sector	*2000-01*	*2005-06*	*2010-11*	*2015-16*
Organised	2.80	4.63	8.25	10.80
Unorganised	0.92	1.11	1.55	2.27
Total	3.72	5.74	9.80	13.07

Source: ASI and NSSO

Table 4
Labour Productivity (GVA per Employee, (in 000′ Rs.) in Manufacturing Sector

Sector	*2000-01*	*2005-06*	*2010-11*	*2015-16*
Organised	360.88	508.31	649.98	754.89
Unorganised	24.78	30.52	44.35	63.06
Total	82.89	126.09	205.93	259.58

Source: ASI and NSSO

Table 5

Labour Productivity (in 000'Rs.) in Unorganized Manufacturing Sector

	2010-11			*2015-16*		
	OAE	*Estt.*	*All*	*OAE*	*Estt.*	*All*
ICT	78.63	128.72	121.19	112.69	199.62	183.31
Non-ICT	31.81	74.36	38.37	45.88	103.14	53.50
Enterprise Type(ICT Using)						
Low Tech	79.30	125.76	116.96	105.85	155.20	141.57
Medium Tech	139.80	126.35	126.84	150.83	194.66	192.49
High Tech	105.71	141.92	138.02	177.55	263.86	257.24

Source: NSSO

Table 6

Labour Productivity (in 000' Rs.) in Organised Manufacturing by Enterprise Type

Enterprise Type	*2010-11*	*2014-15*
Low Tech	294.53	363.98
Medium Tech	1024.59	1068.55
High Tech	886.12	929.49
Total	659.28	724.17

Source: ASI

Table 7

Capital Intensity (in Rs) by ICT & Non-ICT in Organised Manufacturing

Enterprise Type	*ICT*		*Non-ICT*	
	2010-11	*2014-15*	*2010-11*	*2014-15*
Low Tech	342	227	3.2	3.9
Medium Tech	393	397	2.5	2.2
High Tech	230	248	4.7	4.8
Total	298	317	3.2	3.2

Source: ASI

Table 8

Broad Manufacturing Sector and Industry Codes at 2-Digits

Sl No	*Manufacturing Sub-Sector*	*NIC*
1	Food Products, Beverages and Tobacco	10+11+12
2	Textiles, Textile Products, Leather and Footwear	13+14+15
3	Wood and Products of Wood, Furniture	16+31
4	Pulp, Paper, Paper Products, Printing and Publishing	17+18
5	Coke, Refined Petroleum Products and Nuclear Fuel	19
6	Chemicals and Chemical Products	20+21
7	Rubber and Plastic Products	22
8	Other Non-Metallic Mineral Products	23
9	Basic Metals and Fabricated Metal Products	24+25
10	Manufacture of computer, electronics and optical products	26
11	Electrical Equipment	27
12	Manufacturing of machinery & equipment nec	28
13	Transport Equipment	29+30
14	Other Manufacturing	32

Source: UNIDO

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Examining the Relationship between Economic Growth, FDI and Trade: VAR and Causality Analysis

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The objective of the present study was to investigate the dependency of GDP on exports, imports, and FDI. Using Johansen Juselius approach the study tested whether GDP, exports, FDI and imports are co-integrated or not. The test findings suggested that there is no long-run relationship between the variables. Time series econometric techniques: The VAR model infers that the current GDP growth of Indian economy is significantly affected by exports and FDI but imports were found to be insignificant. From the empirical results of the impulse response function, the study found that shocks to export sand FDI had a positive impact on GDP both in the short-run and long-run. The results of the Granger Causality test reveal that there is bi-way causality between GDP and FDI. However, there is unidirectional causality between GDP and exports-the causality runs from exports to GDP. To enhance the GDP growth, dispersal, production, distribution of exports and FDI need to be organized in a systematic and coherent manner. This calls for dynamic role of growth-led, export-led and FDI led growth strategies in context of the Indian economy. In order to boost the GDP growth in India, it is argued that the important constituents of GDP should be further promoted through liberal policies.

Keywords: *Economic growth, FDI, Trade, Feedback causality.*

I. INTRODUCTION

The interventionist role of government after independence worked for almost 4 decades although some relaxations were provided to exporters, importers and foreign investors in mid-1980's through the minor economic reforms. Unfortunately, the strict inward looking strategies did nothing as far as poverty, unemployment, provision to education and health facilities are concerned (Sen and Dreze, 1995). The GDP growth rate of India stagnated around 3.5 per cent per annum for almost three decades after the independence (Misra & Puri, 2011). It was considered as a problematic issue as it would not trickle down to the weaker sections of the society. Thus, the objectives which were set up before the implementation of a planned economy for India were not achieved in the manner they should have been. The ecstasy of liberalization, privatization and globalization that evolved in the world since early 1980's and its success in eradicating poverty in East Asian economies (Bhagwati and Srinivasan, 2002) tempted the Indian

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policymakers towards market-oriented reforms (Rodrik, 2002). The BOP crisis of early 1990's brought Indian economy into shambles. The external pressure of IMF and opinion of the domestic policymakers in favour of more liberal measures shifted the emphasis towards indicative planning; in fact, it replaced the former in the 1990's. In the post-reform period, the trade policy got totally changed which included concepts like import liberalization and export promotion. Every developing nation like India would always prefer a high GDP growth rate but that is only possible when major determinants of GDP will explain the maximum amount of variation in it. Therefore, the present study selected a few crucial determinants of GDP i.e. FDI, imports and exports to analyze their impact on the GDP during the period of 1980-2017.

II. LITERATURE REVIEW

Saaed and Hussain (2015) tried to find out the causality between exports, GDP and imports in Tunisia for a period extending from 1972-2012. The findings revealed that the variables were found to be stationary at the first difference and were found to be cointegrated i.e. there exhibited a long-run relationship between the variables. The study further revealed that the growth of Tunis is highly correlated with the growth led import policies.

Ming (2014) used Vector error correction model (VECM) in his study to analyze the impact of FDI on economic growth in Taiwan. Annual time series data was used in the study ranging from 1978-2009. Since VECM estimates were very much responsive to different lags, a proper lag selection was carried out by the study using AIC and SIC lag selection criterions which indicated that 1 lag should be used for further estimates. The study suggested that there existed at least one co-integrated vector among the given variables. Further, granger causality test indicated that there existed causality from GDP to FDI.

Kumar (2012) conducted a pairwise Granger causality test between various economic variables of the South African economy using time series data for a period of almost 50 years i.e. from 1960-2009. Empirical tests under vector autoregression model were carried out with and without the inclusion of structural breaks. Findings of the study verified that there was bidirectional causality between economic infrastructural investment and gross domestic product. This bidirectional causality also existed between economic infrastructural investment and public-sector employment. To capture the effect of a structural break in the system, a dummy variable was incorporated in the model which verified the impact of the then-popular wave of the democratic transition of 1994. The study further revealed that the inclusion of structural break increased the number of the significant relationships among the variables to 7 out of 10 of the hypothesized relationships as against the 4 out of 10 when the structural break was not included in the model.

Asari et al (2011) analyzed the impact of the inflation rate and interest rate on the volatility in the exchange rate of Malaysian economy using various econometric techniques like VECM, Johansen and Juselius test for cointegration. The study rightly stated that in order to find out whether VAR can be used for the given variables, it is mandatory to check the various properties of the given data i.e. to check the stationarity of the variables (for which ADF test and PP test were used), to find out the optimal lag for the model (AIC, SIC were used), to find out whether all the variables of the given study were co-integrated or not (Johansen and Juselius test was used). The Granger causality test confirmed that the inflation rate impacts the interest rate. Subsequently, findings and causality tests also confirmed that the interest rate influences the exchange rate. Taking into account the long-run relationship between the variables it was revealed that the interest rate moves positively towards exchange rate volatility while inflation rate moves negatively towards the exchange rate volatility. Hence the study confirmed that increasing interest rate would be the prime factor in solving the exchange rate volatility problems in Malaysia.

Moudatsou and Kyrkills (2011) assessed the relationship between FDI inflows and GDP growth in two different regional trading blocs i.e. European Union and ASEAN by using annual time series data for a period of almost three decades i.e. from 1970-2003. Various time series techniques were applied by the study like ADF, Cointegration test (Johansen & Juselius test), VECM and Causality analysis. It was found that there exists, one-way causality from GDP to FDI in the countries which come under the domain of European Union. Regarding the ASEAN countries, it was revealed that a two-way causality between FDI inflows and GDP exists implying that along with growth driven FDI, it was found that FDI was positively affecting the GDP growth in ASEAN. To put in simple words FDI led growth strategy holds well in ASEAN bloc.

Awokuse (2008) tried to re-examine the relationship between imports, exports, and economic growth in three South American countries namely Argentina, Columbia, and Peru. Impulse response functions and causality tests were used to examine that whether trade stimulates economic growth or vice versa. Strong evidence was found for import led growth hypothesis, although there were some instances which confirmed evidence in favour of export-led growth. Finally, in some cases reverse causality from GDP to exports and imports was also confirmed.

Tang et al (2008) investigated the causal link between FDI, domestic investment, and economic growth in China using annual time series data ranging from 1988-2003. Multivariate Vector Auto Regression framework along with Error Correction Mechanism and Innovation accounting (i.e. Variance decomposition and Impulse response analysis) were used. The results reveal that bi-directional causality exists between domestic investment and economic growth. In contrast to that, it was found

that unidirectional causality exists from FDI to domestic investment and economic growth. In fact, it was further revealed by the study that FDI was not crowding out the domestic investment rather it was complementing. Hence, the study finally confirmed that FDI did not assist positively as far as the shortage of domestic capital is concerned but it stimulated economic growth through complementing domestic investment in China.

Ugur (2008) empirically analyzed the relationship between imports and economic growth in his paper. Imports were decomposed into several individual categories. Vector Autoregression model was used to analyze the relationship between the given variables. Finally, it was confirmed by causality analysis and Impulse response functions that bi-directional causality exists between GDP and investment goods imports and raw material (imports). In contrast to that it was found that unidirectional causality exists between GDP and consumption imports.

Liu et al (2002) investigated the causal links between trade, economic growth and FDI in China. Multivariate tests, causality tests were applied to the quarterly data of major four macroeconomic variables (exports, imports, GDP FDI) for a period from 1981:1 to 1997:4. The Vector Auto Regression and Error Correction Mechanism framework revealed that bi way causality exists between the variables but, it was found that the feedback from imports to the other three variables was not much stronger.

Sharma and Panagiotids (2001) in their paper tried identify the sources of GDP growth in India using time series data for a period of three decades, ranging from 1971-2001. The study further tried to assess the validity of export-led growth strategy which as per the empirical findings based on Granger causality test, was found invalid in the case of India (i.e. exports cannot Granger cause GDP). The results of the study confirmed that there was no long-run co-integration between GDP, exports and imports. Finally, Impulse Response Function (IRF) revealed that a relatively big shock (innovation) to real exports does not generate significant responses, which further supported the argument that even if extensive and liberal reforms were introduced by the government of India in 1991, the Indian economy had still various characteristics of a typical import substituting economy.

In order to analyze the relationship between exports, imports and economic growth in Portugal (1865-1998), Ramos (2000) used various time series techniques like Cointegration tests, Granger Causality analysis, Vector Autoregression etc. It was empirically confirmed by the Granger causality test that there is no unidirectional causality between the variables under study. In fact, there is a feedback effect between exports and GDP growth and between imports and GDP growth. Further, it also confirmed that no causality exists between import and export growth.

III. DATA AND METHODOLOGY

Vector autoregression model has been used to analyze the impact of exports, imports and FDI on GDP growth. The data used has been extracted from World Developmental Indicators (World Bank). The annual time series data set consists of observations on GDP, exports, imports and FDI between the periods 1980 and 2017. These four variables have been taken in their natural logarithms to avoid the problems of nonstationarity, heteroscedasticity and to secure homogeneity. E-views software has been used to carry out this econometric analysis. The abbreviations for the data used are as follows;

LGDP = log of GDP

LEXP = log of exports of goods and services.

LIMP = log of imports of goods and services

LFDI = log of FDI inflow.

D (LGDP) = the first differencing of LGDP. This represents the growth in GDP.

D (LEXP) = the first differencing of LEXP. This represents the growth in exports.

D (LIMP) = the first differencing of LIMP. This represents the growth in imports.

D (LFDI) = the first differencing of LFDI. This represents the growth in FDI.

To analyze the impact of exports, imports and FDI on GDP growth, the estimation methodology consists of 8 steps;

1. Unit root test, for stationary of variables.
2. VAR analysis.
3. Granger causality test.
4. Impulse response Function
5. Variance Decomposition
6. LM test for autocorrelation of the residuals.
7. Normality test of residuals.
8. Heteroscedasticity test.

IV. EMPIRICAL RESULTS

Unit Root Test

In statistics and econometrics, there are several tests of stationarity but a test of stationary that has become widely popular over the past several years is the Augmented-Dickey Fuller test (Dickey and Fuller; 1979). This test has been used to test the stationarity of the time series variables in the present study. ADF tests the null hypothesis that a time series sample contains a unit root against the alternative hypothesis that a time series sample does not contain a unit root (Gujarati, 2012). The ADF statistic (conventionally

referred as tau statistic) used in the ADF test is a negative number in most applications and more negative it is, the stronger the rejection of the hypothesis that there is a unit root at some level of confidence. Differencing is conducted until stationary is reached if we fail to reject the null hypothesis at the level (Mukherji and Pandey, 2014). The results of the ADF statistic are reported in Table 4.

Table 4
Results of ADF Statistic

Series	*ADF Statistic*	*CriticalValuesat 5%*	*Prob.**	*Decision*
LGDP	2.480879	-2.943427	1.0000	Don't reject the null hypothesis
LEXP	0.309382	-2.943427	0.9757	Don't reject the null hypothesis
LIMP	-0.334309	-2.943427	0.9100	Don't reject the null hypothesis
LFDI	-0.890040	-2.943427	0.7803	Don't reject the null hypothesis
D(LGDP)	-4.967432	-2.945842	0.0003	Reject the null hypothesis
D(LEXP)	-4.825672	-2.945842	0.0004	Reject the null hypothesis
D(LIMP)	-5.187656	-2.945842	0.0001	Reject the null hypothesis
D(LFDI)	-6.402416	-2.945842	0.0000	Reject the null hypothesis

Table 4 shows that the series LGDP, LEXP, LIMP and LFDI are not level stationary (i.e. they are non-stationary at level). However, it does show that their first differences namely D(LGDP), D(LEXP), D(LIMP) and D(LGDP) are stationary. Therefore (LGDP), D(LEXP), D(LIMP) and D(LFDI) are integrated of order (1); they follow an I(1) process.

Lag Order Selection

There are several criterions that are used for the optimal selection of lags for a model. The number of lags to be included in the VAR model is determined by minimizing the SIC or AIC. In the current investigation, almost all criterions namely Akanke's Information Criterion (AIC), Schwarz's Information Criterion (SIC), Hannan and Quinn Information Criterion (HQ) and Final Prediction Error (FPE) suggest one lag. Therefore, we select lag (1) on the basis of these criterions in general and AIC (Akaike, 1974) in particular, and accordingly precede further tests and analysis with lag (1).

Table 4.1
Lag Selection Criteria

Lag	*LogL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*
0	-24.74358	NA	5.80e-05	1.596865	1.772812	1.658275
1	147.3905	296.4531*	9.99e-09*	-7.07724*	-6.197515*	-6.77019*
2	159.8034	18.61935	1.26e-08	-6.877965	-5.294446	-6.325274

Cointegration Test

After selecting appropriate number of lags for a model and proving that all series are integrated of the same order, next step is to look for the existence of any cointegrating vector in the series. The series are said to be co-integrated if two or more series are individually integrated in same order, such as I(1) order series but some linear combination of them has a lower order of integration. Two most common tests of checking cointegration are Engle and Granger two steps procedure (1987) and Johansen's maximum likelihood procedure (1991). However, the present analysis uses Johansen's method of two likelihood ratio (LR) test statistic; the trace test and the maximum Eigenvalue test because the Johansen test allows for more than one co-integrating relationship, unlike the Engle – Granger Method, but this test is subject to asymptotic properties as it is rightly revealed by Bilgili (1998) that Johansen and Juselius (1990) is generally preferred over Engle and Granger due to statistical reasons.

Table 4.2
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	*Eigenvalue*	*Trace Statistic*	*0.05 Critical Values*	*Prob.***
None	0.401615	39.65953	47.85613	0.2349
At most 1	0.269676	21.17276	29.79707	0.3470
At most 2	0.228433	9.859136	15.49471	0.2917
At most 3	0.014428	0.523182	3.841466	0.4695

Notes: Trace test indicates no cointegration at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Table 4.3
Unrestricted Cointegration Rank Test (Maximum Eigen value)

Hypothesized No. of CE(s)	*Eigenvalue*	*Trace Statistic*	*0.05 Critical Values*	*Prob.***
None	0.401615	18.48677	27.58434	0.4552
At most 1	0.269676	11.31362	21.13162	0.6160
At most 2	0.228433	9.335954	14.26460	0.2593
At most 3	0.014428	0.523182	3.841466	0.4695

Notes: Max-eigen value test indicates no cointegration at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
***MacKinnon-Haug-Michelis (1999) p-values*

The result of Johansen's two-step procedure is listed in Table 4.2 and 4.3. The null hypothesis of the existence of no co-integration among the series is rejected when the test statistic exceeds the critical value. The result of Johansen's two-step procedure suggests that there is no equilibrium and long-run relationship among GDP, exports,

imports and FDI in case of the Indian economy. Thus, ΔY_t follows a VAR (1) model and therefore, VAR (1) was fitted to the stationary data series and diagnostics tests were conducted to carry forward the analysis.

VAR Model

The model of vector auto regressions (VARs) was introduced by C.A Sims (1980) into the empirical analysis. Basically a VAR implies that everything depends on everything and such a model provides a tractable and flexible framework for analyzing time series data. VAR model can explain past and causal relationships among multiple time series variables and can predict future observations as well. Precisely stated, VAR model is used to capture linear relationships among multiple time series. A VAR system can be expressed as follows;

$$Y_t = B_0 + B_1 y_{t-1} + B_1 y_{t-2} + \ldots + B_p y_{t-p} + \varepsilon_t \quad (1)$$

Where Y_t is a vector of endogenous variables at time t, B_i (I = 1, 2 …p) are coefficient vectors, p is the number of lags, ε_t is a vector of residuals. B_0 is a vector of intercept term.

In this model, the four endogenous variables that have been be used, are the first differences of Gross Domestic Product (GDP), exports (EXP), imports (IMP) and Foreign Direct Investment (FDI) denoted by D(LGDP), D(LEXP), D(LIMP) and D(LFDI) respectively. The transpose of the vector of endogenous variables, therefore, is given by;

$$Y_t = [D(LGDP_t)\ D(LEXP_t)\ D(LIMP_t)\ D(LFDI_t)] \quad (2)$$

The number of lags on the basis of AIC is taken in the model as one, therefore,

$$Y_t = [D(LGDP_{t-1})\ D(LEXP_{t-1})\ D(LIMP_{t-1})\ D(LFDI_{t-1})] \quad (3)$$

The aim of this paper was to assess the dependency of Gross Domestic Product (LGDP) on its own past values as well as the values of LEXP, LIMP and LFDI. In order to achieve this objective, unrestricted VAR model with the order of one was fitted and the results of this fitted VAR model are presented in Table 4.4.By observing the Table 4.4, it becomes clear that the GDP growth is positively related to its own first lag and the first lag of the exports, imports (but not significant) and FDI. Based on this discussion, results of VAR(1) model fitted with significant estimated coefficients of LGDP, LEXP, IMP and LFDI are presented in equation (4) (see also table 4.4).

$$D(LGDP_t) = (0.945828)^* D(LGDP_{t-1}) + (0.123675)^* D(LEXP_{t-1}) + .082865)^* D(LFDIt\text{-}_1) \quad (4)$$
(P-value = 0.0000) (P-value = 0.0495) (P–value = 0.0503)

The fitted VAR model estimate of $D(LGDP_t)$, when considered as the dependent variable is reported in equation (4). The estimated coefficient of 0.945828 of $D(LGDP_{t-1})$ is statistically highly significant at 1% level of significance with p-value 0.0000. The overall statistically positive coefficient of $D(LGDP_{t-1})$implies that the elasticity of $D(LGDP_t)$with respect to $D(LGDP_{t-1})$ is about 0.94%. This estimated coefficient of 0.94% of $D(LGDP_{t-1})$ implies that with an increase of 1 unit in the value of $D(LGDP_{t-1})$, there will be an increase of 0.94% in the value of $D(LGDP_t)$. This finding of the fitted VAR model shows that the current GDP growth of the Indian economy has a significant dynamic relationship with a one-year lag of its GDP during the study period. On the other hand, the estimated coefficient of 0.123675 of $D(LEXP_{t-1})$ is statistically significant at 5% level of significance with p-value 0.0495.

The overall statistically significant positive coefficient of $D(LEXP_{t-1})$ implies that a unit increase in total $D(LEXP_{t-1})$ while keeping other factors constant results in about 12 % increment in current GDP growth of the Indian economy. This finding of the fitted VAR model shows that GDP growth of the economy has a dynamic relationship with one-year lag of exports of the economy during the study period. Similarly, the estimated coefficient of 0.082865of $D(LFDI_{t-1})$ is statistically significant at 10% level of significance with p-value 0.0503. The overall statistically significant positive coefficient of $D(LFDI_{t-1})$ implies that a unit increase in total $D(LFDI_{t-1})$ while keeping other factors constant results in about 0.0829% increment in current total GDP growth of the Indian Economy. This finding of the fitted VAR model shows that GDP growth of the economy has a dynamic relationship with one-year lag of foreign direct investment of the economy during the study period. The Adjusted-R Square for this fitted model is 0.9175 indicating that 91.75% of the variation in the future $D(LGDP_t)$ observation is explained by the given independent variables.

Table 4.4
Results of Vector Auto regression Model (VAR1)

Variables affecting D(LGDP)	*Coefficients*	*P- value*
First lag of D(LGDP)	0.945828	0.0000*
First lag of D(LEXP)	0.123675	0.0495**
First lag of D(LIMP)	0.007604	0.8239
First lag of D(LFDI)	0.082865	0.0503***
Constant	0.692767	0.1806

Notes: * 1% level of significance, ** 5% level of significance and *** 10% level of significance

Therefore, these results indicate that previous year's growth in GDP, exports and FDI caused growth in current year's GDP. Moreover, previous year's growth in imports does not cause any growth in current year's GDP or in simple parlance, the

exports and FDI are influencing GDP positively as both the coefficients are to be found positive and statistically significant and imports are insignificant in explaining the GDP for the given period.

Residual Testing

The next step after the VAR model has been developed is to determine if the selected model provides an adequate description of the data. In familiar regression models, this is done by examining the differences between the actual observations and model-fitted values (i.e., by examining the residuals). Examining residuals implies that one needs to check for the absence of serial correlation and heteroscedasticity. Additionally, it is also important to see if the residuals are multivariate normal. Autocorrelation of the residual values is used to determine the goodness of fit of the time series models. Autocorrelation of the residuals indicates that there is information that has not been accounted for in the fitted model.

The Lagrange Multiplier/ Breusch-Godfrey test is a usual tool for testing residual autocorrelation in VAR models. The null hypothesis for the LM test is that there is no residual autocorrelation against the alternative hypothesis that residual autocorrelation exists. The Breusch-Godfrey test indicates the absence of serial correlation when one fails to reject its null hypothesis. The ARCH test is one tool used for testing residual heteroscedasticity in VAR models. The null hypothesis for ARCH test is that there is no heteroscedasticity among the residuals and the ARCH test indicates the absence of heteroscedasticity when one fails to reject its null hypothesis with p values of more than 5%. Yet another specification test for the time series VAR models includes VAR residual normality test. We have employed the Jarque-Bera normality test to check the normality of residuals. The null hypothesis for JB test is that the residuals are multivariate normal and failure to reject this null hypothesis with p values more than 5% indicates normality.

The results of these diagnostic tests are reported in Table 4.5 and it shows that both the LM test for autocorrelation (proposing null hypothesis of no serial correlation in the VAR model) and the ARCH test of heteroscedasticity (proposing null hypothesis of no heteroscedasticity in the VAR system) could not be rejected and therefore, we conclude that our fitted model does not suffer from serial correlation and heteroscedasticity problems. The normality tests such as Kurtosis, Skewness, and Jarque-Bera, (proposing the null hypothesis that residuals are multivariate normal) could not be rejected either. The nonexistence of serial correlation heteroscedasticity and non-normality of residuals in the estimated VAR model imply that the estimated VAR model is robust.

Table 4.5
Diagnostic Tests of VAR (1)

Test	*Chi. Sq*	*Prob.*
LM test	0.009574	0.64
ARCH test	1.707439	0.19
JB VAR	0.629747	0.72

Causality Analysis

VAR model provided the framework in order to study the Granger casual dynamics among the given time series variables. VAR model framework describes the joint generation process of a number of variables over time, so they can be used for examining relationships between the variables. Granger causality is one type of relationship between time series variables (Granger, 1969). The logic behind the Granger Causality test can be stated as *if the forecast of one time series is improved by incorporating the knowledge of a second-time series, then the latter is said to have a causal stimulus on the first*. The null hypothesis in case of Granger Causality test is that no explanatory power is added by jointly considering the lagged values of *Y* and *X* as predictors. We fail to accept the null hypothesis - *X* does not cause *Y* - if coefficients for the lagged values of X are significant. This implies that we can call a variable *X* causal for a variable *Y* if the lagged values of X are helpful for improving predictions of *Y* (*Y* at future times). The VAR framework is flexible and provides an environment for implementing this type of analysis. The results of the Granger Causality test shown in Table 4.6 reflect that there is bi-way causality between GDP and FDI. However, there is unidirectional causality that exists between GDP and exports-the causality runs from exports to GDP but not vice-versa. Further, the table shows that there is no causality between GDP and imports as also revealed by the fitted VAR model. The results of the Granger Causality test also suggest that exports augment FDI but FDI does not augment exports. Thus, it can be said that higher exports of goods and services in India lure foreign investors as it is reconfirmed by the fact that since economic reforms of 1991 both exports of goods and services and FDI has been increasing at a tremendous pace. In case of the Indian economy, FDI does not augment exports because a major chunk of FDI inflows is directed towards the costly projects but not towards small-scale industries/projects which basically augment exports in long-run in India as they use labour-intensive technologies in which India has a comparative advantage. Finally, it can be confirmed that there is bidirectional feedback between imports and exports and FDI which clearly reveals that imports can result in exports. Since 1991, it can be found that massive import liberalization has been carried out in our country to import raw materials needed

for manufacturing goods which can be exported so that our export performance in the world trade market gets boosted. This strategy somehow and to some extent increased the productivity of our exporting units.

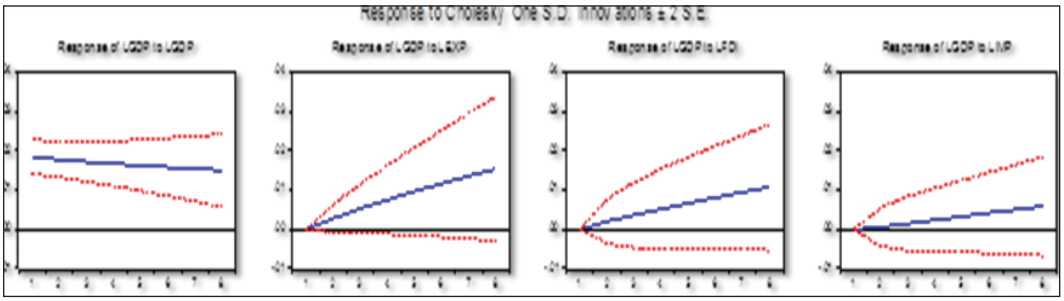
Table 4.6
Pair-wise Granger Causality Tests

Null Hypothesis (H0)	*Obs.*	F- Statistic	*Prob.*
LFDI does not Granger Cause LGDP	37	1.79666	0.0490
LGDP does not Granger Cause LFDI	37	6.18729	0.0179
LEXP does not Granger Cause LGDP	37	3.30046	0.0781
LGDP does not Granger Cause LEXP	37	0.23153	0.6335
LIMP does not Granger Cause LGDP	37	2.97726	0.0935
LGDP does not Granger Cause LIMP	37	0.03007	0.8634
LEXP does not Granger Cause LFDI	37	6.32063	0.0168
LFDI does not Granger Cause LEXP	37	2.28289	0.1400
LIMP does not Granger Cause LFDI	37	7.26319	0.0109
LFDI does not Granger Cause LIMP	37	5.27959	0.0279
LIMP does not Granger Cause LEXP	37	3.11143	0.0867
LEXP does not Granger Cause LIMP	37	2.90035	0.0977

Impulse Response Function

Impulse Response Function (IRF) is an essential tool in empirical causal analysis and policy effectiveness analysis. IRF function tracks the impact of any variable on other variables in an economic system. Typically the IRF tends towards zero which implies the effect of a single shock dies out over time. The graphs of GDP response function to impulses (innovations) of the model variables indicate that with time, the impulses of the four independent variables (Including past values of GDP) have both an enhancing as well as weakening impact on the forecasted values of the GDP. The response of the GDP dynamics revealed the increasing effect of the impulses (innovations) of the three variables: LEXP, LFDI and LIMP after the second quarter. After the second period, the response of GDP to LEXP, LFDI and LIMP rises above their steady-state values and remains in the positive region but the response of GDP to LIMP is not so much enhanced. However, a one unit SD shock to GDP initially has no noticeable impact on GDP in periods 1st and 2nd. After the 2nd period, the response enhances in the 3rd period and then again declines in the 4th period. This response of GDP to one SD shock to GDP continues to show the same behaviour up to 8^{th} period but its response remains in the positive region throughout the eight periods. All this implies that shocks to exports, imports and FDI will have a positive impact on GDP, both in the short-run and the long-run.

Figure 4
Impulse Response function



Variance Decomposition

While impulse response function graph represent the response of a variable given an impulse to another variable, the variance decomposition is useful in evaluating how shocks reverberate through a system (that is, it is used to assess the pass-through of external shocks to each economic variable(s).

Table 4.7
Variance Decomposition of LGDP

Period	*S .E*	*LGDP*	*LEXP*	*LFDI*	*LIMP*
1	0.018543	100.0000	0.000000	0.000000	0.000000
2	0.025957	98.18441	1.169163	0.600542	0.045889
3	0.031861	94.51979	3.517245	1.731954	0.231007
4	0.037228	89.50189	6.690222	3.233744	0.574144
5	0.042438	83.62434	10.35694	4.970500	1.048213
6	0.047674	77.34064	14.22990	6.819399	1.610061
7	0.053023	71.01680	18.08669	8.679366	2.217143
8	0.058527	64.91296	21.77523	10.47692	2.834888

The variance decomposition of LGDP in Table 4.7 reveals that in short-run (i.e. period 3) an impulse or shock to GDP can account for 94.52 per cent fluctuation in GDP (own shock). In the long run (i.e. period 8) an innovation or shock to GDP can cause 64.92 per cent fluctuation in GDP (own shock). This result shows that a shock to GDP can cause fluctuations in GDP both in the short run as well in the long-run. The table also shows that a shock to exports can cause 1.73 per cent fluctuation in the GDP in the short-run and 21.78 per cent fluctuation in the long-run. This implies that a shock to exports cannot contribute much to fluctuations in GDP in the short-run however a shock to exports can greatly cause fluctuations in the GDP in the long-run. Similarly a shock to FDI cannot contribute much to fluctuation in GDP in the short-run but a shock to FDI can cause fluctuations in the GDP in the long-run. Finally, a shock to imports cannot contribute much in the fluctuation of GDP neither in the short-run nor in the long-run.

IV. CONCLUSION

The objective of this study was to investigate the dependency of GDP on exports, imports and FDI. We tested if, whether GDP, exports, FDI and imports are Co-integrated using Johansen Juselius approach and the test suggested that there is no long-run relationship between these time series variables. Time series econometric techniques: The VAR model infers that the current GDP growth of Indian economy is significantly affected by past one lagged value of its own as well as by the past values of EXP, and FDI but is not affected by the past one lagged value of imports. From the empirical results of the impulse response function and variance decomposition, the study found that shocks to GDP will have a positive impact on GDP (itself), exports, and FDI both in the short-run and long-run and almost negligible impact on imports. From the causality tests, it was found that bi way causality exists between GDP and FDI and unidirectional causality exists from exports to GDP. To enhance the GDP growth, the dispersal, production, distribution of exports and FDI needs to be organized in a systematic and coherent manner. This calls for an increased role of growth-led, export-led and FDI led growth strategies in the context of the Indian economy.

References

Akaike, H. (1974). A New Look at the Statistical Model Identification. *IEEE Transactions on Automatic Control*, Vol.19 (6), 716-723.

Asari, H.A., Baharuddin, S., Jusoh. N., Mohamad. Z., Shamsudin.N., and Jusoff. K, (2011). A Vector Error Correction Model (VECM) Approach in Explaining the Relationship between Interest Rate and Inflation towards Exchange Rate Volatility in Malaysia. *World Applied Sciences Journal 12(Special issue on Bolstering Economic Sustainability*. pp. 49-56.

Awokuse, O.T. (2008) Trade openness and economic growth: is growth export-led or import-led? *Applied Economics*, Vol.4 (2), pp. 161-173.

Bhagwati, J. & Srinivasan, N.T. (2002). Trade and Poverty in the Poor Countries.*American Economic Review*, Vol. 92 (2), pp. 180-183.

Bilgili, F (1998). Stationarity and Cointegration Tests: Comparison of Engle- Granger and Johansen Methodology. *Munich Personal RePEs Archive*, Paper No.75967, Retrieved from:https://mpra.ub.uni-muenchen.de/75967/.

Dickey, A. D & Fuller, A.W (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, Vol. 74 (366), pp.427-431.

Engle, F. R., and Granger, W. C. (1987). "Co-integration and Error Correction. Representation, Estimation and Testing". *Econometrica*, Vol. 55 (2), pp. 251-276

Granger, C.W. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica*, Vol. 37 (3), pp. 424-438

Gujarati, N. D. (2012). "Basic Econometrics," 5edition, McGraw Hill Education India, New Delhi.

Johansen, S. (1991). Estimation and Hypothesis Testing of Cointegration Vectors in Gaussian Vector Autoregressive Models. *The Econometric Society*, Vol. 59 (6), pp. 1551-1580.

Johansen, S. &Juselius, K. (1990).Maximum Likelihood Estimation and Inference on Cointegration

with Applications to the Demand for money.*Oxford Bulletin of Economics and Statistics*,Vol. 52 (2), pp. 169-210.

Kumo, L.W.(2012). Infrastructure Investment and Economic Growth in South Africa.A Granger Causality Analysis.*Working Paper series, paper no. 160, African Development Bank*.

Liu, X., Burridge. P., and Sinclair, N.A. (2002). Relationships between economic growth, foreign direct investment and Trade: evidence from China. *Applied Economics*, Vol. 34 (11), pp. 1433-1440.

Ming, S. H. (2014). Foreign Direct Investment, Trade and Economic Growth in Taiwan. *Modern Economy*, Vol. 5 (1), pp. 21-23.

Misra, K. S and Puri, K.V. (2011*). Indian Economy- Its Development Experience*. Himalayan Publishing House Pvt. Ltd

Moudatsou, A and Kyrkills, D. (2011). FDI and Economic Growth: Causality for the EU and ASEAN. *Journal of Economic Integration*, Vol.26 (3), pp. 554-557.

Ramos, R.F. (2000). Exports, imports, and Economic growth in Portugal: evidence from Causality and cointegration analysis. *Economic Modelling*, Retrieved from: https:// plagiarism.repe c.org/ amiri-gerdtham/amiri-gerdtham3.pdf. pp. 613-623.

Rodrik, D. (2002). In Search of the Deep Determinants of Economic Growth, Institutions, Integration and Geography. Retrieved from: http:// projects.iq.harvard .edu /files /wcfia /files/530_rodrik6. pdf.

Ronit, M. and Divya, P. (2014).“The Relationship between the Growth of Exports and Growth of Goss Domestic Product of India.”*International Journal of Business and Economics Research*, Vol. 3 (3), pp. 135-139.

Saaed, J.A and Hussain, A.M.(2015). Impact of Exports and Imports on Economic Growth: Evidence from Tunisia. *Journal of Emerging Trends in Economics and Management Sciences.* Vol. 6 (1), pp. 13-21.

Sen, A. & Dreze, J. (1995*). Economic Development and Social Opportunity*. Calerendon Press, Oxford.

Sharma, A. and Panagiotidis, T. (2014). An Analysis of Exports and Growth in India: Cointegration and Causality Evidence (1971-2001)*. *Loughborough University Institutional Repository*, Paper, no. 04-07.

Sims, A. C. (1980). Macroeconomics and Reality,” *Econometrica*, Vol. 48 (1), pp. 1-48.

Tang, S., Selvanathan, E. A., and Selvanathan. S. (2008). Foreign Direct Investment, Domestic Investment, and Economic Growth in China: A Time Series Analysis. *World Institute for Development Economics Research*, Paper No. 2008/19.

Ugur, A. (2008). Import and Economic Growth in Turkey: Evidence from Multivariate VAR Analysis. *East-West Journal of Economics and Business*, Vol.11 (1&2), pp. 54-75.

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Demand for Water Supply Improvement in Uttar Pradesh, India: Quality & Quantity

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The study makes an assessment of the demand for water supply improvement in Uttar Pradesh. Using primary level data from Lucknow and Kanpur districts, findings reveal that people are willing to pay for the water services that are reliable both in quantity as well as in quality. This willingness to pay reflects economic valuation of improved water supply. The findings show that willingness to pay not only depends on income but also on the socio-economic characteristics of households as well as source of drinking water. The analysis points out that even if the households are required to bear the cost of service improvement, the water charges will still be well within the affordability capacity of people. Average mean WTP for safe drinking water supply and for 24 hour water supply is approximately 1 percent of average household income within the study area. All estimates lie below the World Bank's benchmark which is 4 percent of the household income. Therefore, there is scope for improvement for water service provision in the study area even if its at a higher water price.

Keywords: *Drinking water, Willingness to pay (WTP), Affordability to pay (ATP), Contingent valuation method (CVM)*

I. INTRODUCTION

Provision of adequate water supply to a growing urban population is a daunting task. The problem has aggravated over the years due to the inadequacies in the governmental efforts, particularly in the less developed countries. Although at present, none of the states in India have been able to ensure 24 hour water supply to people however the current status of urban water supply in Uttar Pradesh is much worse when compared with the urban India. In urban India, about 71 per cent of the households receive drinking water from taps while only 51.5 per cent households of urban Uttar Pradesh get water from tap (Census, 2011). All the towns in Uttar Pradesh are covered by piped water supply; however, the service level is well below the norms observed in several towns. More than one-third of the towns are operating at below 50 percent of the norms (GOI, 2007). There is an inadequate water supply in Lucknow and Kanpur districts compared to that of other districts of Uttar Pradesh. A recent study also points out

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that the current state of water supply in Uttar Pradesh is inadequate both in terms of quantity and quality (Tiwari, 2017) and provision of piped water supply still remains an unachieved goal in Uttar Pradesh.

In India, water is a state subject and the Union Government is responsible for setting the water quality standards. In urban areas, Urban Local Bodies (ULBs) are in charge of operation and maintenance of water supply systems. According to Tiwari & Nayak (2014), water utilities in India are neither operated independently nor managed on principles of accountability and transparency. As a result of absence of metering in Uttar Pradesh, water tax for domestic households is charged based on the annual rental value of the properties as assessed by Nagar Nigams. The current water rates charged to the users are highly subsidized and have resulted in low revenue realization with an adverse impact on providing satisfactory and continuous water supply. Prices for water are based on socio-political considerations and are not determined based on the economic principles (Vaidyanathan, 2006). Therefore, these utilities are weak in terms of financial capacity. The revenues of municipalities fail to cover the operation and maintenance cost due to low water tariffs. In order to improve the water supply services and expand the existing ULB's financial position of local bodies needs to be enhanced. Urban water service improvements require large capital investments. Therefore, it is vital to assess the demand of households for improved water supply, but there is no competitive price for improved water services. Measuring the demand for improved drinking water supply is not straight forward. Willingness to Pay (WTP) is one of the most widely used instruments for measuring the demand for environmental quality (Devi, et al., 2009). The WTP concept generally refers to the economic value of a good to a person or a household under given conditions. It is the maximum amount that an individual is willing to pay for a good or a service.

The rest of the paper is organized as follows. The second section deals with the objectives and methodology, while the third section of the paper presents socio-economic characteristics of households, mean WTP, existing drinking water facility in Uttar Pradesh and household's perception about drinking water. The fourth section identifies the determinants of WTP for piped water users and ground water users while the results from logistic regression are presented in the fifth section which discusses the association between WTP and selected variables. The sixth section provides the estimates for affordability of households for improved services. Finally, the concluding section provides a summary of the study and its main conclusions.

II. OBJECTIVES AND METHODOLOGY

The article measures demand for water supply improvement in Uttar Pradesh by using WTP concept with a focus on socio-economic factors which determine the demand of

households for water supply improvement. It also examines Ability to Pay (ATP) while comparing it with the Willingness to Pay. Using a structured questionnaire, primary-level household data was collected from 200 households from Lucknow and Kanpur districts in Uttar Pradesh. Four zones were selected including two zones from each district. Within each zone, 50 households were selected from every section of society.

Contingent Valuation Method (CVM) was used for estimating the WTP for improved water supply. It is a direct technique which involves taking survey through a structured questionnaire of consumer's WTP at specified prices for hypothetical services (Raje, et al., 2002). It mainly asks people what they are WTP for a benefit. The bivariate and multivariate analysis helped in identifying the determinants of WTP for improved drinking water facilities.

CVM has been successfully applied to a variety of water related issues including sanitation, water supply (Whittington et al., 1990; Roy et al., 2004; Fujita et al., 2005; Misra & Goldar, 2008; Gunatilake & Tachiri, 2012). A study on Calcutta Municipal Corporation points out that WTP of households varies within a wide range and spending power and educational background of households play an important role as determining factors of WTP (Roy et al., 2004). Fujita et al. (2005) studied the WTP pay in Iquitos city, Peru and found that WTP was approximately twice of the current average payment level. Haq et al. also points out that people are willing to pay for improved water services. Further, a study conducted about WTP and affordability for improvements in WSS services in Delhi points out that domestic and non-domestic consumer are bearing a huge cost to cope with the inadequacies of water supply and sewerage services currently being provided. The results reveal that the consumers are willing to pay much more for improved services than the amount they are paying now (Misra & Goldar, 2008). Akram & Olmstead (2011) used CVM to estimate WTP for improved piped water quality and reductions in supply interruptions in Lahore, Pakistan and found that WTP is higher for water quality improvements than for water supply improvements. Furthermore, a WTP study conducted in Khulna city, Bangladesh reveals that both WTP for monthly water bill and WTP for the connection cost are higher for richer households. It shows that the huge connection cost is regarded as one of the major obstacles to expand the piped water among the poor (Gunatilake & Tachiri, 2012).

III. WILLINGNESS TO PAY (WTP) FOR IMPROVED WATER SERVICES

In CVM, there are two common contingent valuation questions; open-ended & close-ended. The close-ended CV question helps to evoke WTP from the respondents. For example, the respondents were asked to value drinking water, which is defined in terms of both quantity and quality. While the quantity aspect captured adequacy of

water supply in 24 hours, the quality aspect considered as drinking directly from tap. The respondents were required to answer with a "yes" or "no" in context of their willing to pay a given amount (bid) for public good.

Bid design is an important aspect from the point of view of efficiency of the estimators. Respondents were asked whether they would be willing to pay 1.5 times, 2 times, or 3 times their current monthly bill. These price multiples were assigned in order of the survey i.e., the first household was offered a price of 1.5 times their current bill, the second household twice, and so on. In Uttar Pradesh, water tax is charged based on annual rental value of the properties as assessed by Uttar Pradesh Jal Nigam for domestic households. For example, if the water tax is Rs.1200, the monthly water bill would be Rs.100. In view of this, three bids of Rs. 150, 200 and 300 were randomly used. Since the household's water bills vary significantly, the absolute amount of offered prices varied substantially. Further, this absolute amount represented by the relevant price multiple for each household was calculated and this was actually the offered price. So the offered prices were in the range of Rs. 75 to 375. The lowest bid prices were offered to the public tap users. The connection charges for unconnected households were not estimated as water expansion policy is beyond the scope of the study.

3.1. Determinants of Household Demand for Improved Water Service

The socio-economic and demographic characteristics of the households, the characteristics of the existing source of water and household's attitudes toward government policy in the water supply sector influences a household's willingness to pay for an improved water supply (World Bank, 1993).

Socio-economic Characteristics of Households

Socio-economic characteristics of households influence their response for WTP bid for improved water supply. A recent study also found that numerous socio-economic indicators, such as caste, education and income of the households determine the access to safe and clean drinking water (Tiwari & Nayak, 2017). Educated and higher income households provided more positive response for both bids of WTP, i.e. safe drinking water as well as 24 hour water supply than less educated and lower income households. Occupation and caste also affect WTP. Nearly 95 per cent professionals and semi-professionals are willing for improved water supply as compared to 64 per cent elementary and craft workers (Table 1).

The overall sample results reveal that about 80 percent of the respondents were willing to pay for water supply improvement, while 20 percent of the households were not willing to pay for water supply improvement with budget constraint being the common reason.

Table 1
Socio-economic Characteristic-wise Response of WTP for Improved Water Supply

Household Characteristics	*Willing for Improved Water Supply*		*Positive Response of WTP Bid for Safe Drinking Water*	*Positive Response of WTP Bid for 24 Hour Water Supply*
	Yes	*No*		
Income Level				
Lower Income Group	58	27	40	34
	(68.24)	(31.76)	(47.06)	(40)
Middle Income Group	63	9	55	44
	(87.5)	(12.5)	(76.39)	(61.11)
Upper Income Group	38	5	35	24
	(88.37)	(11.63)	(81.40)	(55.81)
Education Level				
No Education	20	18	16	13
	(52.63)	(47.37)	(42.11)	(34.21)
Intermediate	54	14	41	36
	(79.41)	(20.59)	(60.29)	(52.94)
Graduation	85	9	73	53
	(90.43)	(9.57)	(77.66)	(56.38)
Occupation				
Elementary & Craft Work	33	18	26	22
	(64.71)	(35.29)	(50.98)	(43.14)
Business & Clerical Job	87	19	69	54
	(82.08)	(17.92)	(65.09)	(50.94)
Professional & Semi-professional	39	2	35	26
	(95.12)	(4.88)	(85.37)	(63.41)
Caste				
General	113	21	94	72
	(84.33)	(15.67)	(70.15)	(53.33)
OBC	32	14	25	22
	(69.57)	(30.45)	(54.35)	(47.83)
SC	12	5	9	7
	(70.59)	(29.41)	(52.94)	(41.18)
ST	2	1	2	1
	(66.67)	(33.33)	(66.67)	(33.33)
District				
Kanpur	80	20	67	53
	(80)	(20)	(67)	(53)
Lucknow	79	21	63	49
	(79)	(21)	(63)	(49)
All Households	159	41	130	102
	(79.5)	(20.5)	(65)	(51)

Source: Tiwari, 2015.

Existing Water Supply and Perceptions

Household's WTP for an improved water supply also depends on existing source of water and its characteristics. There were four principal sources of drinking water in the study area; piped water, public tap, tube-well and hand-pump. About 49 per cent of the sampled households used municipal water supply consisting piped water and public tap for drinking purposes, while 29 per cent of the households used bore-well and 22 per cent received drinking water from hand pumps. None of the households said that the municipal water was available to them for 24 hours a day and all throughout the week. Majority of the households reported that the water was available only twice a day. The analysis shows that the source of drinking water affects WTP. Piped water users were more willing to pay for improved water supply both for quantity and quality (Table 2). Bore-well users were second in showing their willing to pay for improved water supply and WTP bid for safe drinking water while hand-pump users ranked second in providing positive response for 24 hour water supply. Public tap users had the least WTP among all sources. The most common reason cited for not willing to pay among the public tap and hand-pump users was lack of money.

Table 2
Source-wise Response of WTP for Improved Water Supply

Sources of Water	*Willing for Improved Water Supply*		*Positive Response of WTP Bid for Safe Drinking Water*		*Positive Response of WTP Bid for 24 Hour Water Supply*	
	Freq.	*Percent*	*Freq.*	*Percent*	*Freq.*	*Percent*
Piped Water	57	95	51	85	40	66.67
Public Tap	22	57.89	13	34.21	9	23.68
Bore-well	47	81.03	40	68.97	27	46.55
Hand-pump	33	75	26	59.09	25	56.82
Total	159	79.5	130	65	101	50.5

Source: Tiwari, 2015.

Household's WTP for an improved water supply also depends on perception of households about water quality. About 55 percent of the households reported dissatisfaction regarding the quality of drinking water available to them, while only 37 percent households reported drinking water provided by their principal source to be satisfactory (Table 3). Satisfaction about quality was much lower for households served by such principal sources as public tap / piped water because they were most affected by sand, mud, and foul smell, while bore wells was reported to be the safest drinking water source. There is a notion that the ground water pumped directly through bore-well and hand-pump is bacteria free and safe for drinking. A recent study by Tiwari

(2017) also confirms that the households encounter problems with municipal water services in terms of its look and smell in Uttar Pradesh.

Table 3
Perception about Quality of Drinking Water by Source (in Percent)

Source	*Not Safe at all*	*Not so Safe*	*Quite Safe*	*Very Safe*	**Can't say**
Piped Water	25	53.33	16.67	--	5
Public Tap	10.53	63.16	15.79	--	10.53
Bore-well	8.62	31.03	55.17	--	5.17
Hand-pump	4.55	22.73	59.09	2.27	11.36
Total	13	42	37	0.5	7.5

Source: Tiwari, 2015.

The results support the expectation that a household would be more willing to pay for an improved source when the perceived quality of the existing or an alternative water source is poor (Table 4).

Table 4
Quality-wise Response of WTP for Improved Water Supply

Response	*Clean*		*Cloudy*		*No Smell*		*Foul Smell*	
	Freq.	*Percent*	*Freq.*	*Percent*	*Freq.*	*Percent*	*Freq.*	*Percent*
Yes	109	78.99	50	80.65	119	79.33	40	80
No	29	21.01	12	19.35	31	20.67	10	20

Source: Tiwari, 2015.

3.2. Mean WTP for Improved Water Supply

The average willingness to pay for safe drinking water was about Rs. 167 per month while average WTP for 24 hour water supply was about Rs. 154 per month. The mean WTP for safe drinking water was found to be about Rs. 91 for lower income group and Rs. 253 per month for upper income group. It is clearly revealed that the mean WTP for 24 hour water supply is lower than the mean WTP for safe drinking water among all income groups. However, this difference is very little between quantity and quality improvement within the group (Table 5). The educated households were more willing to pay for improved water supplies in terms of both quantity and quality. The longer time in formal schooling in terms of years, the more people understand the consequences of using unsafe water in a better manner and the need to have reliable water supply. The head of the household who completed post-graduation was willing to pay about 2 times more than illiterate households for these improvements (Table 5).

WTP for improved water quality and reliability of supply is also affected by the occupation. The mean WTP of household belonging to professional and semi professional was Rs. 241 for water quality and Rs. 225 for water quantity improvement, whereas it was only Rs. 95 and Rs. 93 for elementary and craft workers respectively.

One reason may be their budget constraint. Mean WTP for both water quality and water quantity improvement was higher for large families than small families, as they get more affected by poor water supply than small families. Source-wise analysis shows that it is the highest for bore-well users and lowest for public tap users among all sources. It was Rs. 217 for safe drinking water and Rs. 211 per month for 24 hour water supply while piped water users were willing to pay Rs. 176 and Rs. 163 per month for such improvements. Public tap and hand-pump users were willing to pay only about Rs. 100 for safe drinking water.

Table 5
Mean WTP for Improved Water Supply by Household Characteristics (in Rs.)

Household Characteristics	*Safe Drinking Water*		*24 Hour Water Supply*	
	Mean WTP	*S D*	*Mean WTP*	*S D*
Income Level				
Lower Income Group	91.63	24.51	90.88	26.27
Middle Income Group	167.55	61.92	161.36	61.68
Upper Income Group	253.29	87.34	231.88	81.25
Education Level				
No Education	110	41.38	108.97	43.20
Intermediate	135	70.58	141.67	90.14
Graduation	206.74	75.18	191.72	58.84
Occupation				
Elementary & Craft Work	95.19	26.48	93.18	25.80
Business & Clerical Job	156.74	78.55	145.37	68.07
Professional & Semi-professional	241.57	77.57	225.19	76.11
Caste				
General	186.65	88.76	170.21	79.32
OBC	110	63.74	109.09	67.5
SC	138.89	41.67	142.86	44.99
ST	100	NA	100	NA
Family Size				
Small	154.04	61.94	157.38	62.32
Medium	159.76	92.96	145.85	81.78
Large	186.55	89.84	168.57	83.09
Primary Water Source				
Piped Water	176.33	85.46	163.78	70.26
Public Tap	100	41.29	86.11	13.18
Bore-well	217.63	84.75	211.67	84.36
Hand-pump	101.92	37.37	102	38.13
District				
Kanpur	181.64	97.95	170.85	94.31
Lucknow	151.98	71.37	136.74	51.92
All Households	167.27	87.06	154.46	78.45

Source: Tiwari, 2015.

The average willingness to pay for improved water services was higher in Kanpur than in Lucknow (Table 5). The mean WTP of Kanpur was Rs. 181.64 for safe drinking water and Rs. 151.98 for 24 hour water supply, while in Lucknow, it was Rs. 170.85 for safe drinking water and Rs. 136.74 for 24 hour water supply. Making such comparison for both the districts shows that the value of improved water supply was relatively much greater for households of Kanpur than the households of Lucknow. It may be attributed to the poor water supply in Kanpur. In all indicators, including look, pressure and frequency, the households in Kanpur were more affected from these problems than the households in Lucknow (Tiwari, 2017).

The analysis indicates that the households were more willing to pay for the water quality than the quantity. The reason may be several benefits which the households valued more while stating their willingness to pay for safe water supplies such as the avoidance of diarrhoeal and other water-borne illnesses, along with their associated costs, time and effort costs due to inadequacy or non-availability of the safe piped water (Dasgupta, 2006).

IV. EMPIRICAL ANALYSIS

In order to identify determinants of willingness to pay for improved drinking water facilities, a binary logistic regression is computed. The dependent variable was binary, assuming the value 1 if the household wants to pay more for improvement, 0 if he did not.

Based on descriptive statistics, an empirical model was developed to identify the factors affecting willingness to pay of households, as follows:

$$\text{Log } \lambda_i = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

where X_1 is source of drinking water, X_2 is education, X_3 is income, X_4 is importance of water for health and X_5 is the family size.

Among the predictors, the beta values indicate that drinking water source was the most significant variable (Table 6). Piped water is positively related to WTP that means the likelihoodness of paying more for improved water supply is higher for piped water consumers than those households who use other sources for drinking water. The odd ratios revealed that the probability of willingness to pay for improved drinking water was about 6 times higher for those households who used municipal piped water for drinking.

The results indicate that among the factors on socio-economic profiles of the households, estimated coefficients confirmed that education, importance for health and family size had positive and significant impact on willingness to pay for improved drinking water. The probability of willing to pay for improved water supply was about

4 times more than those households with heads with education till 12th standard or below. The effect of awareness about importance of water is significant on dependent variable. The probability for willingness to pay was more than 2 times greater than the households who were not aware.

The small and positive, though significant estimated coefficient of the family size variable shows that`W the household size and composition significantly affect the willingness for improved drinking water facility, whereas large families were more likely willing to pay for improved water facility than small families. Income has a negative effect on the WTP, although statistically the effect of income is not significant. The likelihood ratio test statistics indicate that the explanatory variables used for predicting willingness for improved drinking water facility explain a fairly good fit in the model. Thus, the result reveals that the probability of willingness to pay for improved drinking water is significantly high if the person has a piped water user, is aware of water quality and is highly educated.

Table 6
Results of Logistic Regression

Independent Variables	Reference Category	Coefficient	Odd Ratio
Source	Piped water =1, others =0	1.869***	6.48
Education	Above 12th Std.	1.368**	3.92
Income	Above 12,000 Rs.	-0.454	0.634
Important	Importance for health	0.9004**	2.46
Size	Size of Family	0.268**	1.306
Constant		-1.21**	
	Log likelihood = -83.53	LR chi^2 (5) 35.80	
	Pseudo R^2 = 0.1764	Prob > Chi^2 = 0.0000	

Note: The probabilities values of the marginal effects are reported in parentheses. The marginal effects significant at 1 percent, 5 percent and 10 percent levels are indicated by ***, ** and * respectively.

Source: Tiwari, 2015.

Models of WTP for Water Quality and Supply Improvements

The study measured WTP for two types of water supply improvement, viz., (a) WTP for water quality improvement (b) WTP for 24 hour water supply. The logit regression was used for identifying the determinants of WTP for piped water users and ground water users because piped water and groundwater households were different in their socio-economic characteristics, had different types of problems with their sources and, might have had different WTP functions. The logit model was used largely to estimate WTP in studies that use CVM since this model has the advantage of simplicity (Piaxo, et al., 2011). There are four possible models of WTP, viz., water quality improvement and piped water users, water quality improvement and groundwater users, water

quantity improvement and piped water users, water quantity improvement and ground water users. In all the four models, logit regression was used with the same set of independent variables.

4.1. Determinants of Water Quality Improvement for Piped Water Users and round Water Users

This section highlights the impact of household's socio-economic and educational status on the likelihood of accepting a bid for safe drinking water. The dependent variable is binary, assuming the value 1 if household accepts the bid to pay for water quality improvement and the 0 if he does not. Table 7 shows marginal effects of the explanatory variables on the probability of accepting the bid for water quality improvement. In Model 1, all the coefficients were statistically significant. Bid price of improved water quality was negatively related while education, income, awareness and family size were positively related with WTP. The negative sign of bid shows that as bid price offered to household increased, the household would be less willing to pay for improved water quality.

The positive sign of income coefficient implies that as households' income increases, they become more willing to pay for improved water quality. Among all odd ratios, income seems the most important variable for accepting WTP bid for quality improvement. The odd ratio of income suggests that the probability of accepting bid for water quality improvement was about 72 times higher for those households whose income was above 12,000 implying that with increased monthly income, the households' WTP would increase. The positive coefficient of regression for education implies that the higher educated households were more willing to pay than those households' heads that were educated below 12th standard. The probability of willingness to pay for improved water supply was about 3 times more than those household's heads that were educated till 12th standard or below. Knowledge about importance of safe water for health has positive and significant impact on WTP. The odd ratio of this variable suggests that the probability of willingness to pay for water quality improvement was about 3 times higher for those households who knew the importance of safe drinking water for health. Family size remains significant at 5 percent level and the estimated positive coefficient suggests that bigger the family size, there would be higher probability for acceptance of offered price for water quality.

The logistic analysis for groundwater users (Model 2) also shows similar relationship between dependent and independent variables except in the case of income (Table 7). Among the predictors, the beta values indicate that education is the most significant variable followed by importance of safe water. The odd ratios reveal that the probability of willingness to pay for safe drinking water is about 6 times more than those households' heads that are educated by 12th standard and below. Family size is positively while income is negatively related with dependent variable; however, they are not statistically significant.

The results of the two models about water quality improvements were quite similar for independent variables (bid, awareness for health and family size). It is difficult to say whether the effect of the offered price on WTP is stronger for piped water users or for groundwater users. The two coefficients do not differ significantly. Income is significant at 1 percent level for piped water users while it is not statistically significant for ground water users. Education is significant for both users. It means that income is more of a determining factor for accepting a bid for piped water users while education is more of a determining factor for ground water users.

Table 7
Results of Logistic Regression for water Quality Improvement for piped Water Users & Ground Water Users

Independent Variables	*Reference C Category*	*Model 1 Piped Water Users*		*Model 2 Ground Water Users*	
		Coefficient	*Odd Ratio*	*Coefficient*	*Odd Ratio*
Bid	Value of bid in Rs.	-0.207***	0.9795	-0.0075**	0.9925
Education	Above 12th Std.	1.233*	3.4299	1.7997**	6.0478
Income	Above 12,000 Rs.	4.273***	71.755	-0.247	0.7811
Important	Importance for health	1.206*	3.340	1.437**	4.2081
Size	Size of Family	0.318**	1.375	0.1827	1.2004
Constant		-0.068		-0.879	
Log likelihood = -43.451				Log likelihood = -57.175	
LR Chi^2 (5) = 39.62				LR Chi^2 (5) = 18.10	
Prob > Chi^2 = 0.0000				Prob > Chi^2 = 0.0028	
Pseudo R^2 = 0.3131				Pseudo R^2 = 0.1316	

Note: The probabilities values of the marginal effects are reported in parentheses. The marginal effects significant at 1 percent, 5 percent and 10 percent levels are indicated by ***, ** and * respectively.

Source: Tiwari, 2015.

4.2. Determinants of Water Quantity Improvement for Piped Water Users and Ground Water Users

This section highlights the impact of household's socio-economic and educational status on the likelihood of accepting a bid for 24 hour water supply. The dependent variable is binary; assuming the value 1 if household accepts the bid to pay for 24 hour water supply and the 0 if they do not. Among the predictors, the beta values indicate that income is the most significant variable for Model 3 (Table 8). Income is positively related to WTP that means the likelihoodness of WTP for 24 hour water supply increases as the income of household increases. The odd ratios reveal that the probability of accepting price bid was about 18 times higher for those households whose income was above than Rs. 12,000 per month. The positive sign of education coefficient implies that higher educated households were more likely to accept the

price bid than the less educated households. The odd ratio suggests that probability of willingness to pay for 24 hour supply was about 3 times higher for those households' heads that were educated till 12th standard or below. The negative sign of the coefficient of the bid indicates that bigger the value of the proposed fee, the lower is the probability of a household to accept it. Awareness for health and family size were not significant.

Estimates of the logit model for 24 hour water supply (Model 4) did not produce good results for ground water users, since only the bid and the awareness were statistically significant, where education, income and family size were not significant (Table 8). The negative sign of the coefficient of the bid indicates that the bigger the value of the proposed fee, the lower is the probability of a household to accept it. On the other hand, awareness about water affects the probability of accepting to pay offered price for 24 hour water supply in a positive way. It implies if a household is aware about the importance of water for health, he would be more likely to accept the price bid. Education was positively and income was negatively related to dependent variable but they were not statistically significant.

In all the four models, the regressors had a significant impact on the dependent variable. The first three models were significant at 1 percent level, while the last model was significant at 5 percent level. The price effects for water supply improvement were similar to those for water quality improvement. All coefficients were similar, negative and statistically significant at 1 percent level.

Table 8
Results of Logistic Regression for water Quantity Improvement for piped Water Users & Ground Water Users

Independent Variables	*Reference C Category*	*Model 3 Piped Water Users*		*Model 4 Ground Water Users*	
		Coefficient	*Odd Ratio*	*Coefficient*	*Odd Ratio*
Bid	Value of bid in Rs.	-0.0190***	0.9811	-0.0082**	0.9917
Education	Above 12th Std.	1.136*	3.1157	1.0453	2.8444
Income	Above 12,000 Rs.	2.864***	17.537	-0.3775	0.6855
Important	Importance for health	0.7973	2.219	1.400**	4.0564
Size	Size of Family	-0.090	0.9136	0.1841	1.2021
Constant		1.299		-0.9500	
Log likelihood = -53.788				Log likelihood = -62.713	
LR Chi^2 (5) = 28.24				LR Chi^2 (5) = 15.94	
Prob > Chi^2 = 0.0000				Prob > Chi^2 = 0.007	
Pseudo R^2 = 0.2079				Pseudo R^2 = 0.1127	

Note: The probabilities values of the marginal effects are reported in parentheses. The marginal effects significant at 1 percent, 5 percent and 10 percent levels are indicated by ***, ** and * respectively.

Source: Tiwari, 2015.

V. WTP: QUALITY AND QUANTITY

The previous section highlights an association between willingness to pay with selected variables for piped water users and ground water users separately. These variables explain a particular association, but there is a need to see the direction and strength of the association when all the variables are present together. Thus, combining the data of all sources of water, a multivariate logistic regression was undertaken by including "source" as a variable. In the first model, only those households were included who were willing to pay for improved water supply, while in the second model, all sampled households were included.

5.1. WTP for Water Quality

The dependent variable is binary, which estimates the probability of accepting bid to pay for water quality improvement (1 if household accepts the bid to pay for safe drinking water and the 0 if he does not). Variables that significantly influence WTP for water quality included bid, source of drinking water, large family size, education, importance for health and income, as can be seen on Table 9. The estimated coefficients confirm that among sources of drinking water, only piped water has significant association with WTP while bore-well and hand-pump are not significant. Piped water is positively related with dependent variable that means a household who uses municipal piped water, has a higher probability of accepting a bid than public tap users. The odd ratios reveal that probability of paying for safe drinking water is about 8 times higher for those households who use piped water than those with public tap as a principal source for drinking.

The effect of income on WTP is strong and positive. The upper income group is significant at 5 percent level while middle income group is significant at 10 percent level. This indicates that the households belonging to upper and middle income group are more likely to pay for safe drinking water than lower income group. The odd ratios reveal that probability of WTP for safe drinking water is about 30 times higher for upper income households and about 5 times higher for middle income households than lower income households. The negative coefficient of bid price indicates that increase in bid price decreases the probability of WTP. Large household size is positively and significantly related to WTP. This indicates that the households with large family size are more willing to pay for safe drinking water compared to those with small family size. Awareness about quality of water is also positively and significantly related with WTP. It implies that an aware household is more likely to pay for water quality than unaware. The odd ratio shows that the probability of accepting bid is about 4 times higher than those who do not understand the importance of water for health. The logistic analysis for all the households also shows similar relationship between dependent and independent variables except in the case of education and middle income group.

Table 9
Results of Logistic Regression for Water Quality

Model 1 Model 2

Without not willing (159 Households) Total (200 Households)

Description of Variables	*Model 1 Without not willing (159 Households)*				*Model 2 Total (200 Households)*			
	Coefficient	*Z*	*P value*	*Odd Ratio*	*Coefficient*	*Z*	*P value*	*Odd Ratio*
Source; piped water =1, others =0	2.029	2.00	0.045	7.612	1.8838	2.60	0.009	6.579
Source; Bore-well =1, others =0	0.109	0.90	0.367	3.033	0.3771	0.44	0.658	1.458
Source; hand-pump =1, others =0	0.921	1.32	0.187	2.512	0.6834	1.32	0.186	1.980
Value of bid in Rs.	-0.0156	-3.46	0.001	0.985	-0.01154	-3.54	0.000	0.9885
No education =1, others =0	1.4928	1.52	0.129	4.450	0.1635	0.27	0.784	1.178
Education; 13-17years =1, others =0	0.5392	0.67	0.505	1.715	2.09	2.18	0.030	8.085
Upper income Group =1, others =0	3.4078	2.45	0.014	30.201	2.09	2.18	0.030	8.085
Middle income group =1, others =0	1.6692	1.68	0.093	5.308	1.141	1.64	0.100	3.131
Large Family =1, others =0	1.451	1.91	0.056	4.271	1.249	2.40	0.017	3.488
Medium Family =1, others =0	0.6416	1.10	0.273	1.899	0.703	1.54	0.124	2.021
Important =1, others =0	1.4247	1.85	0.064	4.157	1.1918	2.18	0.029	3.293
Constant	-0.3065	-0.28	0.776		-0.9749	-1.19	0.236	
	Log likelihood = -55.3778 LR Chi^2 (11) = 40.29 Prob > Chi^2 = 0.0000 Pseudo R^2 = 0.2668				Log likelihood = -96.377 LR Chi^2 (11) = 66.22 Prob > Chi^2 = 0.0000 Pseudo R^2 = 0.2557			

Source: Tiwari, 2015.

5.2. WTP for Water Quantity

The dependent variable is binary, which estimates the probability of accepting bid to pay for 24 hour water supply (1 if household accepts the bid to pay for 24 hour water supply and the 0 if he does not). Variables that significantly influence WTP for 24 hour water supply include bid, sources of drinking water, importance for health and income, whereas family size and education remain insignificant for both models (Table 10). The estimated coefficients confirm that among the sources of drinking water, hand-pump is positively and significantly associated with WTP for both models. That means hand-pump users are more likely to pay for continuous water supply as compared to the public tap users. The odd ratios reveal that probability of WTP for 24 hour water supply is about 4 times higher for those who use hand-pump than public tap as a principal source for drinking. However, piped water is significant for second model.

The variable related to income of the households is significantly and positively associated with WTP. This indicates that the households belonging to upper and middle income group are more likely to pay for 24 hour water supply than the lower income group. One of the main reasons may be lack of money or budget constraint. The odd ratios of income vary between 4.22 belonging to middle income group to 11.69 belonging to upper income group. It means that probability of WTP for 24 hour water supply is about 4 to 12 times greater for those households belonging to upper and middle income groups as compared with the lower income households.

The coefficients are significant in all models. It is important to note that in all four models, the signs of coefficients are in accordance with economic theory. This is also reflected in research conducted by Raje et al. (2002), Piaxao et al. (2011). The results of the above four models are quite similar for independent variables (bid and awareness for health). It is difficult to say whether the effect of the offered price on WTP is stronger for safe drinking water or for 24 hour water supply. The coefficients do not differ significantly. Thus, the analysis shows that income is the key determinant of WTP for safe drinking water as well as 24 hour water supply. It does not mean that WTP depends solely on income, but water price, water source, family size, awareness also affects WTP. Bore-well users were not significantly associated with WTP as they had a reliable source of water.

Table 10

Results of Logistic Regression for Water Quantity

Description of Variables	*Without not Willing (159 Observations)*				*Total (200 Observations)*			
	Coefficient	*Z*	*P value*	*Odd Ratio*	*Coefficient*	*Z*	*P value*	*Odd Ratio*
Source; piped water =1, others =0	0.7472	1.01	0.313	2.111	1.1545	1.77	0.077	3.172
Source; Bore-well =1, others =0	-0.345	-0.04	0.968	0.9660	0.0659	0.09	0.931	1.068
Source; hand-pump =1, others =0	1.382	2.14	0.032	3.985	1.1095	2.10	0.036	3.033
Value of bid in Rs.	-0.012	-3.82	0.000	0.987	-0.0124	-4.13	0.000	0.988
No education =1, others =0	0.9632	1.28	0.202	2.620	0.1294	0.23	0.820	1.138
Education; 13-17years =1, others =0	0.3715	0.64	0.520	1.450	0.533	1.06	0.288	1.704
Upper income Group =1, others =0	2.458	2.67	0.008	11.686	2.073	2.55	0.011	7.956
Middle income group =1, others =0	1.753	2.47	0.014	5.774	1.439	2.38	0.017	4.219
Large Family =1, others =0	-0.0914	-0.17	0.867	0.913	0.2477	0.53	0.597	1.281
Medium Family =1, others =0	0.502	1.02	0.306	1.652	0.6167	1.45	0.148	1.853
Important =1, others =0	1.110	1.63	0.103	3.036	1.009	1.86	0.063	2.744
Constant	-0.404	-0.43	0.664		-0.8911	-1.11	0.266	
	Log likelihood = -86.2353				Log likelihood = -112.52085			
	LR Chi^2 (11) = 35.04				LR Chi^2 (11) = 52.14			
	Prob > Chi^2 = 0.002				Prob > Chi^2 = 0.0000			
	Pseudo R^2 = 0.1689				Pseudo R^2 = 0.1881			

Source: Tiwari, 2015.

VI. ESTIMATION OF AFFORDABILITY TO PAY (ATP)

WTP is a maximum amount which households are willing to pay for improved water services; it is difficult to use this data as basis of setting its tariff directly. It is necessary to set water tariff at price level that the majority of beneficiaries can actually afford because the water service is of highly public in nature. For that purpose, ATP is frequently referred and used (Fujita et al., 2005). Affordability has to be taken into consideration in determining the price levels to ensure that the fundamental water needs of the poor can be met (Devi et al., 2009; Wang et al., 2010). The ATP is considered as amount, which beneficiaries can pay for certain services, calculated with reference to household income and composition of household expenditures in the study area. The World Bank suggests that 4 percent of household income is a benchmark ceiling for affordable expenditures on water service in the developing countries (Akram & Olmstead, 2011; Fujita et al., 2005). While a recent study of reforming water supply and sewerage services in Delhi, took 3 percent of income as affordability criterion. This criterion was based on the ratio of water bill to income of the bottom 30 percent of households. The underlying assumption was that if the poor households can pay 3 percent of their income towards water bill, then households with higher income can also spend 3 percent of their income on water bill (Misra & Goldar, 2008).

Table 11
Comparison between WTP, ATP and Current Payment for Water Services in Study Area

Income Group	*Mean of Current Water Bill**	*Mean Safe WTP*	*Mean WTP 24 Hours*	*ATP (4 percent of Income)*	*ATP (3 percent of income)*
Lower	53.33	89.39	88.79	143.73	107.79
Lower-Middle	76.67	135.74	135.57	433.24	324.95
Middle	103.33	189.82	184.52	819.57	614.68
Upper-Middle	116.35	241.96	203.08	1277.24	957.93
Upper	118.75	275.00	265.91	2240.00	1680.00
Average	94.25	167.27	154.46	647.89	485.91

Notes: * In Study area, water tax is charged based on annual rental value (ARV) of properties due to absence of domestic water meters. It is 12.5 percent of ARV.

Source: Tiwari, 2015.

Using World Bank's benchmark of ATP, the average affordable water bill as a proportion of the household income was Rs. 143 to Rs. 2240 per month for different income groups (Table 11). Average mean WTP for safe drinking water supply was about Rs. 167 per month and for 24 hour water supply was about Rs. 154 per month, which is approximately 1 percent of the average household income in the study area. All estimates lie below the World Bank's benchmark. The average water bill of

the study area was about Rs. 95 per month. The analysis clearly brings out that the affordable water bills are well above the charges currently being imposed and the amounts that the respondents have said they are willing to pay. It is evident that the households are willing to pay much more for improved water services and what they are paying currently as water bill is well below the level of payment that they can afford for improved services.

VII. DISCUSSION AND CONCLUSIONS

The study measures WTP and the affordability for improved water services of drinking water. The consumers face considerable difficulties due to limited hours of water supply, low pressure and water quality issues. They are willing to pay much more for improved services what they are paying now. The article empirically analyses factors affecting WTP for improved water supply using the logistic regression analysis. The results show that willingness to pay for improved water services whether it is for quality or quantity does not depend solely on income, but equally on the socio-economic characteristics and sources of water.

It may be concluded that reliability of both water services and quality is important for the households within study area. However, WTP is the amount expressed by respondents on the basis of a hypothetical scenario, so that the results cannot readily be applied to the actual tariff system of water services, but it can provide significant basic information for cost-benefit analysis and tariff setting. The analysis brings out that even if the households are required to bear the cost of service improvement, the water charges will be well within the affordable bill limits. Average mean WTP for safe drinking water supply is about Rs. 167 per month and for 24 hour water supply is about Rs. 154 per month, this is approximately 1 percent of the average household income in the study area. All estimates lie below the World Bank's benchmark which is 4 percent of household income. From a public policy viewpoint, it appears possible to address the problem of water infrastructure financing using substantially increased water charges. Hence, it seems that cost recovery is possible even in the water sector if supply is improved.

References

Akram, A. & S. Olmstead (2011), "The Value of Household Water Service Quality in Lahore, Pakistan", *Environmental and Resource Economics*, Vol. 49, No. 2, pp. 173-198.

Dasgupta, P. (2006), "Household Water Services in Incomplete Markets: Managing Water Stress for the Urban Poor", in V. Ratna Reddy and S. Mahendra Dev (eds), *Managing Water Resources: Policies, Institutions and Technologies,* Oxford University Press, USA, pp. 229-245.

Devi, J. Sarla, B. Joseph, K. Karunakaram, B. Anurdha & K. Rama Devi (2009), "People's attitudes towards paying for water", *Current Science,* Vol. 97, No. 9, pp. 1296-1302.

Fujita, Yasuo, Ayumi Fujii, Shigeki Furukawa & Takehiko Ogawa (2005), "Estimation of Willingness to Pay (WTP) for Water and Sanitation Services through Contingent Valuation Method (CVM): A Case Study in Iquitos City, The Republic of Peru", *JBICI Review*, No. 11, pp. 59-87.

Government of India (2007), *Uttar Pradesh Development Report*, Planning Commission, New Delhi.

Gunatilake, H. & M. Tachiri (2012), "Willingness to Pay and Inclusive Tariff Designs for Improved Water Supply Services in Khulna, Bangladesh", South Asia Working Paper Series No. 9, Asian Development Bank.

Haq, M., Usman Mustafa & Iftikhar Ahmed (2007), "Household's Willingness to Pay for Safe Drinking Water: A Case Study of Abbottabad District", *The Pakistan Development Review,* Vol.46, No.4, pp. 1137-53.

Misra, S. & B. Goldar (2008), "Likely Impact of Reforming Water Supply and Sewerage Services in Delhi", *Economic and Political Weekly,* Vol.43, No.41, pp. 57-66.

Piaxao, Adriano, Wilson Vieira & Joao Lima (2011), "Contingent Valuation of Improvement in Basic Sanitation Services: A Case Study in Brazil", *Economic and Environmental Studies,* Vol.11, No.3, pp. 213-234.

Raje, D. V., P. S. Dhobe & A. W. Deshpande (2002), "Consumer's Willingness to Pay More for Municipal Supplied Water: A Case Study", *Ecological Economics,* Vol. 42, No.3, pp. 391-400.

Roy, Joyashree, Subhorup Chattopadhyay, Sabyasachi Mukherjee, Manikarnika Kanjilal, Sreejata Samajpati & Sanghamitra Roy (2004), "An Economic Analysis of Demand for Water Quality: Case of Kolkata", *Economic and Political Weekly,* Vol. 39, No. 2, pp. 186-192.

Tiwari, Rashmi & Sanatan Nayak (2014), "Urban Water in India: Pricing and Challenges", *Review of Development and Change,* Vol. 19, No.1, pp. 93-108.

——, (2017), "Drinking Water, Sanitation and Waterborne Diseases", *Economic and Political Weekly,* Vol. 52, No.23, pp. 136-140.

Tiwari Rashmi (2015), *Water Sector in Uttar Pradesh: An Economic Analysis of Drinking Water and Sanitation* (Ph. D thesis), Babasaheb Bhimrao Ambedkar University, Lucknow.

——, (2017), "Inequality, Sufficiency and Sustainability of Urban Drinking Water in Uttar Pradesh," *Social Change,* Vol. 47, No. 2, pp. 214-229

Vaidyanathan, A. (2006), *India's Water Resources: Contemporary Issues on Irrigation,* Oxford University Press, New Delhi.

Wang, Hua, Jian Xie & Honglin Li (2010), "Water Pricing with Household Surveys: A Study of Acceptability and Willingness to Pay in Chongqing, China", *China Economic Review,* Vol. 21, No.1, pp. 136-149.

Whittington, Dale, John Briscoe, Xinming Mu & William Barron (1990), "Estimating the Willingness to pay for Water Services in Developing Countries: A Case Study of the use of Contingent Valuation Surveys in Southern Haiti", *Economic Development and Cultural Change,* Vol. 38, No.2, pp. 293-311.

World Bank (1993), "The Demand for Water in Rural Areas: Determinants ands Policy Implications", *The World Bank Research Observer,* Vol.8, No.1.

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Structural Transformation, Population Ageing and Elderly Labour Force Participation in Kerala, India

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This paper attempts to explore the pattern of elderly Labour Force Participation (LFP) in Kerala and its determinants using both secondary and primary data. National Sample Survey Office (NSSO) data from 1983 to 2011-12was used to find out the broad trends and changing pattern of elderly LFP rate, whereas, the primary data was used to provide an in-depth analysis of the factors determining their LFP in Kerala. Using stratified random sampling method, information was collected from 801 households selected from three districts in Kerala. The major findings of the paper suggest that elderly LFPR is high in Kerala. At the macro level, it is mainly due to the ongoing structural transformation process owing to agricultural transformation, which has very close connection with the changing social and family structure. At the household and individual level, poverty and old age financial insecurity are the major determining factors of elderly LFP in Kerala. As a higher percentage of elderly population is engaged in the informal sector jobs (mostly in the service sector), provision of appropriate health and social security norms would help in improving their overall wellbeing in Kerala.

Keywords: *Elderly population; Labour force participation; Social security; Kerala*

I. INTRODUCTION

Kerala's economy has been experiencing a number of changes in its productive sectors and other dimensions of the economy. The economy has changed from a traditional backward agrarian economy to a modern growing economy (Rajan, 2011). This change has led to a structural transformation of Kerala's economy, giving it a non-agrarian character, both in terms of income and employment (Kannan, 2011). The rise of income and employment in service sector is one of the important driving forces behind the increase in elderly labour force participation decision. Moving from an agriculture-oriented employment towards a service-oriented employment will reduce the physical stamina required for work. Thus, inviting more of the elderly people to participate in the labour market.

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As compared to all India and other major states, the labour force participation of elderly is high in Kerala. It is estimated that the proportion of total elderly in the labour market was 32.29 per cent with 51.21 per cent among elderly males and 15.47 per cent among elderly females during 2011-12 (NSSO, 2012). This is a huge percentage for a section of population which is vulnerable to health problems. Hence, they need more emotional, mental, physical and economic support than other sections of the population. A few advanced states like Goa (8.19 per cent), Delhi (24.06 per cent), Haryana (27.78 per cent) and-, Uttarakhand (26.93 per cent) are far behind Kerala in terms of the elderly labour force participation. Elderly labour force participation in Kerala is equally comparable with some of the other advanced states of India like Punjab (34.92 per cent), Maharashtra (33.21 per cent) and, Tamil Nadu (37.6 per cent) etc. But these states are mainly dependent on agriculture sector unlike Kerala, which is least dependent on agriculture. In Kerala, about 71 per cent of the population depends on service sector, but still having a high proportion of elderly is found in the labour force.

Labour force participation has gone through significant changes, especially for the elderly. These changes are mainly due to the social and economic factors. Social factors, such as longer schooling for younger population results withdrawal of the younger population from the labour market and increases the participation of elderly. Other factors include, changing role of women in the household, changing family structure, urbanization and migration of younger people; demographic factors such as decline of fertility rates, improved health and longevity (Oshio and Usui, 2018). The economic factors include rate of unemployment, e average income of household, lack of social security benefits, share of part-time employment in total employment, the share of the services sector or high wage rate in the economy and others. The structural transformation in Kerala economy has increased the share of service sector jobs encouraging the elderly to stay longer in the labour force due to less amount of physical work needed.

Traditionally, Kerala has a joint family system and usually the elderly stay with their adult children. This traditional pattern of living arrangement places the responsibility for the care of elderly members (Gulati and Rajan, 1999) with the adult children. Such a living arrangement usually provides the elderly with both an emotional as well as economic support (Rajan and Kumar, 2003). However, with economic and social changes, urbanization, migration, nuclear families are at a rise. Consequently, family care and economic support for the elderly has been declining (Dandekar, 1996; Gulati and Rajan, 1999; Rajan and Kumar, 2003; Rajan, 2007; Pal and Palacios, 2011). Improving the health status of the elderly is essential in order to encourage employment among older people (Adhikari et al., 2011). Kerala's achievements in the health sector have

been often cited as role models for the country as a whole. Some of its health indices could be comparable with that of the developed countries of the west (GoK, 2018). As a result of the improved health sector, elderly in Kerala have a good health status which leads them to participate in the labour market even in the older age. There are several social security and pension schemes available in Kerala like disability pension, widow pension, old age pension, unmarried women pension, agriculture labour pension and others. However, the amount provided by these social security schemes is too small to meet the needs and consumption expenditure of the elderly but the coverage of the schemes have been modest (Kumar and Anand, 2006; Dandekar, 1996; Rajan, 2007; Narayana, 2011). Thus, the elderly have to continue working in their old age in order to meet their day-to-day expenses. When the older generation loses the support of their children (Sonawat, 2001) due to urbanization, induced migration of younger adults of the family, it forces the elderly to join the labour market.

This paper is organized in five sections. Section two provides a brief review of literature (both theoretical and empirical) on elderly labour force participation. Data and econometric methods used in the estimation of determinants of elderly LFPR is explained in the section three. Section four provides a discussion on trends of the sectoral employment and labour force Participation of Elderly in India and Kerala. Finally, the section five provides concluding remarks along with some policy suggestions.

II. A BRIEF REVIEW OF LITERATURE

The determining factors for elderly LFPR is different among different countries. In the developed countries like USA, UK, Canada, Mexico, Australia, Germany, Spain, Netherlands and Sweden, good health is the most important factor that determines LFPR of the elderly. A better health causes a stronger attachment to the labor market in Mexico (Van Gameren, 2008). If elderly's health is poor, it discourages them from participating in the labour market and vice versa. Different health indicators impact elderly's participation in Europe differently (Kalwij and Vermeulen, 2005). Improved health conditions may help over 10 per cent higher participation rates in countries like Australia, Germany, Spain, Netherlands and Sweden. Most of the elderly retired from the labour market because of poor health in USA (Davis and Oever, 1985). Green (2006) explains the unexpected impact on health on the labour supply of the oldest Americans. Level of educational attainment is another factor that determines labour force participation and remains a positive determinant of the labour market participation decision in U.S, Canada and U.K (Schirle, 2008). It is mostly concentrated among the educated, wealthiest and healthiest elderly (Best and Kale, 1996; Haider and Loughran, 2010; Hill, 2002).

Another factor that determines LFPR of the elderly is social security. When the elderly population is getting enough social security benefits, they are ready to withdraw from the labour market irrespective of their health status. In more of the developed countries, social security provision by the state is an essential part of their living standards (Kulkarni et al., 2014). In these countries, majority of the elderly in the labour force are able to receive some form of formal social security benefits which contributes a major part of their retirement income (Crawford and Lilien 1981). This lowers the work participation in their old age (Boskin, 1977 and Quinn, 1977). Elderly's retirement decisions in the developed countries are very much influenced by the economic factors such as availability of pension, financial incentives and others. Higher social security benefits result in early retirement from the labour market (Samwick, 1998; Gratton, 1987; Wise, 2004; Pampel, 1979; Guillemard, 1989; Hernaes et al., 2016; Moulton and Stevens, 2015; Supan and Schnabel, 1998; Sugawara and Nakamura, 2014; Oshio and Oishi, 2004). Growth in pension coverage or social security provisions contributed towards the decline in labor force participation of older Americans (Quinn, 1977; Samwick, 1998; Wise, 2004). The size of social security old age benefits, representing social security wealth at retirement ages, has a strong negative effect on participation, particularly among women (Hanoch and Honig, 1983). Market oriented social insurance of elderly care policy has decreased the work participation of elderly female in Japan (Sugawara and Nakamura, 2014).

Unlike in the developed countries, LFPR of elderly in the developing and under developed countries is determined by poverty and income shortage. Most countries in sub-Saharan Africa are struggling to attain both the financial resources and the political will to implement social protection policies (United Nations). In the developing and under developed countries, elderly are forced to work until very old age due to poverty and even those who stop working, withdraw themselves primarily because of poor health (Gaminiratne, 2004; Vodopivec and Arunatilake, 2011).

Lack of vocational or technical training reduce the probability of participation in the labour market (Nasir et al., 2000) and the educated ones are less likely to continue in the labour market since high levels of human capital formation helps them to save enough to meet their old age requirements (Nasir et al., 2000; Alam and Mitra, 2012). Older workers in South Africa face an increasingly competitive labour market characterized by high unemployment and limited opportunities especially for those with poor education and training (Lam et al., 2006; Tati, 2005). Majority of the working elderly are engaged in the agriculture sector where there is no offset/predefined retirement age (Nasir et al., 2001; Giang and Pfau, 2007). Within the agricultural sector, there is no difference in work stoppage across regions. Workers simply continue to work until they get physically unable (Friedman et al., 2001).

In India there are a number of micro as well as macro factors that determine the LFPR of elderly. Poverty, unavailability of social security benefits, nuclear family system, longevity, structural transformation are a few among them. Majority of the Indian elderly workers are engaged in the unorganized sector where no retirement pension or social security benefit is available.

Elderly living alone or with other elderly members have experienced more poverty, compared to those elderly living with non-elderly members in India (Srivastava and Mohanty, 2012). As a result of high incidence of poverty, elderly living alone or living with other elderly members are participating more in the labour market, especially in the informal or unorganized sector. Around 90 per cent of the total elderly labour force is a part of the informal or unorganized economy (Narayana 2011; Srivastava and Mohanty, 2012) and benefits from public pension schemes are not adequate enough to meet their consumption needs (Narayana 2011). Most of the elderly people in India do not have enough savings to meet their requirements in the old age. Majority of them tend to work even after post retirement due to inadequate old age security, both emotional as well as material (Rajan, 2014). Those who are involved in agriculture or casual wage labour have access to income only during the time they are working. Once they stop working, they become totally dependent on their children or relatives. As a result, elderly men and women continue to work much beyond what is normally regarded as the working ages (Gulati, 1993; Ladusingh and Narayana 2011). The total number of elderly workers in India was approximately seven per cent of the total work force in 2004-05 and it slightly increased to 8 per cent in 2011-12. WFP of elderly declined from 42 per cent in 1983 to 39 per cent in 2004-05. This is mainly due to the increasing elderly mainly in the group of higher age group, as age increases the participation of elderly declines (Selvaraj et al. 2011). Most of the Indian elderly are working as self-employed or in the informal sector jobs (Samordov, 1999; Chakraborty and Sekhar, 2011; Reddy, 2016).

Normally in India, elderly people live with their families and family is the most important supporting institution for aged people in their advanced age (Gupta, 2009; Sebastian and Sekhar, 2012; Bloom et al, 2010). Now-a-days the family set up has changed from joint family to nuclear family and the number of adult members in the family has separated. So, the elderly members are also in the labour market.

The ageing scenario of Kerala is different as compared to the other states of India. Earlier studies conducted on ageing in Kerala are mostly concentrated on the health aspects, old age homes, elderly women', consumption pattern of elderly and others. (Gulati, 1993; Prasad and Beena, 2008; Rajan and James, 2007; Kumari, 2010; Sebastian and Sekhar, 2012). Studies conducted on the work force participation of aged population is the least in Kerala. The present study explains why elderly LFPR

is high in an advanced state like Kerala. What is its composition on sector, sex, caste, employment, age group, nature of employment and others? The study assumes that the states which are turning to elderly society will have higher elderly LFPR and elderly LFPR will decline with improved level of economic development.

III. ON DATA AND METHODS

This paper is based on both secondary and primary data. The main source of secondary data was National Sample Survey Organization (NSSO). Various rounds of NSS (period 1983, 1987-88, 1993-94; 1999-00, 2004-05, 2009-10 and 2011-12) were used to identify the broad trends and patterns of elderly LFP in Kerala. Moreover, NSS data was also used for designing the methodology of primary survey. Information on number and share of older people and other demographic and socio-economic details were collected from Census Population data (2011), NSSO reports on employment and un-employment (2011) and Economic review of State Planning Board (various years).

Methodology of Primary Survey

Primary data was collected from Kerala. First, Kerala was divided into three major regions based on the geographical[1] locations (viz. Northern, Central and Southern regions).One district from each of these three regions was selected for Primary survey. District Kozhikode from the Northern Region, Ernakulam from the Central Region and Trivandrum from the Southern Region were selected. The selected districts possess the highest number of elderly population within their regions (as per Census data, 2011).

From each of these districts, one taluk was randomly selected (using lottery method). And from each of these taluks, one rural village and one urban ward was selected. Given the total number of households in each of the selected villages (and wards), number of sample households to survey was fixed using normal distribution criteria (at 90 per cent confidence interval) and using the sample size calculator with the help of *Raosoft*[2] online sample calculator. The details of sample districts, taluks and villages as well as the sample size is given in *Annexure 1*. Out of the total 53144 households only 801 households were surveyed with a pre-tested interview schedule. This interview helped in collecting social and economic details of the households. In addition, information on elderly's health and labour force participation was also collected.

Demographic, Socio-economic Profile of Selected District

District Kozhikode

The Kozhikode metropolitan area is the second largest urban agglomeration in Kerala with a population of 2 million in 2011. The district is situated in the northern part of Kerala and highest number of elderly population among the northern districts.

The district has three taluks viz, *Vadakara, Quilandi and Kozhikode*. *Vadakara* taluk was selected for the primary survey.

District Ernakulam

Ernakulam is the most industrially advanced and flourishing district of Kerala compared to the other districts. It is highest revenue yielding and richest district in Kerala in terms of GDP and per capita income. It contributes 41.74 per cent of the total state revenue. The district is situated in the central Kerala and has the highest number of elderly population among central districts. It has seven taluks viz, *Kunnathunad, Aluva, Paravur, Kochi, Kanayannur, Muvattupuzha* and *Kothamangalam. Kothamangalam* was selected for the survey.

District Thiruvananthapuram

Thiruvananthapuram stretches along the shores of Arabian Sea for a distance of 78 KMs. The district is situated in the southern part of Kerala. It has four taluks viz, *Chirayinkeezhu, Nedumangad, Thiruvananthapuram* and *Neyyanttinkara. Chirayinkeezhu* was selected for the survey. The demographic and socio-economic profile of the selected districts is shown in *Annexure 2*

Econometric Methods Used

To identify the individual- and household-level factors that determine the elderly labor force participation (LFP) decision, at the micro level, elderly labor force participation function was estimated. Since the dependent variable is dichotomous (which assumes value 1 for labor force participation and zero otherwise) and having a very large sample, probit regression was the appropriate choice. Both instrumental variable (IV) probit regressions models are used.

IV. FINDINGS

4.1 Trends and Patterns of Elderly Labour Force Participation in Kerala

In a country like India, where no social security exists, people tend to work as long as they can (Rajan, 2010). People who were either 'working' (or employed) or 'seeking or available for work' (or unemployed) constitute the labour force. It consists of the economically active population in a particular age group as a percentage of the total population of that same age group (United Nations, 2013). The elderly in the developing countries like India face different problems than those faced by the same age group in the developed countries. In developed countries, the majority of the elderly labour force has access to some form of formal social security benefits which is the major source of their retirement income (Crawford and Lilien, 1981). However, in India the system is entirely different as the workers in formal and informal sector

faces differences in retirement system and also in the access to retirement pension. Only a small portion of elderly workforce engaged in the formal sector and have a proper retirement system and formal social security benefits. The rest of the lion share engages in the informal sector employment and has no retirement schemes or pensions and is expected to work even in their old age.

The proportion of people in labour market drops significantly after people reach their sixties and under-represented in the labour market. Different explanations have been provided for such a decline including lack of requisite skills in elderly workers, employment and wage discrimination, restructuring and tightening of labour market rules which reduced the availability of older workers and others (Whiting, 2005).

Elderly people today are considerably less likely to participate in the labour force than they were in the past. It may be because of many reasons. Among elderly population, gender differences are more noticeable. It may be due to sexual division in families where women are expected to stay at home for domestic work. Basically, a large number of women work but their contributions to the labour market remains undetectable as many of them are not paid workers (Paltasingh, 2012; Mehrotra and Parida, 2017). Especially in the case of elderly women, they are expected to stay and take care of their young grandchildren. So eventually, as a result the labour force participations of elderly women is low. Elderly females' participation has declined by around 46 per cent from 28 per cent in 1983 to 15 per cent in 2011-12 in Kerala (See Figure 1). Over all, elderly participation was 32 per cent in 2011-12 which is less than the national average. This declining LFPR in Kerala may be due to relatively better social security system and low level of poverty in the state as compared to the earlier days. Among elderly men in India, the labour force participation reduced from 63.4 per cent in 1983 to 57 per cent in 2011-12. Among women, the reduction was considerably high, from 20.7 per cent in 1983 to 17.4 per cent in 2011-12. Labour force participation rate continues to be high in the case of older men compared to older women. Low physical stamina of females and their higher participation in household activities may be the reasons for their low participation in labour market at old age (Rajan and Mathew, 2006). Declining LFPR of elderly women presumably the result of rising household incomes from other sources, as well as the open market wage rates rising in both rural and urban areas (Mehrotra et al., 2014). The relatively high male labour force participation could be due to having more financial responsibilities than women, even in the later part of their life (Sai et al., 2010).

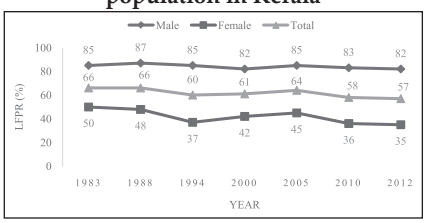
Higher proportion of working age group (15-59 years) is considered as a demographic bonus contributing to the development of a state. LFPR of working age males in Kerala remained stable during the period between 1983 and 2011-12. During 1983, the male labour force participation in Kerala was 85 per cent and it was 82 per cent in 2011-12 with a meager change of 3.5 per cent. But among females,

the withdrawal was much higher. It declined from 50 per cent to 35 per cent with a declining rate of 30 per cent. There are many reasons for this decline of LFPR among females including attainment of education as one of them. Especially women in rural areas are now pursuing higher education and they are not available for the labour force (Chowdhury 2011, Rangarajan et al. 2011, Neff et al., 2012). Another reason for the withdrawal of females from labour market is income effect. As compared to the earlier days, household's incomes could have risen due to higher wage levels. As a result, it could have taken off the pressure on women to seek distress employment in times of economic hardship (Mazumdar and Neetha, 2011). Other reasons could be non-availability of job opportunities within their locality and some security issues due to increasing criminal activities against women. These may be the reasons for restricting young girls from moving out of their village or home town for work (Mehrotra and Parida, 2017). In India, the male working age population has declined more than that in Kerala. Women belonging to 15-59 age groups have much lower labour force participation rate than that of the corresponding age group of males. During 1983, 90 per cent of the males participated in the labour market in India, while in 2011-12 it has declined to 82 per cent by a decline of 8.2 per cent. In case of females, LFPR declined by 30.3 per cent from 47.6 to 33.2 per cent.

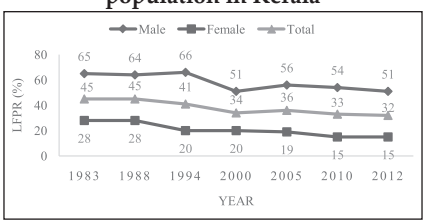
Figure 1

Comparison of Labour Force Participation Rate of Working Age and Elderly Population in Kerala & India, 1983-2012

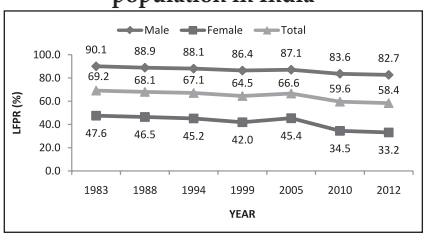
Panel A: **LFPR of working age (15 to 59 years) population in Kerala**



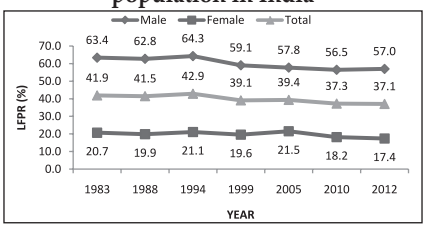
Panel B: **LFPR of Elderly (60 years and above) population in Kerala**



Panel C: **LFPR of working age (15 to 59 years) population in India**



Panel D: **LFPR of Elderly (60 years and above) population in India**



Source: Authors' estimates from the NSS Unit-level data, various rounds

Table 1
Sector and Sex-wise Labour Force Participation Rate (%) of Working Age and Elderly Population in Kerala and India

Year	LFPR of working age population (age 15 to 59 years)						LFPR of Elderly (60 years and above) population					
	Rural Areas			Urban Areas			Rural Areas			Urban Areas		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Kerala												
1983	85.3	52.4	67.7	84.8	39.1	60.6	65.4	29.8	46.2	60.5	21.9	38.3
1987-88	87.0	50.2	67.3	85.0	37.4	60.4	64.5	29.4	45.8	60.0	19.1	38.8
1993-94	84.8	38.0	59.7	83.9	35.6	59.0	68.0	22.0	42.7	61.2	15.5	35.3
1999-00	82.7	41.9	61.3	78.7	41.5	59.3	50.7	20.0	33.6	51.5	18.4	34.2
2004-05	84.8	45.9	64.0	84.2	42.6	62.7	58.9	19.6	37.3	48.3	17.1	31.3
2009-10	83.5	36.7	58.3	80.1	34.5	56.2	57.6	17.6	36.4	43.3	7.9	23.9
2011-12	82.7	36.6	57.7	81.7	32.5	55.5	54.0	18.6	35.5	43.2	7.5	23.5
2017-18*							59.5	14.0	34.3	52.0	10.1	27.2
India												
1983	91.8	54.9	73.3	85.4	24.8	64.8	66.7	22.6	44.8	50.4	13.8	31.3
1987-88	90.5	53.0	71.8	84.0	25.1	64.6	66.8	22.0	44.7	46.8	12.0	29.2
1993-94	89.8	52.1	71.2	83.3	25.1	64.7	69.8	24.1	47.4	44.2	11.3	27.3
1999-00	88.3	48.7	68.5	81.9	23.5	63.6	63.6	22.8	43.4	42.2	9.6	24.4
2004-05	88.7	52.4	70.6	83.4	26.1	64.9	64.5	25.4	44.8	36.6	10.0	22.8
2009-10	84.8	39.9	62.6	80.9	21.0	62.3	64.7	22.6	43.7	34.2	7.0	20.2
2011-12	83.6	37.9	60.9	80.9	22.2	62.5	64.9	21.3	43.1	36.5	7.7	21.8

Note: *Implies primary survey data collected during 2017-18.

Source: Authors' estimates from the NSS Unit-level data, various rounds.

As expected the labour participation among females is very low particularly in urban areas. Around 60 per cent of the elderly men and 22 per cent of elderly women were working in urban Kerala during 1983 (See Table 1). In urban areas relatively higher proportion of people were employed in formal sector regular jobs. These urban sector employers can expect to receive a pension upon retirement. While, the rural sector employers are largely working on informal farm and non-farm jobs which not only gives low income but also does not offer any retirement pension. So the urban people are themselves to find their future income by continuing work. This may be a result of inadequate provision of social security for the elderly, which has left the majority without any economic support and resultant need to continue to work in their old age (Reddy, 2016). In rural Kerala, 65.4 per cent of elderly men and 29.8 per cent of the elderly women were working in 1983 and it has declined to 54 per cent and 18.6 per cent respectively in 2011-12. The declining rate was higher among elderly females (37.6 per cent). During the period 1999-2000 to 2004-05 the rural female labour force had increased by 7.6 per cent and the urban female labour force had increased by 11.1 per cent among the working age group. Both being the highest increment in

the labour force between two NSS rounds. For elderly females, it has increased by 11.4 per cent and 4.2 per cent respectively. For urban males too we find this rise in 2004-05 followed by a decline in 2009-10.

As compared to urban elderly, rural elderly is more likely to participate in the labour market. Out of the total elderly population in the rural area, 34.3 per cent are engaged in the labour force with 59.5 per cent of male elderly and 14 per cent of female elderly (Table 1; 2017-18*). While in urban area, the LFPR is only 27.2 per cent with 52 per cent of male elderly and 10.1 per cent of female elderly. The incidence of financial insecurity has been found to be greater among the rural elderly, female elderly (particularly widows), the aged residing in nuclear families or alone etc. (Rajan, et al., 2003). So this category gets forced to participate in the labour market.

The probability of participating in labour force decreased significantly with increasing age. The fall in the female LFPR is mainly because of the steep fall in employment in the agricultural sector (Sanghi et al., 2015). The decline in LFPR in agriculture sector is not compensated by an increase in the participation in industrial and service sector. In the last three decades the decline of LFPR of 65-69 years age group of elderly male and female was 31.2 and 31.7 per cent respectively in Kerala (See Table 2). The interesting fact is that the LFPR of elderly male in the age group of 75 years and above has showed an increasing trend during the above period. It has increased from 31 per cent to 36.1 per cent with an increase of 16.5 per cent indicating ageing of older population in the state. Unlike developed countries, one of the important reasons for withdrawal of labour market is poor health. As age increases, health deteriorates. This may be one of the reasons for declining LFPR with increasing age. And another thing is retirement age. Some of the government institutions have the retirement age set as 60 to 65 years. So, the elderly in the age group of 60-64 years are still in the service and they are counted as employed or labour market participants.

Among the different age groups, majority of the state's elderly workforce population belongs to the age group 60-64 years and least majority is in the age group of 75 plus age group. The elderly working male population aged 60-64 during 1983 was 83.3 per cent. It has declined over the years and reached to 67.9 per cent with 18.5 per cent decline. However, this group still has the highest share of participation in the labour market. In case of female workers, it has declined sharply from 43.9 per cent to 23.2 per cent with a decrease of 47.2 per cent. As age increases, LFPR of elderly deteriorates. That is clearly reflected in table 2. Female LFPR is very low among the 75 plus age group. A mere 2 per cent of the total elderly female population is in the labour force. In the same age group, male LFPR is 21 per cent. Among the 60-69 age groups, three forth of the male elderly are still in the labour force. They may be working for supplementing family income, or for making themselves as independent. But in the case of elderly female, 80 per cent are out of the labour force. They are dependent of their spouse or children's.

Traditionally in India, the participation of women in the workforce has been low in all the communities. There is some evidence that when household income goes up, women generally withdraw themselves from the labour market. The LFPR for males was much higher than those for females for all religious groups. The LFPR among Christians is higher as compared to other religious groups. It may due to higher literacy levels in the community. The decline in LFPR was mainly among the Muslim community with 72.8 per cent decline among females and 26.4 per cent in males from 1983 to 2011-12 (Table 2).

LFPR varies across religion and caste. In terms of labour force participation, Muslim community is behind other religious communities and the lag is more among Muslim females. When disaggregated by religion, it is found that only 6 per cent of elderly Muslim females are in the labour force as compared to 14 per cent of elderly Hindu females and 11 per cent of Christian females. Elderly males' participation is also low among Muslims as compared to Hindus. Low educational status of Muslims in comparison with their Hindu counterparts is reflected in the lower labour force participation among Muslims (Das, 2003). Another reason might be their cultural norms and seclusion. SC/ST communities are the most deprived category and they have the highest labour participation rate. Elderly women are also in the labour force among this category. It may due to higher incidence of poverty or low standard of living compared to other communities.

A large section of the Muslim community prefer women to stay at home, which is one of the reasons for low work participation among them. Lack of education and work opportunities for females, cultural factors such as the practice of Purdah and seclusion might have affected the Muslim females LFPR at the state level (Sarikhani, 2008). The Purdah system also prohibits women from holding noticeable social roles. This makes Muslims women unable to participate in visible work force when compared with women in other religions. Any country or region with higher proportions of Muslim community, women may likely have lower labour force participation rate. In Kerala, some districts like Malappuram, Kozhikode and Kasargod have high percentage of Muslim population with a comparatively very low LFPR. District with high Christian population, such as Kottayam, Idukki, Ernakulam and Pathanamthitta, have high LFPR. So, religion also plays an important role in determining the labour market participation. The low participation exists within Muslim community maybe the impact of gulf migration also. They are getting a large amount of money as foreign remittances. So that both males and females are reluctant to participate in the labour market.

The benefits from government and other organizations have not really trickled down to all sections of the society. Elderly who belong to historically, socially

and economically most disadvantaged social groups had the highest labour force participation rates. Economic deprivation has been much more pronounced among these social groups. Looking across social groups, elderly LFPR is highest among the ST communities in Kerala, both for males and females. During 1983, about 70 per cent of elderly male and 4 per cent of elderly females in the ST community are in the labour force. It may be attributed to their relative social and economic disadvantage compared to other groups. For males, there wasn't much decline in their percentage of participation. It has declined to only 67 per cent in 2011-12 with a mere 4 per cent decline. However, for elderly females, LFPR has declined to 24 per cent with a 47 per cent decrease.

Table 2
Patterns of Elderly (Age 60 years and above) LFPR by Socio-Economic and Demographic Groups in Kerala

Socio-economic & demographic groups		*Elderly LFPR (in %)*													
		Males							*Females*						
		1983	*1988*	*1994*	*2000*	*2005*	*2010*	*2012*	*1983*	*1988*	*1994*	*2000*	*2005*	*2010*	*2012*
Age	60-64	83.3	80.7	79.7	80.5	68.9	67.3	67.9	43.9	35.2	30.8	29.1	29.9	26.2	23.2
	65-69	73.8	68.3	71.6	65.7	67.2	62.0	50.8	28.1	35.1	21.1	22.7	21.2	13.9	19.2
	70-74	49.5	58.1	57.2	43.7	52.2	39.5	35.0	21.3	23.1	15.9	18.7	15.6	9.9	10.6
	75+	31.0	31.9	40.5	14.9	31.4	35.2	36.1	10.9	11.9	6.2	9.6	7.6	6.3	5.7
Religion	Hindus	65.2	65.2	66.5	54.4	55.5	51.0	51.4	30.4	31.9	21.3	22.8	21.3	14.9	17.4
	Muslims	59.2	60.9	63.5	45.2	53.9	44.0	43.6	18.2	19.4	16.0	15.3	9.7	6.8	5.0
	Others	66.1	62.1	68.2	49.2	60.4	66.7	58.5	29.8	23.2	20.6	14.8	19.8	21.2	18.6
Social group	SC	69.7	89.5	70.7	78.3	53.9	41.8	67.0	53.7	41.5	42.5	0.0	15.6	8.3	24.2
	ST	60.9	57.9	57.9	27.5	54.7	44.6	49.7	69.3	41.6	32.6	12.0	27.0	31.8	20.3
	OBC	---	---	---	45.0	54.2	52.9	48.9	---	---	---	21.9	19.2	11.6	14.6
	Others	65.1	64.2	67.0	58.3	59.9	57.8	54.6	72.1	25.8	19.4	19.3	17.1	16.6	15.7
Economic group	Quintile 1	50.4	51.6	50.2	36.3	40.6	35.6	34.0	26.4	26.9	20.9	20.1	15.3	11.5	10.8
	Quintile 2	63.3	60.0	66.3	45.3	46.4	43.6	53.6	30.4	23.2	22.4	14.2	16.3	11.1	18.6
	Quintile 3	72.6	67.9	68.4	51.3	58.6	59.1	50.7	25.1	28.1	18.4	24.1	19.9	17.4	17.4
	Quintile 4	63.4	63.8	71.0	59.5	65.4	66.5	57.3	28.8	32.1	16.2	24.3	21.0	19.9	17.6
	Quintile 5	71.7	74.9	80.6	67.8	64.2	59.5	59.3	31.5	28.7	24.2	18.6	22.5	15.4	12.6

Source: Authors' estimates from the NSS Unit-level data, various rounds.

Elderly women from all social groups have much lower labour force participation rates compared to elderly men. Elderly women belonging to socially and economically well-off group (Others) have the very lowest labour force participation rates. This could be due to their relatively better economic position compared to elderly from

other social groups. Relatively high rate poverty and lower restrictions on mobility may be the main driving forces behind higher labour force participation of ST women compared to other women. Among the general and OBC category, keeping women within the boundaries of the home is an assertion of status and honor.

The elderly labour force participation by household income quintile in Kerala presents a more complex picture. The elderly LFPR movements across the distribution in 2004–05 and 2011–12 were in opposite direction, especially at the lower end of the distribution. Among men from the poorest households, the LFPR was as low as 26 per cent, while rising to about 60 per cent in the well-off households (see Table 2). In total, the elderly female LFPR in the upper MPCE quintile thus increased from 16.5 per cent in 1983 to 26.1 per cent in 2011-12. Whereas, a sizeable proportion of elderly women from upper MPCE households appear to have withdrawn from the labour market from 2004-05 (37.9 per cent) to 2011-12 (26.1 per cent).

To assess the impact of income effect on withdrawal of elderly from the labour force, the household MPCE (Monthly Per Capita Expenditure) data is also examined. The household level MPCE data is used to form decile classes. The elderly from higher quintiles are less likely to participate in the labour market. Likewise, elderly from lower and middle quintiles are more likely to participate. This is the general tendency that as income increases, people start withdrawing from the labour market. It may due to the lower MPCE classes indicate they can't afford luxury of leisure and can't spare any hand out of work. So that their participation in the labour market is high and the opportunity cost of leisure is also high (Motkuri, 2013). For both the male and female elderly in Kerala, the LFPR is high among upper quintile classes in the last three NSSO rounds. Women from the highest MPCE households are actively engaged in gainful employment, probably in better-off and well-paying occupations, as reflected in the upward trend of LFPR (Mathew, 2015).

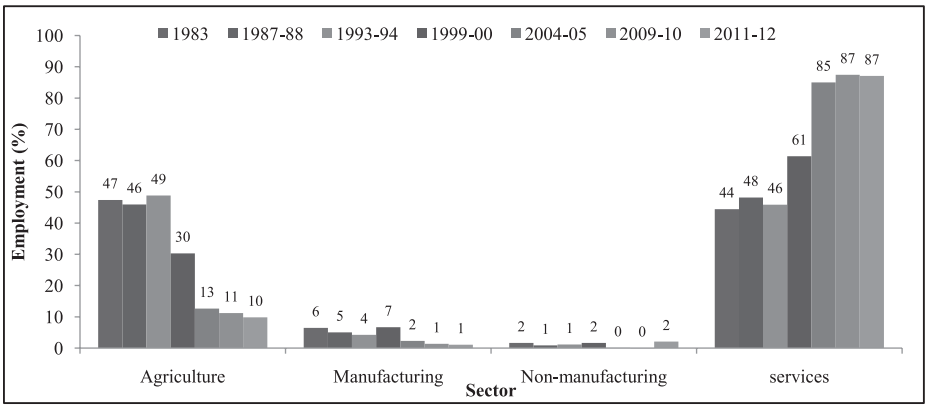
4.2. Quality of Elderly Employment in Kerala: Evidence from Primary Data

On one hand, the dependence on the service sector continues to rise whereas on the other hand, the dependence on agriculture continues to decline in Kerala. Employment in agriculture, relative to other sectors has fallen while the share of employment in non-manufacturing and service sector has risen both in the case of males as well as in females. During 1983, about half of the (47.4 per cent) elderly males were engaged in the agriculture sector. It decreased to 27.1 per cent in 2011-12. While in the case of elderly females, it decreased from 21.9 per cent to 9.9 per cent in the same period of time (See Figure. 2). As per 2011-12, lion share of the elderly females are engaged in the service sector. Their share increased from 73.7 per cent in 1983 to 87.1 per cent in 2011-12 with 18 per cent increase. The number of elderly females working in the non-

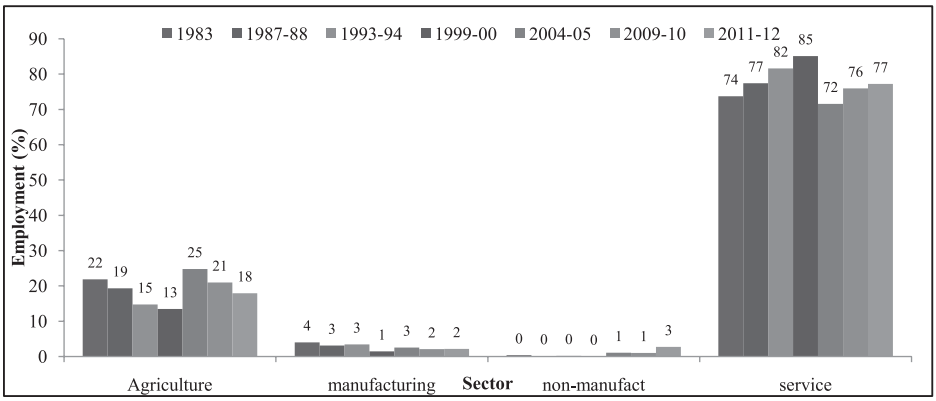
manufacturing sector was almost non-existent in all the rounds. Elderly engaged in the manufacturing sector declined over the years implying that elderly engaged in manufacturing sector faced loss of jobs. Job loss for both men and women could be a result of a decrease in demand for the products from traditional industries (Sanghi et al., 2015).

Figure 2
Sectoral Employment Patterns of Elderly Population in Kerala

Panel A: Sectoral Employment patterns of elderly males in Kerala



Panel B: Sectoral Employment patterns of elderly females in Kerala



Source: Authors' estimates from the NSS Unit-level data, various rounds

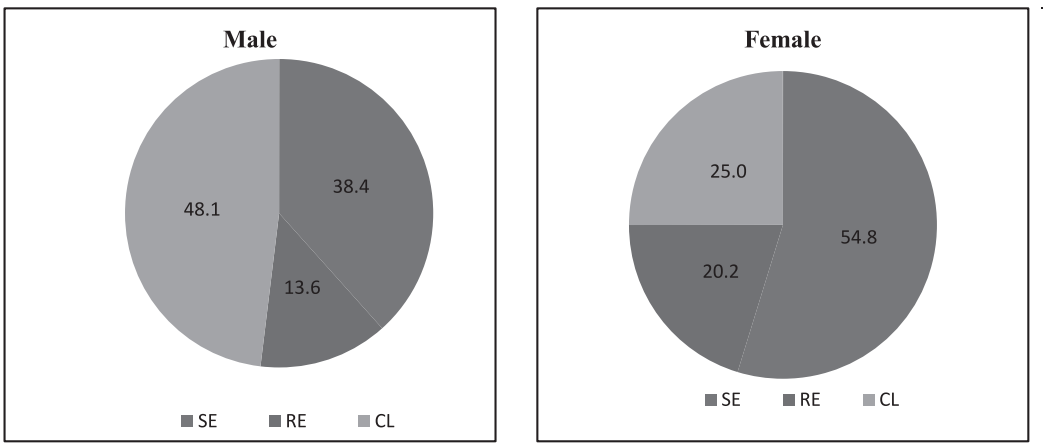
Percentage of elderly males engaged in the service sector is far behind than the elderly females. Male female gap in the service sector employment was about 21 per cent in 2011-12. Structural transformation of Kerala economy remains the main reason for such a shift of employment. Over the last three decades, Kerala economy experienced a structural transformation i.e. moving from an agricultural economy to

service-oriented economy. Changes in the cropping pattern also had displaced large volume of the women workforce from agriculture, and the primary sector is no longer the most significant channel of employment for females (Mazumdar and Guruswamy, 2006).

Employment shifted from agriculture to industry and then finally to services sector. A structural change in employment has taken place (Parida, 2015). The services sector overtook agriculture as the sector that employs the highest number of women and men. This is the fastest growing sector in Kerala.

The most noticeable aspect of the employment status of the elderly is that vast majority of them are self-employed. Self-employment provides a wider opportunity for the elderly to continue working beyond the mandatory retirement age (Sai et al., 2010). As per the primary data collected among elderly in Kerala, it is estimated that self- employed elderly workers constituted 38.4 per cent of males and 54.8 per cent of females (See Figure 3). Among elderly males, casual labours are more in number. Around 48 percent of the elderly males and 25 per cent of the elderly females are casual labours.

Figure 3
Types of Elderly Employment in Kerala



Note: SE=Self Employed; RE= Regular wage/salary earning; CL=Casual Labour

Source: Authors' estimates from primary survey

Regular (salaried/wage) employment has constituted the smallest share. This is natural since old people are seldom hired in regular employment. While they have a better chances of being hired in a casual capacity, their last option remains to be self-employed (Mathew and Rajan, 2008). Moreover, the declining health and energy of the elderly discourages them to withdraw from regular employment while forcing them

to opt for self-employment. This pattern generally applies to both men and women (Rajan, 2010).

Majority of the old people are engaged in self-employment, mainly in the informal sector and paid poorly compared to working age workforce (Reddy, 2016). Employers tend to be hesitant to hire older people on a regular salaried basis in view of their age and perceived deterioration of their health with age. Moreover, the official age of retirement for most of the public sector and regular salaried jobs in the formal sector is 60 years in India (Rajan, 2010). Hence, only very few old people are able to work as regular salaried workers as shown in the Figure 3.

4.3. Factors Determinants of Elderly LFPR in Kerala: Econometrics Results and Discussion

To identify the determining factors for elderly labor force participation decision, simple probit and IV-probit regression models were estimated for rural and urban areas separately. The study used household-level characteristics including number of adult members, age, elderly living standards, marital status, pensions, remittances, caste and religion to run the IV-probit regressions.

MPCE quintiles were used as proxy variable for level of income. The study found out that rural elderly from lower MPCE quintiles do more work than urban elderly from same quintiles (Table 3 and 4). Elderly females are more likely to withdraw from the labour force as the household income increases. They are overburdened with household work and other work; especially in the rural areas. So, with improvement in their financial situation, they withdraw from the labour force to get relief from the burden of work.

Age has a negative impact on elderly's employment opportunities. LFPR diminishes as a person becomes older and approaches retirement age. One possible reason for this is that additional productivity or output at work decreases as the person gets older (Ingco and Pilitro, 2016).

Table 3 explains the determinants of elderly labour force participation in rural Kerala. The coefficients of adult members dummy are negatively associated with the LFPR of elderly. As elderly belonging to the family with less number of adult members are more likely to participate in the labor force to support family income. Increasing labor force participation of elderly is likely to improve the household living standards. In other case, elderly with large number of adult members are less likely to participate in the labour market as the other adult members will participate in the labour market and will earn enough family income. This reduces pressure on the elderly persons to work.

Table 3
Determinants of elderly Labour Force Participation in rural Kerala

Variables	*Simple Probit Estimates*						*IV Probit Estimates*	
	Model 1			*Model 2*				
	Coefficient	*Z-value*	*Marginal Effects*	*Coefficient*	*Z-value*	*Marginal Effects*	*Coefficient*	*Z-value*
Log mpce	-0.34	-1.79	-0.07				0.42	0.47
Mpce Quintile2	---	---	---	-0.50	-2.01**	-0.10	---	---
Mpce Quintile3	---	---	---	-0.56	-2.08**	-0.11	---	---
Mpce Quintile4	---	---	---	-0.19	-0.64	-0.04	---	---
Mpce Quintile5	---	---	---	-0.63	-1.74*	-0.12	---	---
Age	-0.36	-0.99	-0.07	-0.41	-1.10	-0.08	-0.50	-1.42
Age square	0.002	0.64	0.0003	0.002	0.77	0.0004	0.003	1.07
No. of adult members	-0.15	-2.30**	-0.03	-0.18	-2.81***	-0.04	-0.09	-0.85
Sex male	2.18	8.09***	0.43	2.11	7.78***	0.42	2.11	7.46***
Primary education	0.21	0.46	0.04	0.21	0.44	0.04	0.30	0.70
Secondary education	0.35	0.69	0.07	0.33	0.62	0.07	0.21	0.44
Graduate and above	-0.45	-0.48	-0.09	-0.44	-0.48	-0.09	-0.68	-0.74
Unmarried	0.58	0.68	0.11	0.31	0.34	0.06	0.40	0.51
Widow/Separated	0.71	2.60***	0.14	0.66	2.39**	0.13	0.71	2.52***
Living with spouse only	0.01	0.02	0.002	0.02	0.04	0.00	0.16	0.36
Living alone	-0.92	-1.96**	-0.18	-0.81	-1.79*	-0.16	-0.33	-0.18
Living with relatives/OAH	-0.51	-0.85	-0.10	-0.43	-0.64	-0.09	-0.48	-0.92
Govt. pension	-0.99	-1.61	-0.20	-1.02	-1.69*	-0.20	-0.88	-1.34
Widow/old age pension	0.08	0.35	0.02	0.04	0.16	0.01	0.17	0.66
Other disability pension	1.57	2.56**	0.31	1.19	1.84*	0.24	1.40	1.00
ENT	-4.17	-8.29***	-0.83	-4.33	-10.01***	-0.86	-4.32	-0.02
Cardiovascular	-4.07	-10.93***	-0.81	-4.27	-13.64***	-0.85	-4.20	-0.02
Respiratory	-4.52	-10.98***	-0.90	-4.78	-13.28***	-0.95	-4.66	-0.02
Rheumatic diseases	-4.30	-11.90***	-0.85	-4.54	-15.97***	-0.90	-4.50	-0.02
Psychological	-4.26	-11.39***	-0.85	-4.46	-14.07***	-0.88	-4.42	-0.02
Severe diseases	-3.29	-5.84***	-0.65	-3.52	-6.32***	-0.70	-3.64	-0.02
Other diseases	-4.02	-6.18***	-0.80	-4.29	-5.63***	-0.85	-4.15	-0.02
Hindus	-0.21	-0.98	-0.04	-0.19	-0.89	-0.04	-0.24	-0.99
Muslims	-0.41	-1.40	-0.08	-0.32	-1.09	-0.06	-0.46	-1.40
SC/ST	-0.20	-0.59	-0.04	-0.21	-0.59	-0.04	-0.07	-0.19
OBC	-0.33	-1.53	-0.07	-0.31	-1.47	-0.06	-0.14	-0.46
Remittance receipts	-0.21	-1.05	-0.04	-0.26	-1.27	-0.05	-0.27	-1.18
Constant	22.5	1.75*		22.1	1.73*		21.7	0.10
Number of observations			386			386	385	
Wald chi2(32)			1873.54			1438.59	118.02	
Pseudo R2			0.4508			0.4545		
Log pseudo likelihood			-136.516			-135.60315		
Wald test of exogeneity chi2(1)								0.83

Note: *,** and *** imply statistical significance level at 10 %, 5 % & 1 % levels respectively.

Source: Authors 'estimation based on primary data

Pension is another factor that negatively determined elderly labor force participation decisions. The coefficient of government pension dummy (in model 2) is statistically significant at 10 per cent level. Those with government pension are less likely to participate in the labour market post-retirement as they receive enough old age pension and wish to take rest in their later life. The elderly who are receiving normal old age pension are more likely to participate since the pension amount is very nominal and not enough to meet their day to day expenses. In order to meet their consumption expenditure, they participate in the labour market even in the later stages of their life. The major diseases of the elderly are divided into seven categories. The coefficients of diseases type dummy are significantly related to elderly labour force participation decision at one per cent level. Elderly with major type of diseases are less likely to participate in the labour market. There is always a positive relation between health status and labour market participation. If health status improves LFPR will also increase and vice versa.

The coefficients of social group dummies, and dummies for migration status of the household members and remittance receipts are negatively associated with the probability of elderly participating in the labour force. But these coefficients are not statistically significant in the rural areas. Elderly from Muslim community is less likely to participate in the labour market. One reason may be the flow of foreign remittances. In Kerala, Muslim families are receiving large amount of remittances when compared with families belonging to other religions. An average Muslim household received Rs. 144,000 as remittances in 2014 (Zachariah and Rajan, 2015). Elderly from SC/ST families are more participating in the labour market. The SC/ST households received the lowest average amount as remittances i.e. only Rs. 13,000 (Zachariah, 2016). Another reason for this could be that some religions encourage practices of labour force participation that spur economic growth while others put high value on non-market activities than on market activities (O'Neil & Bilgin, 2013).

Table 4 explains the determinants of elderly labour force participation in urban Kerala. We find that higher educational attainment of elderly has a negative but statistically insignificant effect on labour force participation in the urban areas. The coefficients for the education dummy variable indicates that with higher level of education attainment, the probability of participating in labour force decreases for the elderly in urban Kerala. Higher educated elderly retired from government services. They are receiving some good amount of pension and they don't want to participate in the lower sector jobs in their later life.

Table 4
Determinants of Elderly Labour Force Participation in Urban Kerala

Variables	*Simple Probit Estimates*						*IV Probit Estimates*	
	Model 1			*Model 2*				
	Coefficient	*Z-value*	*Marginal Effects*	*Coefficient*	*Z-value*	*Marginal Effects*	*Coefficient*	*Z-value*
Log mpce	0.15	1.04	0.03				0.42	1.25
Mpce Quintile2	---	---	---	0.26	1.20	0.06	---	---
Mpce Quintile3	---	---	---	0.26	1.19	0.05	---	---
Mpce Quintile4	---	---	---	0.25	1.17	0.05	---	---
Mpce Quintile5	---	---	---	0.25	1.12	0.05	---	---
Age	-0.10	-0.53	-0.02	-0.10	-0.55	-0.02	-0.09	-0.51
Age square	0.0001	0.10	0.00003	0.0002	0.12	0.00003	0.0001	0.07
No. of adult members	-0.03	-0.55	-0.01	-0.02	-0.36	0.00	-0.02	-0.43
Sex male	1.65	9.04***	0.35	1.63	8.96***	0.35	1.63	9.37***
Primary education	-0.42	-1.48	-0.09	-0.43	-1.51	-0.09	-0.45	-1.67*
Secondary education	-0.45	-1.46	-0.10	-0.45	-1.43	-0.10	-0.51	-1.64
Graduate and above	-0.28	-0.65	-0.06	-0.27	-0.63	-0.06	-0.39	-0.96
Unmarried	0.03	0.07	0.01	-0.01	-0.03	-0.003	0.07	0.17
Widow/Separated	-0.07	-0.34	-0.01	-0.07	-0.33	-0.01	-0.08	-0.40
Living with spouse only	0.12	0.39	0.03	0.14	0.46	0.03	0.12	0.35
Living alone	0.05	0.14	0.01	0.05	0.13	0.01	0.01	0.05
Living with relatives/OAH	-0.81	-1.72*	-0.17	-0.78	-1.64	-0.17	-0.83	-2.57*
Govt. pension	-0.68	-2.22**	-0.14	-0.64	-2.11**	-0.14	-0.71	-2.51*
Widow/old age pension	0.62	4.29***	0.13	0.62	4.28***	0.13	0.66	3.92***
Other disability pension	-0.36	-0.91	-0.08	-0.36	-0.91	-0.08	-0.34	-0.87
ENT	0.32	1.08	0.07	0.29	0.97	0.06	0.30	0.92
Cardiovascular	-0.27	-1.07	-0.06	-0.29	-1.16	-0.06	-0.31	-1.07
Respiratory	-0.43	-1.19	-0.09	-0.46	-1.26	-0.10	-0.43	-1.03
Rheumatic diseases	-0.20	-0.82	-0.04	-0.24	-0.96	-0.05	-0.27	-0.93
Psychological	-0.31	-1.14	-0.07	-0.33	-1.20	-0.07	-0.34	-1.15
Severe diseases	0.52	0.96	0.11	0.50	0.92	0.11	0.36	0.67
Other diseases	-0.30	-0.83	-0.06	-0.36	-0.98	-0.08	-0.34	-0.80
Hindus	0.07	0.39	0.02	0.10	0.55	0.02	0.03	0.13
Muslims	-0.19	-0.84	-0.04	-0.16	-0.73	-0.03	-0.16	-0.68
SC/ST	0.07	0.32	0.02	0.07	0.32	0.02	0.14	0.61
OBC	-0.04	-0.23	-0.01	-0.05	-0.32	-0.01	-0.01	-0.04
Remittance receipts	-0.36	-2.10**	-0.08	-0.38	-2.30**	-0.08	-0.38	-2.03**
_cons	4.02	0.61		4.97	0.79		1.99	0.29
Number of observations			669			669		667
Wald chi2(32)			177.35			179.83		175.94
Pseudo R2			0.3508			0.3522		
Log pseudo likelihood			-251.61037			-251.07415		
Wald test of exogeneity chi2(1)								0.87

Note: *,** and *** imply statistical significance level at 10 %, 5 % & 1 % levels respectively.

Source: Authors 'estimation based on primary data

Living arrangement of the elderly also have significant association with their LFPR. The coefficient of living with relatives/OAH dummy (in model 1) is significantly related to the LFPR at 10 per cent level. Those who are living with relatives/OAH are less likely to participate in the LFP. There are strict rules and regulations in each OAHs. They won't allow the inmates to go out or for any kind of employment. Factors like government pension and widow/old age pension are significantly determining elderly labour force participation decision. Elderly with government pension have negative significance on elderly LFPR at 5 per cent level (in both model one and two). They are getting enough amount of pension up on retirement. So that they do not have much economic needs for working in the later years of age. On the other hand, elderly with widow/old age pension has positive significance on elderly LFPR at one per cent level (in both model one and two). Their pension amount is very minimal and not enough for their day to day expenses. This forced them to participate in the labour market.

The coefficient of remittance dummy shows that the elderly with remittance receiving family are negative effect on LFPR. Migration would play a greater role in raising household living standards and hence it is expected that remittance could have played a greater role in reducing income poverty (Parida et al., 2015). The international migration has a disincentive effect on left-behind members, especially elderly and females, through the inflow of remittances, which raises the reservation wage of left-behind members, and encourages them to withdraw from the labour market (Khan and Valatheeswaran, 2016, Parida, 2014). The LFPR among remittance recipient households is high because the financial support from emigrant members through remittances allows them to afford to remain unemployed until they find the job they prefer (Zachariah et al., 2001). Recently female migration is also at high (Parida and Raman, 2018) and it is negatively affected elderly LFPR decision.

4.4. Provision of Existing Social Securities and Its Limitations

Social security system is composed of a number of schemes and programs spread throughout a variety of laws and regulations. Social security system under service sector comprises of provident fund, pensions and gratuity schemes, health care and maternity benefits. A lion share of the elderly people is not eligible for any kind of pension, gratuity, and health benefits under the service sector. Those people are receiving only a nominal old age pension provided by the government as unorganized/informal social security benefit. During 2011-12, 94.7 per cent of elderly males and 73.1 per cent of elderly females were not eligible for these kind of social security benefits. They were receiving only Rs. 1100 through government's old age pension policy. This amount of pension is not even enough for meeting one month's expenditure. As age increases, health deteriorates and health issues are increasing. Health care expenditure is ones among the expensive one for elderly people.

Most of the elderly become vulnerable with ageing due to their inability to work and earn in the old age. Vulnerability due to increasing age can be anticipated in time, and can be alleviated by making specific provisions if one is earning adequate income. When people and families are not able to make arrangements for the care of the elderly, their needs must be provided for by the society/state, either in cash or kind through social security schemes (Kulkarni et al., 2014). There are several schemes to assist older persons in the unorganized sector. Firstly, there are central government's public-assistance schemes. It includes National Social Assistance Scheme (NSAS) and Annapurna scheme introduced in 1995 and 1999 respectively. The Ministry of Justice and Empowerment has taken the lead in commissioning an OASIS (Old Age Social and Income Security) project to enable voluntary provision of old age income for those belonging to the unorganized sector (Rajan, 2002).

Table 5
Social Security Benefits under Service Sector

Nature of Social Security Benefits		*Male*			*Female*		
		2004-05	*2009-10*	*2011-12*	*2004-05*	*2009-10*	*2011-12*
Social Security Benefits	Eligible for only PF/ pension	6.55	---	0.29	----	---	---
	Eligible for only gratuity	2.98	9.21	---	2.52	---	---
	Eligible for only health care & maternity benefits	---	1.65	0.58	---	---	3.83
	Eligible for only PF/ pension and gratuity	---	14.63	---	10.86	---	---
	Eligible for only gratuity and health care & maternity benefits	--	1.44	1.74	---	36.72	---
	Eligible for PF/ pension, gratuity, health care & maternity benefits	5.04	17.82	2.69	22.99	13.37	23.09
	Not eligible for any of above social security benefits	85.43	55.26	94.71	63.62	49.92	73.08
Job Contract	No written job contract	83.86	70.99	83.75	66.66	79.05	59.22
	Written job contract for 1 year or less	4.34	---	6.64	21.18	---	24.4
	Written job contract for more than 1 year to 3 years	---	2.24	---	---	---	2.18
	Written job contract for more than 3 years	11.8	26.77	9.62	12.16	20.95	14.2
Paid Leave	Yes	39.6	61.7	28.0	36.3	96.8	29.4
	No	60.4	38.3	72.0	63.7	3.2	70.6

Source: Authors' estimates from the NSS Unit-level data, various rounds

Majority of the elderly do not have any written job contract in the service sector. With a written job contract, the elderly might have to work on regular basis with some

rules and regulations until the contract ends. For elderly people, it may not be possible to work regularly. If the employers are getting paid leave that means the job is formal one. Only 28 per cent of elderly males and 29 per cent of elderly females were eligible for paid leaves in the service sector during 2011-12 (Table 5).

V. CONCLUDING REMARKS

The main objective of the paper was to explore how the process of structural transformation affects the employment patterns of elderly and their labour force participation decision in Kerala. This paper is based on both secondary and primary data.

As the economy of Kerala has been transformed from low productive agrarian to services-oriented economy, so the sectoral employment pattern changed. Since, service sector employment normally requires low level of physical stamina compared to that of agriculture and industry, elderly people are likely to participate in this sector with increasing numbers in the recent years. The major findings of the paper also suggest that economic insecurity of the elderly is a result of absence of other adult members in the family, increasing healthcare expenditure, incidence of poverty, and lack of social security measures etc. Hence, elderly living with family members are less likely to participate in the labour force. However, changing family structure from traditional joint family system to nuclear family increases the probability of elderly labour market participation in Kerala.

This study also finds a receipt of remittances has negative influence on the elderly LFPR. Elderly residing in remittance recipient households are getting adequate financial support and hence on the average are less likely to take up wage/salaried jobs in labour market. Since, most of the *Muslim* households in our sample are receiving remittances, their elderly members are less likely to participate in the labour market as compared to *Hindus* and all other religions. As elderly from lower quintile of the income groups are more likely to participate in the labour market, and most of them are engaged in the low paid jobs without any social security benefits, their working and living conditions are very measurable. Moreover, it is found that elderly working in rural areas are more vulnerable than their urban counterparts.

On the basis of these findings, it is therefore suggested that the provision of adequate social security benefits including health and accidental insurance schemes is important for the informal sector workers. Moreover, monitoring the existing old age pension schemes is vital to ensure provision of adequate amount of monthly pension on regular basis. This would not only reduce the incidence of poverty and income dependency among elderly, but at the same time it will help to improve their overall standard of living and welfare.

References

Adhikari, R., Jampaklay, A. and Chamratrithirong, A. (2011), "Impact of children's migration on health and health care-seeking behavior of elderly left behind" *BMC public health*, Vol. 11, No. 1, pp.143-150.

Alam, Moneer, and Arup Mitra (2012), "Labour market vulnerabilities and health outcomes: older workers in India", *Journal of Population Ageing*, Vol. 5, No., 4, pp. 241-256.

Best, John R., and Balkrishna D. Kale (1996), "Older workers in the 21st century: Active and educated, a case study", *Monthly Labor Review,* Vol. 119, No. 6, pp. 18-28.

Bloom, David E., Ajay Mahal, Larry Rosenberg, and Jaypee Sevilla (2010) "Economic security arrangements in the context of population ageing in India." *International Social Security Review,* Vol. 63, No. 3-4, pp. 59-89.

Börsch-Supan, Axel, and Reinhold Schnabel (1998), "Social security and declining labor-force participation in Germany" The American Economic Review, Vol. 88, No. 2, pp.173-178.

Boskin, Michael, J (1977), "Social security and retirement decisions." Economic inquiry, Vol. 15, No. 1, pp. 1-25.

Census of India (2011), Office of the Registrar General Census Commissioner, India.

Chakrabarti, Suvalaxmi and Ashis Sarkar (2011), "Pattern and trend of population ageing in ndia", *The Indian Journal of Spatial Science*, Vol. 2, No. 2, pp. 1-11.

Chowdhury, Subhanil (2011), "Employment in India: What does the latest data show?", *Economic and Political Weekly*, Vol. 46, No. 32, pp. 23-26.

Crawford, Vincent, P and Lilien, David, M (1981), "Social security and the retirement decision", *The Quarterly Journal of Economics*, Vol. 96, No. 3, pp. 505-529.

Dandekar, Kumudini, (1996), "The elderly in India", Thousand Oaks, Calif, Sage Publication, New Delhi.

Das, Maitreyi, B (2004), "Muslim women's low labour force participation in India: Some structural explanations." A minority: Essays on Muslim women in India, pp.189-221.

Davis, K., and P. van den Oever (1985), "The Economic Status of the Elderly in the United States", *Population and Development Review*, Vol. 11, No. 2, pp. 363-375.

Friedman, Jed, Daniel Goodkind, Bui The Cuong, and Truong Si Anh (2001), "Work and retirement among the elderly in Vietnam", *Research on Aging* , Vol. 23, No. 2, pp. 209-232.

Gaminiratne, Nirosha (2004), "Population ageing, elderly welfare, and extending retirement cover: The case study of Sri Lanka", ESAU Working Paper Number 3, Overseas Development Institute, London.

Giang, Thanh L, and Wade Donald P (2007), "The elderly population in Vietnam during economic transformation: an overview", *Social Issues under Economic Transformation and Integration in Vietnam*, Vol. 1, pp. 185-210.

Government of Kerala (2018), available at https://kerala.gov.in/en/health-services, site accessed on 7th November, 2018.

Gratton, Brian (1987), "The labor force participation of older men: 1890-1950", *Journal of Social History,* Vol. 20, No. 4, pp.689-710.

Green, Carole, A (2006), "The unexpected impact of health on the labor supply of the oldest Americans", *Journal of Labor Research,* Vol. 27, No. 3, pp. 361-379.

Guillemard, Anne, M (1989), "The trend towards early labour force withdrawal and the reorganisation of the life course: a cross-national analysis", in Paul Johnson, Christoph Conrad and David Thomson (1989) (eds), *Workers versus pensioners: Intergenerational justice in an ageing world*, Manchester University Press, New York, pp. 164-180.

Gulati, Leela (1993), "Population ageing and women in Kerala State, India", Asia-*Pacific population journal*, Vol. 8, No. 1, pp. 53-63.

Gulati, Leela, and S. Irudaya Rajan (1999), "The added years: Elderly in India and Kerala", *Economic and political weekly*, Vol. 34, No. 44, pp. WS46-WS51.

Gupta, Indrani (2009), "Out-of-pocket expenditures and poverty: Estimates from NSS 61st round", *Draft paper,* Institute of Economic Growth, New Delhi.

Haider, Steven, J and David S. Loughran (2010), "Elderly Labor Supply: Work or Play?", in Kathleen Christensen and Barbara Schneider (2010) (eds.), *Workplace Flexibility: Realigning 20th-Century Jobs for a 21st-Century Workforce*, ILR press, London, pp. 110-130.

Hanoch, Giora and Marjorie, Honig (1983), "Retirement, wages, and labor supply of the elderly", *Journal of Labor Economics,* Vol. 1, No. 2, pp. 131-151.

Hernæs, Erik, Simen Markussen, John Piggott, and Knut Røed (2016), "Pension reform and labor supply", *Journal of Public Economics,* Vol. 142, pp. 39-55.

Hill, Elizabeth T (2002), "The Labor Force Participation of Older Women: Retired-Working-Both", *Monthly Lab. Rev.* Vol. 125, No. 9, pp. 39-48.

Ingco, Katrina N, and Ver Lyon Yojie P (2016), "Stuck at a Crossroad: A Micro Econometric Analysis of Fertility and Married Female Labor Force Supply in the Philippines", MPRA Paper Number 73492, University Library of Munich, Germany

Kalwij, Adriaan and Frederic, Vermeulen (2005), "Labour force participation of the elderly in Europe: The importance of being healthy", Institute for the Study of Labor (IZA) Discussion Paper Number 1887, Germany.

Kannan, K. P. "Agricultural Development in an Emerging Non-Agrarian Regional Economy: Kerala's Challenges." *Economic and Political Weekly,* Vol. 46, No. 9, pp. 64-70.

Kerala", *Indian Journal of Economics and Development*, Vol. 6, No. 3, pp. 1-6.

Khan, Imran, M and Valatheeswaran, C (2016), "International migration, remittances and labour force participation of left-behind family members: A study of Kerala", *Margin: The Journal of Applied Economic Research,* Vol. 10, No. 1, pp. 86-118.

Kumar, Anand and Navneet, Anand (2006), "Poverty target programs for the elderly in India with special reference to National Old Age Pension Scheme, 1995", Chronic Poverty Research Centre Working Paper Number 2008-09.

Ladusingh, Laishram, and M. R. Narayana (2011), "26. The role of familial transfers in supporting the lifecycle deficit in India", in Ronald Demos Lee and Andrew Mason (2011) (eds.), *Population Aging and the Generational Economy,* pp. 459-474.

Lam, David, Murray Leibbrandt, and Vimal, Ranchhod (2006), "Labor force withdrawal of the elderly in South Africa", in Cohen B, Menken J (2006) (eds), *Aging in Sub-Saharan Africa: Recommendation for Furthering Research*, National Academies Press (US), Washington (DC), pp. 214-249.

Mathew, Shalina S (2015), "Falling female labour force participation in Kerala: Empirical evidence of discouragement?", *International Labour Review,* Vol. 154, No. 4, pp. 497-518.

Mazumdar, Indrani and Neetha, N (2011), "Gender Dimensions: Employment Trends in India, 1993-

94 to 2009-10", *Economic and Political Weekly*, Vol. *46*, No. 43, pp. 118-126

Mazumdar, Sumit and M. Guruswamy (2006), "Female labour force participation in Kerala: problems and prospects", Presented at the 2006 Annual Meeting of the Population Association of America Los Angeles California March 30-April 1 2006.

Mehrotra, Santosh and Jajati, Parida K (2007), "Why is the labour force participation of women declining in India?", *World Development,* Vol. 98, No. C, pp. 360-380.

Mehrotra, Santosh, Jajati, Parida K, Sinha S and Gandhi A (2014), "Explaining employment trends in the Indian economy: 1993-94 to 2011-12", *Economic and Political Weekly*, Vol. *49*, No. 32, pp. 49-57.

Moulton, Jeremy G, and Ann, Stevens H (2015), "Reconsidering the Social Security Notch and retirement: Wealth and incentive effects", *Economics Letters,* Vol. 132, No. C, pp. 65-68.

Narayana, Ranganathan M (2011), "Lifecycle deficit and public age reallocations for India's elderly population: Evidence and implications based on national transfer accounts", *Journal of Population Ageing*, Vol. 4, No. 4, pp. 207-230.

Nasir, Mueen Z, Mubashir, Ali M, and Chaudhry, Aslam M (2000), "Labour Market Participation of the Elderly [with Comments]", *The Pakistan Development Review*, Vol. *39*, No. 4, pp. 1075-1086.

Neff, Daniel F, Sen, Kunal, and Kling Veronika (2012), "The Puzzling Decline in Rural Women's Labor Force Participation in India: A Reexamination", GIGA German Institute of Global and Area Studies Working Paper Number 196.

O'Neil, Mary Lou, and Mehmet, Bilgin H (2013), "Religion as a factor influencing Turkish women's decisions to work", *Journal of International Women's Studies*, Vol. *14*, No. 3, pp. 163-173.

Oshio, Takashi and Akiko, Oishi S ((2004). Social security and retirement in Japan: An evaluation using micro-data. In Social security programs and retirement around the world: Micro-estimation, University of Chicago Press, pp. 399-460.

Oshio, Takashi, Emiko Usui, and Satoshi Shimizutani (2018), "Labor force participation of the elderly in Japan ", National Bureau of Economic Research (NBER) Working Paper Number 24614, pp. 1-22.

Pal, Sarmistha and Palacios, Robert (2011), "Understanding poverty among the elderly in India: Implications for social pension policy", *Journal of Development Studies*, Vol. 47, No. 7, pp. 1017-1037.

Paltasingh, Tattwamasi (2012), "Entrepreneurship among women in India: strategies for economic development', *Nigerian Chapter of Arabian Journal of Business and Management Review*, Vol. *62*, No. 1084, pp. 1-10.

Pampel, Fred C (1979), "Changes in the labor force participation and income of the aged in the United States, 1947-1976", *Social Problems*, Vol. 27, No. 2, pp. 125-142.

Parida, Jajati K., Sanjay K. Mohanty, and K. Ravi Raman (2015), "Remittances, Household Expenditure and Investment in Rural India: Evidence from NSS data", *Indian Economic Review*, Vol. 50, No. 1, pp. 79-104.

Parida, Jajati, K. (2014). Internal migration and informal labour market: New directions and Issues (Ph.D thesis), Institute for Social and Economic Change, Bangalore.

Parida, Jajati, K. (2015), "Growth and Prospects of Non-farm Employment in India: Reflections from NSS data", Journal of Industrial Statistics, Vol. 4, No. 2, pp. 154-168.

Parida, Jajati Keshari, and K. Ravi Raman (2018), "14 India: rising trends of international and internal

migration." In Anna Triandafyllidou (2018) (eds.), Handbook of Migration and Globalisation, Edward Elgar, UK, pp. 226-246.

Prasad, Syam, and Beena S (1999), "An Evaluation of Social Security Pension System in an Ageing Society of Kerala", in B.A.Prakash (1999) (ed), Kerala's Development Issues in the New Millennium, Sage publications, New Delhi.

Quinn, Joseph F (1977), "Microeconomic determinants of early retirement: A cross-sectional view of white married men", *Journal of Human Resources*, Vol. 12, No. 3, pp. 329-346.

Rajan, D. (2011) Kerala Economy. University of Calicut, School of Distance Education, Calicut: Calicut

Rajan, Irudaya S (2002), "Social security for the unorganized sector in South Asia", *International Social Security Review*, Vol. 55, No. 4, pp.143-156.

Rajan, Irudaya S (2007), "Population ageing, health and social security in India", Centre for Development Studies Discussion Paper Number 3, Trivandrum, Kerala, India.

Rajan, Irudaya S (2010), "Demographic ageing and employment in India" ILO Asia-Pacific Working paper series, Bangkok: International Labour Organization, Regional Office for Asia and the Pacific, pp. 1-23.

Rajan, Irudaya S (2014), "Aging, pensions and social security in South Asia", in Irudaya Rajan (2014) (ed.), Social Security for the Elderly: Experiences from South Asia, Routledge, New Delhi, pp. 25-62.

Rajan, Irudaya S and Sanjay Kumar (2003), "Living arrangements among Indian elderly: New evidence from national family health survey", *Economic and Political Weekly*, Vol. 38, No. 1, pp. 75-80.

Rajan, Irudaya S, and James, K. S. (2007), "Demographic transition and economic development in Kerala: The role of emigration", *South Asia Network of Economic Research Initiatives*.

Rajan, Irudaya S, Sarma, Sankara P and Mishra U. S (2003), "Demography of Indian aging, 2001-2051", *Journal of aging & social policy*, Vol. 15, No. 2-3, pp. 11-30.

Rangarajan, C (2011), "Where is the Missing Labour Force?", *Economics and Political Weekly*, Vol. 46, No. 39, pp. 68-72.

Reddy, Bheemeshwar A (2016), "Labour force participation of elderly in India: patterns and determinants" *International Journal of Social Economics*, Vol. *43, No.* 5, pp. 502-516.

Sai, A.J., Gallagher, J.C., Smith, L.M. and Logsdon, S. (2010), "Fall predictors in the community dwelling elderly: a cross sectional and prospective cohort study", *J Musculoskelet Neuronal Interact,* Vol. 10, No. 2, pp. 142-50.

Samorodov, Alexander (1999), "Ageing and labour markets for older workers. Employment and Training Department", *International Labour Office*, pp. 1-33.

Samwick, Andrew A (1998), "New evidence on pensions, social security, and the timing of retirement", *Journal of public economics*, Vol. *70, No.* 2, pp. 207-236.

Sanghi, Sunita, Srija, A and Vijay, Shrinivas S (2015), "Decline in rural female labour force participation in India: A relook into the causes", *Vikalpa* , Vol. 40, No. 3, p. 255-268.

Sarasakumari, R. S. (2001), "Socio-economic Conditions, Morbidity Pattern and Social Support among the Elderly Women in a Rural Area", Department of Community Medicine, Medical College, Thiruvanthapuram.

Sarikhani, Nahid (2008), "Muslim women's work participation in India", *Journal of Social Sciences*, Vol. 17, No. 3, pp. 219-222.

Schirle, Tammy (2008), "Why Have the Labor Force Participation Rates of Older Men Increased since the

Mid-1990s?", *Journal of Labor Economics*, Vol. *26, No.* 4, pp. 549-594.

Sebastian, D and Sekher, T.V. (2012), "Intergenerational Care and Support for Elderly: Evidence from Kerala State, India", *European Population Conference 2012*, Stockholm, Sweden.

Selvaraj, Sakthivel, Anup Karan, and Madheswaran, S (2014), "Elderly workforce participation, wage differentials and contribution to household income", UNFPA Working Paper Number 4.

Sonawat, Reeta (2001), "Understanding families in India: A reflection of societal changes" *Psicologia: Teoria e Pesquisa*, Vol. 17, No. 2, pp. 177-186.

Srivastava, Akanksha and Sanjay K. Mohanty (2012), "Poverty among elderly in India", *Social Indicators Research*, Vol. *109*, No. 3, pp. 493-514.

Sugawara, Shinya and Nakamura, Jiro (2014), "Can formal elderly care stimulate female labor supply? The Japanese experience", *Journal of the Japanese and International Economies*, Vol. 34, pp. 98-115.

Tati, G. (2011). Population Ageing and participation of the elderly in the labour force of South Africa. Population Studies Programme, University of the Western Cape Afrique du Sud.

United Nations (2013), "World Population Ageing", Department of Economic and Social Affairs Population Division, New York.

V.P, Sanitha and A.P, Noushad (2018), "Migration impact on left-behind Elderly's labour participation in.

Van Gameren, E. (2008), "Labor force participation of Mexican elderly: the importance of health", Estudios *economicos (Mexico City, Mexico)*, Vol. *23*, No. 1, pp. 89-123.

Vodopivec, Milan and Nisha Arunatilake (2011), "Population aging and labour market participation of old workers in Sri Lanka", *Journal of population ageing*, Vol. *4, No.* 3, pp. 141-163.

Whiting, Elizabeth (2005), "The labour market participation of older people", *Labour Market Trends*, Vol. *113, No.* 7, pp. 285-296.

Wise, David A (2004), "Social security provisions and the labor force participation of older workers", *Population and Development Review*, Vol. *30*, pp. 176-205.

Zachariah, K.C. (2016), "*Religious denominations of Kerala",* Centre for Development Studies, Thiruvananthapuram, Kerala, India.

Zachariah, K.C. and Rajan, S.I. (2015), "*Dynamics of emigration and remittances in Kerala: Results from the Kerala migration survey 2014",* Centre for Development Studies, Thiruvananthapuram, Kerala, India.

Zachariah, K.C., Mathew, E.T. and Rajan, S.I. (2001), "Social, economic and demographic consequences of migration on Kerala", *International migration*, Vol. 39, No. 2, pp. 43-71.

ANNEXURE 1

Sample Collection Procedure

Village/Ward name	*Urban ward*	*Rural Village*	*Urban ward*	*Rural village*	*Urban ward*	*Rural village*	*Total*
	Attingal	*Chirayinkeezhu*	*Kothamangalam*	*Varappetty*	*Vadakara*	*Onchiam*	
Census Households village/ward wise	9768	7155	9663	4482	15787	6289	
Census Households of the selected villages (taluk total)		16923		14145		22076	53144
No. of Households to be surveyed[1]		267		266		268	801
No. of Households to be surveyed from each[2] of the selected villages/wards	154	113	182	84	192	76	801

Source: Census, 2011

ANNEXURE 2

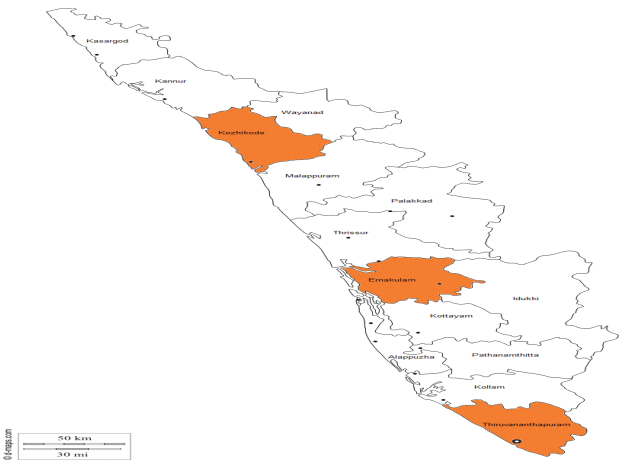
Socio-economic Profile of Selected Districts in Kerala, 2011

Socio-economic Indicators	*Kozhikode*	*Ernakulam*	*Trivandrum*
Year of formulation of the District	1st January 1957	1st April 1958	1st July 1949
Geographical area	2345 sq. KM	3063 sq. KM	2,192 sq. KM
Population	3,086,293	3282388	3301427
District population as percent of total population of the state	9.24 %	9.83 %	9.88 %
Percentage of Hindus	56.21 %	45.98 %	66.46 %
Percentage of Muslims	39.24 %	15.67 %	13.72 %
Percentage of Christians	4.26 %	38.20 %	19.10 %
Elderly population	235976	450794	429431
Percentage of Elderly population	5.63 %	10.75	10.24
Density of population	1316	1072	1508
Literacy rate	95.24 %	95.68 %	92.66 %
Sex ratio	1097	1028	1088
Infant mortality rate	17.67	8.22	12.13
Work Participation rate	30.7 %	38.1 %	37.3 %
Life expectancy	66.62	70.1	68.33

Source: Census, 2011

ANNEXURE 3

Map of Kerala (Selected Districts are Highlighted)



Source: Adapted from https://www.google.co.in/searchh?q=kerala+map&source=lnms&tbm=isch&sa= X&ved=0ahUKEwju2fCA9MzgAhWRfysKHXtg CUYQ_AUIDygC&biw=1366&bih=657 and modified.

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Caste and Educational Inequalities in India

Avinash Kumar* and Nazia Iqbal Hashmi**

Caste for a long time has determined the educational attainment of an individual belonging to specific castes. But even today, people belonging to lower castes are discriminated against and are not given equal opportunities to attain education. Women and people belonging to the lower caste have been historically denied the access to education and even after 60 years of independence and abolishment of untouchability, the lower caste such as Scheduled Castes, OBCs and Scheduled Tribes lag far behind the Brahmins and other forward castes in educational attainment. This paper shows the disparity that exists in the attainment of education (primary, secondary or higher education) among different castes. Using the India Human Development Survey-II (IHDS-II), 2011-12, the paper tries to show the unequal level of educational attainment of households belonging to different castes. The paper brings out the state-wise analysis of disparity that exists in access to education by different castes and also shows the disparity that exists in access to education between men and women of the same caste. It is evident from the analysis of the IHDS-II (2011-12) dataset that, even after so many years of implementation of reservation policies for Scheduled Castes and Scheduled Tribes in the field of education, disparity still exists among different Castes with a significant gap between them. It is quite clear that the caste hierarchy and stratification is embedded in the Indian society.

Keywords: *Social groups, Education, Inequality, Caste, Gender disparity*

I. INTRODUCTION

The pre-conceived notion against backward classes has hindered their progress socially, economically as well as educationally. Social status of an individual ultimately affects all the spheres of his/her life, one being the education. Education is an important element for one's overall development. Women and the lower caste people have been historically denied the access to education and even after 60 years of independence and abolishment of untouchability, the lower castes such as Scheduled Castes (SC), Other Backward Classes (OBC) and Scheduled Tribes (ST) lag far behind the Brahmins and other forward castes in attainment of education. Women, among all, are the most deprived part of the Indian society and women belonging to the lower classes face worst forms of deprivation.

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Reservation policy was implemented for social and educational upliftment of the socially excluded backward classes by providing equal opportunities. But, even after so many years of implementation of reservation policy, a huge gap still remains between reserved and unreserved population. The historically privileged classes still prosper in all the spheres of life however the same thing does not apply for backward classes even after getting reservation. Although the reservation system is not applicable for the elementary education however, the government has taken some steps to promote education among the scheduled castes and scheduled tribes. In order to promote education among the backward classes such as SC and ST, the central and the state government introduced several schemes such as post-matric scholarships, free hostels, provision of books, slates, clothes and mid-day meals for school students. But, facilities provided by these schemes have failed to get the backward and socially excluded castes enrolled in the schools and colleges. There are many reasons behind this dissociation of backward classes from education including factors such as discrimination, ill-treatment of lower caste students in schools, high level of poverty and others. This paper shows the disparity that exists in attainment of education (primary, secondary or higher education) among the different castes. Using the India Human Development Survey-II (IHDS-II), 2011-12, the paper tries to show the unequal level of educational attainment of households belonging to different castes. The paper brings out a state-wise analysis of disparity in access to education of different castes as well as between men and women of the same caste.

II. LITERATURE REVIEW

Buvinic (2005) summarises the meaning of social exclusion as follows: "The inability of an individual to participate in the basic political, economic and social functioning of the society, and it involves denial of equal access to opportunities imposed by certain groups upon the others."[1] India is a heterogeneous country in terms of its population, location, languages, traditions, races, religion and others. Within religion, there are multiple segregations based on the caste. The identity of an individual in Indian society is derived from his/her caste, ethnicity, religion and even the region he/she belongs to. Unfortunately, these identities are still embedded in the caste and religious hierarchical institutions which govern the social conduct and market transactions.[2] Historically, occupation was caste-linked and economic rights pertaining to ownership of land and businesses was restricted to the upper castes. This was true even for education which means that the lower caste people and women were deprived of access to education. This discriminatory access to skill and education had manifold impact over the scheduled castes and tribes including poverty and lack of resources for self-development.

"Education is desirable not merely for income generation or for enhancing ability, but also for the overall development of any individual."[3] Education plays an

important role in liberation from caste based discrimination and untouchability. Dalits (Scheduled Castes) and women lacked the access to education for a long time because of the discriminatory rules and regulations of the caste system. Jotirao Phule and his wife Savitribai Phule were the pioneers of education for women and lower caste in India. To quote Jotirao Phule "A lack of education leads to lack of wisdom, which results in lack of morals, leading to lack of progress and lack of money along with oppression of the lower classes"[4]. He gave education a lot of importance and started schools to educate dalits and women in order to emancipate them from oppression by upper castes.

B.R. Ambedkar, one of the biggest dalit activists in India worked against the discrimination of lower castes while emphasizing on the importance of education. He secured reservation for scheduled tribes and scheduled castes in the government jobs and educational institutions with the hope of uplifting their social status and eradicating discrimination based on caste.

Reservation policy was implemented for the social and educational upliftment of the socially excluded backward classes such as scheduled caste and tribes by providing them with equal opportunities. Even after so many years, there are still some flaws which exist in the implementation of affirmative action which can be observed through huge gap that exists between reserved and unreserved population. The historically privileged classes still prosper in all spheres of skill and educational attainment. There are some more schemes implemented for the benefit of scheduled castes and tribes in the elementary education in order to promote education among them. Although the central and state government introduced several schemes such as post-matric scholarships, free hostels, provision of books, slates, clothes and mid-day meals for school students, however, facilities offered by these schemes were not able to lure the backward and socially excluded castes to enroll in the schools and colleges. After the commencement of first five-year plan, in the two decades a total of 54.49 crores was spent only on the post-matric scholarship.. A total of 1,150,031 scholarships were awarded during this period.[5] But even after so many scholarships and facilities provided by the government, the members of scheduled castes continue to be backward educationally. Although the government provides facilities, the implementation of these facilities has lacked dedication. Govardhan Wankhede, demonstrates in his study conducted in Maharashtra, that most of the dalit students are unaware of the scholarships and assistance available to them by the government. He also discovered that there is no authority in the colleges to check the provision of assistance and guidance for the Dalit students.[6] The backwardness of scheduled castes and scheduled tribes in the area of education exists not only because of lack of assistance and guidance but due to certain social and community norms that deny

them with access to education. Vani K. Borooah and Sriya Iyer states that likelihood of a child to get enrolled in a school is influenced by community specific factors. In fact, in some communities, there is no tradition of sending children to school.

Dreze and Kingdon (2001) in their analysis of school enrolment, discovered that "Dalit children have 'intrinsic disadvantage' – they had a lower probability of going to school, even after controlling for other non-caste factors such as household wealth, parents' education etc."[7] This intrinsic disadvantage for the whole group is because of the mental state of dalit children and their parents. The discrimination against dalits in many different forms impacted their mental state, restricting them from taking part in any kind of community or social event. Often, dalits live in segregated colonies located in the outskirts of the village and are denied use of common resources of the village. Even if the practice of untouchability is illegal in India, the practice is still alive. Borooah and Iyer's study showed that "while there was a latent demand for education among dalits, which was almost as strong as the Hindu (Upper castes) demand, enrolment rates for children from this community were lower than that of Hindus (Upper Castes) because dalits were not endowed as Hindus (Upper Castes) with 'enrolment-friendly' factors."[8] This gives a proof that social status of an individual does impact the access to education. Moreover, discrimination is not only limited to Caste or Religion, but also determined by gender as well. Borooah and Iyer show that "the enrolment rate for Upper Caste Hindu boys and girls was, respectively, 84 per cent and 68 per cent while for Muslim boys and girls, it was 68 per cent and 57 per cent. For Dalit boys and girls enrolment rate was 70 per cent and 55 per cent."[9] It is quite visible that even within one caste and community, the per centage of enrolment for boys and girls remains significantly different.

This discrimination on the basis of caste and gender needs to be tackled immediately as a lot of people are lagging behind on the basis of these grounds.

The disparity arising out of caste hierarchy is not just limited to a few areas or a particular state but is spread throughout India. This paper tries to show the state wise disparity in educational attainment of households belonging to different castes using the household data from India Human Development Survey-II (IHDS-II), 2011-12. The paper also discusses gender disparity that exists in educational attainment within the same as well as different castes.

III. EMPIRICAL ANALYSIS

From the India Human Development Survey-II (IHDS-II), 2011-12, following variables have been taken for the purpose of analysis.

- STATEID: It provides information about the state to which the household belongs.

- ID13: It provides information about the caste category to which the household belongs. Households have been categorized into mainly five castes, namely, Brahmins, Forward/General (except Brahmins), Other Backward Castes (OBC), Scheduled Castes (SC) and Scheduled Tribes (ST).
- HHEDUC: This gives the highest level of education attained by any individual in the household.
- HHEDUCM: This gives the highest level of education attained by any male member of the household.
- HHEDUCF: This gives the highest level of education attained by any female member of the household.

The India Human Development Survey-II (IHDS-II), 2011-12 contains 42,152 observations implying that it contains information about 42,152 households (taken as a sample) spread across the whole country. In order to provide proper representation of the entire population, weights were used while tabulating and analysing the data.

The HHEDUC data provides information about the education level in terms of years of schooling. For the purpose of analysis, these years have been categorised into five levels as given below:

- 0 years = no schooling
- 1 year to 8 years = Primary education
- 9 years or 10 years = Secondary education
- 11 years or 12 years = Higher Secondary
- More than 12 years = Post-Secondary

Using the weights for households, with sample of IHDS-II data, the total number of household becomes 25,46,93,051 which seems relevant for the analysis. Table 1 shows the highest level of education attained by any member of the household.

Table 1

Education Level	*Freq.*	*Per cent*	*Cum.*
No Schooling	49,492,847	19.43	19.43
Primary Education	73,997,271	29.05	48.49
Secondary Education	51,807,257	20.34	68.83
Higher Secondary	30,425,223	11.95	80.77
Post-Secondary	48,970,453	19.23	100.00
Total	254,693,051	100.00	

It can be seen from the table one that 19.43 per cent of the total households do not have members with any formal education. It also reports that 29.05 per cent of the households have members with primary education as their highest level of education.

The members of these households have dropped out from school or have not attained post primary education. Similarly, the highest level of education in 20.34 per cent of the households is secondary, 11.95 per cent of the households have education till higher secondary and 19.23 per cent of the households have educational attainment till post- secondary. This table does not show the caste wise status of the educational level of the households but represents the level of education for all the households in India.

Table 2
Shows Caste-wise Number and Proportion of Households

HQ3 1.13 Caste category	*Freq.*	*Per cent*	*Cum.*
Brahmin 1	12,556,008	4.93	4.93
Forward/General (except Brahmin) 2	53,694,683	21.08	26.01
Other Backward Castes (OBC) 3	107,296,413	42.13	68.14
Scheduled Castes (SC) 4	56,299,648	22.10	90.24
Scheduled Tribes (ST) 5	21,110,764	8.29	98.53
Others 6	3,735,535	1.47	100.00
Total	254,693,051	100.00	

Table 2 shows that 4.93 per cent of the households are Brahmins and 21.08 per cent households belong to the forward caste except Brahmins. This demonstrates that 26.01 per cent of the total households belong to the upper caste. About 42.13 per cent of the households belong to OBC, 22.10 per cent of the households belong to SC and 8.29 per cent of the households belong to ST in India. About 1.47 per cent of the households specified themselves as "others", implying that they did not belong to any of the categories.

IV. CASTE DISPARITY

Table 3 below presents the disparity that exists between households belonging to different castes with different levels of education across India. It can be clearly seen that only 3.85 per cent of the Brahmin households and 11.86 per cent of households belonging to forward castes (except Brahmins) reported no education/schooling in their households. Whereas 25.87 per cent and 31.32 of the households belonging to scheduled castes and scheduled tribes respectively reported no education/schooling at all in their households. "No Schooling" implies that none of the members of the household had ever been to school or even enrolled in a school. There is a huge difference between forward castes, dalits and tribes. Even for the OBCs, 19.49 per cent of the households reported no schooling at all. More than one fourth of the households belonging to scheduled castes and scheduled tribes have members who have never been to school in spite of facilities and programs made available for them by the state and the central government. This shows failure of the implementation or

the approach used for provision or execution of the programs. There can be other social or community related issues such as segregation and caste based discrimination which prevent dalits and scheduled tribes from going to the school.

Table 3

Caste category	*No Schooling*	*Primary*	*Secondary*	*Higher Secondary*	*Post- Secondary*	*Total*
Brahmin	483,367	2,103,046	2,658,079	2,112,889	5,198,627	12,556,008
	(3.85)	(16.75)	(21.17)	(16.83)	(41.40)	(100.00)
Forward/General	6,370,570	13,063,304	11,128,089	7,550,368	15,582,352	53,694,683
(except Brahmins)	(11.86)	(24.33)	(20.72)	(14.06)	(29.02)	(100.00)
Other Backward	20,914,467	32,193,872	22,683,873	12,963,166	18,541,035	107296413
Castes	(19.49)	(30.00)	(21.14)	(12.08)	(17.28)	(100.00)
Scheduled Castes	14,566,578	18,533,446	11,045,817	5,457,011	6,696,796	56,299,648
(SC)	(25.87)	(32.92)	(19.62)	(9.69)	(11.89)	(100.00)
Scheduled Tribes	6,610,866	6,998,782	3,578,833	1,959,769	1,962,514	21,110,764
(ST)	(31.32)	(33.15)	(16.95)	(9.28)	(9.30)	(100.00)
Others	546,999	1,104,821	712,566	382,020	989,129	3,735,535
	(14.64)	(29.58)	(19.08)	(10.23)	(26.48)	(100.00)
Total	49,492,847	73,997,271	51,807,257	30,425,223	48,970,453	254693051
	(19.43)	(29.05)	(20.34)	(11.95)	(19.23)	(100.00)

Again, 30 per cent, 32.92 per cent and 33.15 per cent of the households belonging to OBC, scheduled castes and scheduled tribes respectively reported primary education as the highest level of education attained by any member of the household but brahmins and other forward (except Brahmins) caste reported only 16.75 and 24.33 per cent, respectively. This shows that around one third of the scheduled castes, scheduled tribes and OBCs drop out of school at the early level of schooling itself. There can be many reasons for children of backward class dropping out of school. As discussed earlier, the 'intrinsic disadvantage' of dalit and backward castes children prevent them children from going to the school. There have been instances where children of backward castes especially dalits have been discriminated against by the students and by children belonging to upper caste in the schools. Even though untouchability is illegal in India, "many dalit children are treated as 'untouchable' by teachers and other students. This includes segregation in class rooms, exclusion from school ceremonies and denial of access to school water supplies."[10] Even the teachers and school administrators deny dalit children an access to equal education by treating them as unequal which results in exclusion from the school. Dalit children are often forced to do hazardous work that includes cleaning human excrement and disposing off dead animals. "In addition, many of the children reported that teachers or community members made them clean toilets or pit latrines."[11] With all these discriminatory actions, dalit children feel forced to drop out of schools at a very early stage. The overall dropout rate has decreased in

the recent years but the difference between dalit children and all other Indian children grew from 4.39 per cent in 1989 to 16.21 per cent in 2008.[12]

The higher education in India has always been biased against backward castes and this analysis proves it. Around 41.40 per cent of the brahmin households and 29.02 per cent of other forward caste households reported at least one member having post-secondary education (which includes under graduation and above) whereas only 17.28 per cent of OBC households, 11.89 per cent of scheduled castes households and 9.30 per cent of scheduled tribes household reported at least one member with post-secondary or higher educational level in their household. This shows the inability of households belonging to OBC, SC and ST to acquire higher education which shows a failure of implementation of government schemes introduced for reservation for scheduled castes and scheduled tribes in higher education. Even after reservation policy existing for scheduled castes and scheduled tribes in higher education for so long, the per centage of SC and ST households having higher education remains very less. Either there is a lack in proper implementation of the government schemes or the backward caste people are unable to free themselves from the clutches of the caste system.

V. STATE-WISE ANALYSIS

No Schooling

Among all the Indian states, Rajasthan, Bihar, Madhya Pradesh and Andhra Pradesh show the highest number of households with members with no education at all. In Rajasthan, 27.45 per cent, 39.67 per cent, 23.14 per cent and 27.72 per cent of the total households have members with no schooling or education at all in states of Bihar, Madhya Pradesh and Andhra Pradesh respectively (Table 4 in Annexure).

Rajasthan—Education level

Table 5
Household Education level in Rajasthan

Caste category	*No Schooling*	*Primary*	*Secondary*	*Higher Secondary*	*Post-Secondary*	*Total*
Brahmin	0.89	2.65	6.29	7.55	10.44	4.30
Forward/General (except Brahmins)	10.10	13.06	17.86	21.39	29.26	16.11
Other Backward Castes	48.48	53.09	50.11	43.19	41.66	48.86
Scheduled Castes (SC)	29.27	24.23	17.96	22.35	13.52	22.85
Scheduled Tribes (ST)	9.54	6.32	5.64	5.05	4.98	6.80
Others	1.72	0.65	2.15	0.48	0.15	1.09
Total	100.00	100.00	100.00	100.00	100.00	100.00

In Rajasthan, 48.48 per cent of the households who do not have any education/ schooling belong to OBC, 29.27 per cent belong to scheduled castes and 9.54 per cent

belong to scheduled tribes as compared to only 0.89 per cent belonging to brahmins and 10.10 per cent belonging to forward castes (Table 5).

Similarly, in Bihar, 60.27 per cent of the household with no educated member belong to OBC, 29.38 per cent belong to SC and 2.86 per cent belong to ST as compared to 0.55 per cent belonging to brahmins and 6.95 per cent belonging to forward castes (Table 6). Similar trends can be seen in other states as well including Madhya Pradesh and Andhra Pradesh.

Bihar—Education level

Table 6

Household Education level in Bihar

Caste category	*No Schooling*	*Primary*	*Secondary*	*Higher Secondary*	*Post-Secondary*	*Total*
Brahmin	0.55	2.32	9.48	5.76	10.02	3.89
Forward/General (exce	6.95	15.32	16.44	17.38	29.21	13.90
Other Backward Castes	60.27	59.36	57.88	55.98	51.00	58.26
Scheduled Castes (SC)	29.38	22.15	15.68	17.30	6.82	21.88
Scheduled Tribes (ST)	2.86	0.85	0.52	3.59	2.95	2.08
Total	100.00	100.00	100.00	100.00	100.00	100.00

Post-Secondary Education

Table 7 (in the Annexure) shows state wise post-secondary education status of all the households (caste-wise). It can be seen that on an average only 4.01 per cent of households had at least one member with post-secondary education belonging to Scheduled Tribe except the states of Arunachal Pradesh, Nagaland, Mizoram and Meghalaya. These states have 90 per cent of households' post-secondary education belonging to scheduled tribes.

This is because more than 90 per cent of the households in these states are scheduled tribes. The similar trend can be seen for the scheduled caste households. Out of all the households throughout the country who have at least one member with post-secondary education, only 13.68 per cent on an average belonged to scheduled castes. Even in state of Punjab (38.59%), Uttarakhand (39.53%) and West Bengal (34.94%), where the proportion of scheduled castes households are proportionately more than other states, only 14.67 per cent (Punjab), 20.09 per cent (Uttarakhand) and 20 per cent (West Bengal) of the households have at least one member with post-secondary education belonging to the scheduled castes. It can be seen from the state-wise analysis

that, the attainment of education for scheduled castes and scheduled tribes is not a problem limited to a few states but is spread out across the whole country.

Gender Disparity

Women in Indian society are the worst off section in almost all sectors including education. The data from IHDS-II (2011-12) demonstrates the same supposition. Only19.75 per cent of the total households throughout India reported male members with no education or who have never been to school but 38.73 per cent of the households reported female members with no education at all. Education for women has been prohibited in the Indian culture since a long time. Savitribai Phule was one of the first person to dedicate her life for the benefit of women and their education. She started a school for the education of women. But, there still remains differences in the male and female education and this is not the case in a particular caste, it a phenomenon that exists throughout all the sections of society.

Table 8
Difference in Education between Male and Female

	Freq.	*Per cent*	*Cum.*
F	44,553,138	19.42	19.42
0	26,298,459	11.46	30.88
M	122,253,925	53.28	84.15
No Educ	36,365,702	15.85	100.00
Total	229,471,224	100.00	

Table 8 shows the proportion of households with difference in education level of male and female within the same household. 'F' denotes that the education level of highest educated female member of the household is higher (in number of years of education) than the highest educated male member of the household. Similarly 'M' denotes that the education level of highest educated male member of the household is higher (in number of years of education) than the highest educated female member of the household. '0' denotes that the highest educated male member and highest educated female member have the same years of schooling and 'No Educ' denotes that neither male member nor the female member of the household had any education. It clearly shows that only 19.42 per cent of the households reported female member of the household with more years of schooling than the male member of the household whereas in 53.28 per cent of the household male members exceeded the female members in their years of education. It is quite clear that the households in Indian society prefer education for male members than their female counterparts. Only 11.26

per cent of the household denoted equal number of years of schooling for both male and female member of the household.

Female Education

Table 9
Female Education level

Caste category	*No Schooling*	*Primary*	*Secondary*	*Higher Secondary*	*Post-Secondary*	*Total*
Brahmin	15.08	29.49	19.76	11.85	23.82	100.00
Forward/General (except Brahmins)	23.62	29.44	19.19	10.71	17.04	100.00
Other Backward Castes	40.07	30.35	14.50	6.79	8.29	100.00
Scheduled Castes (SC)	50.01	28.05	11.70	4.86	5.39	100.00
Scheduled Tribes (ST)	57.11	23.99	10.25	4.62	4.03	100.00
Others	27.71	33.50	18.12	7.66	13.01	100.00
Total	38.73	29.13	14.85	7.29	10.00	100.00

Table 9 shows caste wise education level of female member of the household. It shows data about women who have never attained education or gone to school i.e. 40.07 per cent in OBC, 50.01 per cent in SC and 57.11 per cent in ST households as compared to 15.08 per cent in brahmin and 23.62 per cent in forward castes households. In post-secondary educationWW too, female in forward castes have comparative advantage in access to education. Around 23.82 per cent of the brahmin households and 17.04 per cent of the forward castes' households reported highest education level for female as post-secondary as compared to only 5.39 per cent in SC and 4.03 per cent in ST households.

Table 10
Difference in Education between Male and Female within Brahmin

	Freq.	Per cent	Cum.
F	2,068,137	18.38	18.38
0	1,998,510	17.76	36.15
M	6,958,781	61.86	98.01
No Educ	224,406	1.99	100.00
Total	11,249,834	100.00	

Even in brahmin and forward castes households, women have lagged behind in education when compared with the men. Table 10 and Table 11 show the difference in education level between men and women in brahmin and forward caste households.

Households

Table 11
Difference in Education between Male and Female within Forward Castes Households

	Freq.	*Per cent*	*Cum.*
F	11,185,257	22.74	22.74
0	8,262,489	16.80	39.54
M	25,234,514	51.30	90.84
No Educ	4,508,229	9.16	100.00
Total	49,190,489	100.00	

Even though brahmin females and females belonging to forward castes do well when compared with female members of other castes (OBC, SC and ST), they do not stand at par with the men of the same households. Only 18.38 per cent of the brahmin households and 22.74 per cent of the forward castes' households reported highest education for the female member exceeding the highest education for the male member (in number of years). Around 61.86 per cent of the brahmin households and 51.30 per cent of the forward castes' households' male members exceeded the female members in the number of years of education.

Similar trends can be seen in the scheduled castes and scheduled tribes' households where more number of households reported that the male members of the household have comparatively higher education (in number of years) as compared to the female member of the household. (Table 12 and Table 13)

Table 12
Difference in Education between Male and Female within Scheduled Castes Households

	Freq.	*Per cent*	*Cum.*
F	9,243,168	18.33	18.33
0	4,132,799	8.20	26.53
M	26,035,652	51.64	78.17
No Educ	11,006,555	21.83	100.00
Total	50,418,174	100.00	

Table 13
Difference in Education between Male and Female within Scheduled Tribes Households

	Freq.	Per cent	Cum.
F	2,555,850	13.48	13.48
0	1,532,353	8.08	21.56
M	9,488,736	50.04	71.60
No Educ	5,384,759	28.40	100.00
Total	18,961,698	100.00	

Even though female members belonging to brahmin and upper castes household comparatively do better in education as compared to the female members of the scheduled castes and scheduled tribes household, they still continue to lag behind the male members of their own caste. This analysis from IHDS-II (2011-12) household data shows that the households in Indian society, regardless of their caste, prefer education for male as compared to the female member and as Table 9 shows, the female belonging to backward castes such as scheduled castes and scheduled tribes are even worse off than female members of other castes (brahmins and forward castes).

VI. REGRESSION ANALYSIS

From the India Human Development Survey-II (IHDS-II), 2011-12, data for the individuals has been used for regression analysis. The multinomial Probit model was used in order to show the likelihood of different castes and gender to attain a certain level of education. The categories of education level (No education, Primary, Secondary, Higher Secondary and post-Secondary) was taken as the dependent variable. Interaction of gender and caste was used as independent variable to show the impact of female members belonging to different castes on their education attainment.

The results of probit regression are shown in the table 14 in the following page. From the Probit regression results we can interpret the direction of the likelihood but we cannot interpret the magnitude of the likelihood. For the magnitude, marginal effects have been calculated as shown in table 15.

From table 14, it can be said that, a person belonging to an urban area is less likely to have no education at all than a person belonging to the rural area. Similarly, a person belonging to an urban area is more likely to have post-secondary education as compared to a person belonging to the rural areas.

Table 14
Probit Regression Result (All the Coefficients are Significant at 5 per cent Level of Confidence)

Educ	*No Education*		*Primary*	*Secondary*		*Higher Secondary*		*Post-Secondary*	
	Coef.	*Std.*		*Coef.*	*Std.*	*Coef.*	*Std.*	*Coef.*	*Std.*
Urban2011	-0.2792799	0.0093372	Base Outcome	0.2617334	0.0101197	0.336769	0.0115433	0.7671343	0.0118584
Forward	0.0923218	0.0341026		-0.2016532	0.0318903	-0.2648532	0.0344771	-0.4775929	0.0326713
Obc	0.1518474	0.0327857		-0.3944798	0.0307033	-0.5275392	0.0332845	-0.9104091	0.0317621
Sc	0.2492767	0.0339315		-0.4849777	0.0324188	-0.6537825	0.0355854	-1.09718	0.0348737
St	0.2863594	0.0372991		-0.5392526	0.0374761	-0.6995888	0.0422119	-1.009941	0.0425198
Forwardfemale	0.3224974	0.0183312		-0.158303	0.0193605	-0.1695106	0.0216418	-0.1935486	0.0214357
Obcfemale	0.459478	0.0130824		-0.1345721	0.0149814	-0.1671149	0.0176083	-0.1743203	0.0187842
Scfemale	0.4733925	0.017951		-0.1032709	0.0215822	-0.0792795	0.0257137	-0.1259592	0.0290027
Stfemale	0.489317	0.0280747		-0.0370087	0.0349766	-0.0381771	0.0424485	-0.1216166	0.0474223
Brahminfemale	0.2663737	0.0418331		-0.3202848	0.0413699	-0.3275239	0.0449188	-0.4388768	0.042449
_CONS	-0.4081796	0.0315754		-0.330567	0.0293068	-0.6488384	0.031598	-0.5821039	0.0298735

Table 15

Marginal Effects

Variable	*dy/dx*	*dy/dx*	*dy/dx*	*dy/dx*	*dy/dx*
Urban	-0.1378958	-0.0322278	0.0442645	0.0359301	0.089929
Forward	0.0656346	0.0276852	-0.030637	-0.0244546	-0.038228
Obc	0.1203072	0.0617346	-0.056608	-0.048004	-0.0774296
Sc	0.1576428	0.0461762	-0.07464	-0.0565298	-0.072649
St	0.1672041	0.0304725	-0.083249	-0.05636	-0.0580674
Forwar Female	0.1214802	-0.0278283	-0.044498	-0.0260036	-0.0231499
Obc Female	0.1604816	-0.0512418	-0.050791	-0.0318761	-0.0265726
Sc Female	0.1592979	-0.0622599	-0.048579	-0.0246078	-0.0238507
St Female	0.1586285	-0.0714526	-0.040048	-0.0223952	-0.0247325
Brahmin Female	0.1268538	0.0005884	-0.059734	-0.0335547	-0.0341534

Caste Disparity

The OBC, SC and ST are more likely than the brahmins to have no education (as compared to the primary education). The OBC, SC, ST and even the forward castes are less likely than the brahmins to have post-secondary education as compared to the primary education. Table 15 shows the marginal effect which shows the magnitude of the likelihood. It shows that keeping everything else constant, a person belonging to OBC, SC and ST are 12 %, 15.7% and 16.7% respectively more likely to be uneducated as compared to the brahmins. Similarly, in the post-secondary education, keeping everything constant, OBC, SC and ST are 7.7%, 7.2% and 5.8 % less likely than brahmins to attain post-secondary education.

Gender Disparity

From table 14, it can be said that, a female is more likely to be uneducated than a male and a female is less likely to attain post-secondary education as compared to the male. From the marginal effects table, we can show that a female belonging to any caste is more likely to be uneducated than the male members of the society. Like a brahmin female is 12.6 % more likely to be uneducated than the brahmins male and 3.4 % less likely to attain post-secondary education than the brahmin male. We can compare the likelihood of male and female members belonging to the same caste.

	Coef.	*Std.*	*Coef.*	*Std.*	*Coef.*	*Std.*	*Coef.*	*Std.*
Brahmin Female	0.2653	0.0415	-0.3116	0.0412	-0.3169	0.0447	-0.4114	0.0415
Forward Female	0.3184	0.0182	-0.1537	0.0193	-0.1639	0.0216	-0.1751	0.0209
Obc Female	0.4555	0.0130	-0.1288	0.0149	-0.1579	0.0175	-0.1475	0.0183
Sc Female	0.4690	0.0179	-0.0989	0.0215	-0.0712	0.0256	-0.0960	0.0282
St Female	0.4849	0.0280	-0.0331	0.0349	-0.0306	0.0422	-0.0800	0.0458

To check the difference between the male and female education attainment, caste wise probit regression has been done which can be seen below.

Table 16
Mprobit results

	Coef.	*Std.*	*Coef.*	*Std.*	*Coef.*	*Std.*	*Coef.*	*Std.*
Brahmin Female	0.2653	0.0415	-0.3116	0.0412	-0.3169	0.0447	-0.4114	0.0415
Forwardfemale	0.3184	0.0182	-0.1537	0.0193	-0.1639	0.0216	-0.1751	0.0209
Obc Female	0.4555	0.0130	-0.1288	0.0149	-0.1579	0.0175	-0.1475	0.0183
Sc Female	0.4690	0.0179	-0.0989	0.0215	-0.0712	0.0256	-0.0960	0.0282
St Female	0.4849	0.0280	-0.0331	0.0349	-0.0306	0.0422	-0.0800	0.0458

The results in table 16 has been taken by regressing the education levels on female for different castes separately. It indicates that, in brahmins, females are more likely to be uneducated as compared to the men. Similarly, in OBC, SC and ST, females are more likely to be uneducated as compared to the men. For the higher education, female members are less likely than the male members of their caste to attain higher education.

Table 17
Marginal Effects

	No Education	*Primary Education*	*Secondary*	*Higher Secondary*	*Post-Secondary*
Variable	*dy/dx*	*dy/dx*	*dy/dx*	*dy/dx*	*dy/dx*
Brahmin Female	0.1085757	0.0530831	-0.050017	-0.0361402	-0.0755022
Forward Female	0.1077057	-0.0037123	-0.041833	-0.0283706	-0.0337896
Obc Female	0.1527666	-0.0462364	-0.049734	-0.031137	-0.0256594
Sc Female	0.1545176	-0.0668426	-0.047157	-0.0221674	-0.0183505
St Female	0.1551316	-0.0816701	-0.036765	-0.0185462	-0.0181506

Table 17 shows the marginal effect from the mprobit regression. It shows that brahmin females are 10.8 per cent more likely than brahmin males to have no education at all. Similarly, female belonging to OBC, SC and ST are 15.2 per cent, 15.4 per cent and 15.5 per cent more likely than their male counterparts to be uneducated. For the higher education too, the analysis shows results which prove that women are disadvantaged in attaining education. It shows that brahmin female are 7.5 per cent less likely than brahmin male to attain post-secondary education. For the lower castes too, the female of OBC, SC and ST households are 2.5 per cent, 1.8 per cent and 1.8 per cent respectively less likely to have post-secondary education.

Disparity Index (Sopher's Method)

This method of calculating disparity has been developed by David Sopher in 1974. According to this method, If X1 and X2 represents the respective per centage value of variables of group one and group two then the Disparity Index (D), can be calculated as:

$$D = \text{Log } (X2/X1) + \text{Log } [(Q-X2)/ (Q-X1)]$$

Where, X2 is Greater than or equals to X1 and Q = 100.

Disparity between Brahmins and Scheduled Caste in Post-Secondary Education

Using the Sopher's method of disparity, the disparity index between Brahmins and SC in Post-secondary education was 0.69.

X2= 18.31 per centage of brahmins who have post-secondary education.

x1= 4.32 per centage of scheduled castes members who have post-secondary education.

Disparity between Brahmins and Scheduled Tribe in Post-Secondary Education

The Sopher's disparity index between Brahmins and ST in Post-secondary education was 0.73. X2= 18.31 per centage of brahmins who have post-secondary education.

X1= 3.94 per centage of scheduled tribes' members who have post-secondary education. Both Sopher's disparity indices indicate that there is a huge disparity between brahmins, scheduled castes and scheduled tribes in the higher education.

Gender Disparity

The Sopher's Disparity Index between men and women in post-secondary education was 0.17 which indicates that there is inequality in higher education between male and female.

The disparity shown in the above analysis exists among brahmins and forward castes too. The Sopher's disparity index between men and women within brahmins is 0.22 for higher education. Similarly, the disparity index between men and women in higher education in Scheduled Caste and Scheduled Tribes was 0.19 and 0.21 respectively. These disparity indices indicates that the gender inequality in higher education exists not only between different castes but exists even within the same castes.

VII. CONCLUSION

It is evident from the analysis of the IHDS-II (2011-12) dataset that, even after so many years of implementation of reservation policies for Scheduled Castes and Scheduled

Tribes in education, disparity among Forward Castes and Backward Castes remains and not with a small margin but a significant gap between them. It is quite clear that the caste hierarchy and stratification is embedded in the Indian society. Not only it can be said that the members of the Upper Castes discriminate against them but the fear and hesitation remains within the Dalits and other backward castes to break the barrier of the Caste. There are many reasons behind this disparity in household education level as discussed earlier but in order to decrease this disparity, government needs to work more efficiently and formulate more specific policies to target the left out groups. They also need to keep a check on the implementation and proper functioning of these policies. Similar is the case of women of Indian household.

Even women belonging to Upper Caste households lag behind the men of their households. Specific actions and policies need to be implemented to tackle these issues of unequal access to education.

References

Borooah, Vani K., and Sriya Iyer. "Vidya, Veda, and Varna: The influence of religion and caste on education in rural India." *The Journal of Development Studies* 41, no. 8 (2005): 1369-1404.

Chitnis, Suma. "Education for equality: case of Scheduled Castes in higher education." *Economic and political weekly* (1972): 1675-1681.

Deshpande, Satish. "Exclusive inequalities: Merit, caste and discrimination in Indian higher education today." *Economic and Political Weekly* (2006): 2438-2444.

Kijima, Yoko. "Caste and tribe inequality: evidence from India, 1983–1999." *Economic Development and Cultural Change* 54, no. 2 (2006): 369-404

Thorat, Amit. "Ethnicity, caste and religion: Implications for poverty outcomes." *Economic and Political Weekly* (2010): 47-53.

——. "Rural Poor: Who Are They and Why? A Case Study of Madhya Pradesh." *Journal of Social and Economic Development* 8, no. 1 (2006): 41.

Thorat, Sukhadeo, and Katherine S. Newman. "Caste and economic discrimination: causes, consequences and remedies." *Economic and Political Weekly* (2007): 4121-4124.

Wankhede, Govardhan. "Higher Education and the Scheduled Castes in Maharashtra." *Economic & Political Weekly* 51, no. 6 (2016): 83.

"11th April (1827) in Dalit History – Birth Anniversary of the Mahatma Jyotirao Phule." https://drambedkarbooks.com/2012/04/11/11-april-1827-birth-anniversary-of-the- mahatma-jyotirao-phule/

"Dalit children in India – victims of caste discrimination" http://idsn.org/wp- content/uploads/user_folder/pdf/New_files/India/Dalit_children_in_India_-_victims_of_caste_discrimination.pdf

ANNEXURE

Table 4
State-wise Education level

	Education Level				
State	*No Schooling*	*Primar y*	*Secondary*	*Higher Secondary*	*Post- Secondary*
Jammu&Kashmir	12.5	19.54	23.18	16.63	28.15
Himachal Pradesh	7.1	28.46	24.87	20.56	19.01
Punjab	12.11	23.68	23.56	19.66	20.99
Chandigarh	3.53	7.06	10.59	16.47	62.35
Uttarakhand	13.14	38.77	19.27	12.59	16.23
Haryana	14.07	24.48	21.92	16.07	23.45
Delhi	5.41	21.71	19.96	17.21	35.72
Rajasthan	27.45	34.13	15.5	7.49	15.42
Uttar Pradesh	24.52	29.9	17.7	10.84	17.03
Bihar	39.67	24.73	15.39	9.13	11.08
Sikkim	9.56	35	20.74	13.95	20.74
Arunachal Pradesh	12.19	27.86	13.28	13.87	32.8
Nagaland	0.92	19.05	23	16.81	40.23
Manipur	0	12.76	13.99	19.16	54.08
Mizoram	4.59	24.33	16.77	14.09	40.23
Tripura	8.91	27.62	30.58	15.78	17.1
Meghalaya	5.25	40.74	17.24	6.78	30
Assam	11.33	24.46	33.56	15.92	14.74
West Bengal	21.12	39.62	14.73	7.79	16.74
Jharkhand	25.49	31.08	16.98	10.68	15.77
Orissa	18.56	34.22	26.78	6.91	13.53
Chhattisgarh	18.66	43	11.52	11.98	14.83
Madhya Pradesh	23.44	38.36	15.43	10.93	11.85
Gujarat	13.9	30.72	24.41	11.55	19.43
Daman & Diu	17.78	22.62	34.55	11.47	13.58
Dadra+Nagar Haveli	1.89	10.74	24.44	34.01	28.92
Maharashtra	8.64	21.99	24.3	17	28.07
Andhra Pradesh	27.72	24.43	21.87	9.44	16.54
Karnataka	13.52	26.88	24.87	14.03	20.7
Goa	0.52	12.75	28.55	23.38	34.79
Kerala	0.84	13.1	33.64	20.37	32.05
Tamil Nadu	15.68	28.4	20.22	11.41	24.29
Pondicherry	3.39	22.61	14.16	7.91	51.93
Total	19.43	29.05	20.34	11.95	19.23

Table 7
State-wise Post-Secondary Education level

India	*Caste Category*						
State	*Brahmin*	*Forward Caste(Except Brahmin)*	*Other Backward Caste*	*Scheduled Castes*	*Scheduled Tribes*	*Others*	*Total*
Jammu & Kashmir	18.27	59.86	14.71	5.36	1.29	0.51	100
Himachal Pradesh	23.95	48.65	6.55	17.79	3.05	0	100
Punjab	12.19	53.02	20.12	14.67	0	0	100
Chandigarh	5.66	66.04	18.87	9.43	0	0	100
Uttarakhand	31.71	30.37	16.84	20.09	0.99	0	100
Haryana	18.81	40.99	28.44	11.34	0	0.42	100
Delhi	17.5	36.44	20.61	22.93	1.88	0.63	100
Rajasthan	10.44	29.26	41.66	13.52	4.98	0.15	100
Uttar Pradesh	17.2	25.91	43.68	12.36	0.51	0.33	100
Bihar	10.02	29.21	51	6.82	2.95	0	100
Sikkim	3.02	35.77	41.81	1.51	17.89	0	100
Arunachal Pradesh	1.57	7.87	3.15	3.15	84.26	0	100
Nagaland	4.3	4.3	0	0	91.4	0	100
Manipur	10.42	81.88	7.7	0	0	0	100
Mizoram	0	0	0	0	100	0	100
Tripura	5.97	55.95	22.29	6.39	9.4	0	100
Meghalaya	0	28.02	0	2.23	69.75	0	100
Assam	6.98	37.88	26.13	10.44	12.57	6.01	100
West Bengal	16.65	50.3	11.55	20	1.02	0.49	100
Jharkhand	8.97	29.5	36.88	14.74	9.91	0	100
Orissa	17.66	29.2	33.58	10.37	9.19	0	100
Chhattisgarh	15.27	18.89	42.86	10.6	12.39	0	100
Madhya Pradesh	22.82	28.58	34.56	11.71	2.33	0	100
Gujarat	14.85	46.96	24.59	8.44	2.86	2.3	100
Daman & Diu	15.54	0	53.39	0	31.07	0	100
Dadra+Nagar Haveli	28.52	8.01	14.26	14.26	33.61	1.34	100
Maharashtra	4.87	45.09	31.57	14.45	3.01	1.03	100
Andhra Pradesh	1.53	20.52	50.14	20.88	2.33	4.61	100
Karnataka	9.16	15.2	51.27	11.83	6.72	5.82	100
Goa	18.69	39.72	35.36	0	6.23	0	100
Kerala	1.21	42.82	47.01	6.5	0	2.46	100
Tamil Nadu	2.51	1.46	67.67	19.3	0.81	8.24	100
Pondicherry	3.31	0	96.69	0	0	0	100
Total	10.62	31.82	37.86	13.68	4.01	2.02	100

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Reigning Deities of Sacred Groves

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It is only in India that sacred groves have contributed to the preservation of bio-diversity where Nature, Man and Spirit co-exist as the three arms of the "Inter-related Triad". Sacred Groves have existed since "Hunter – Gatherer Times", where groves are believed to manifest the "Earth – Energy" inhering in Nature, on one hand, while the "Cosmic – Forces" of gods and goddesses to which they are dedicated manifest the protective beings watching over the people and their good, on the other. Man is the third arm of the Triad whose reverence of this energy conserve forests and, in turn, biodiversity. This paper aims at an understanding of the role played by the deities of the sacred groves in the preservation of the same and, to that effect, it looks at the current scenario of worship of deities, or its absence, and tries to find answers why this is so and what can be done to repair the situation. It is based on a research study of 85 sacred groves and 500 adult respondents selected randomly according to the number of houses per hamlet in the two districts of Thane and Palghar in Maharashtra State of India. The findings state that any break in this pattern of the Triad would lead to loss of groves and the people's survival.

Keywords: *Sacred groves, Environment conservation, Carnivorous animals, Classification of Gods*

I. INTRODUCTION

The Oxford Dictionary defines "sacred" as an adjective, that is, an attribute of a thing connected with a God or Goddess and treated as holy. Also, if the thing is a writing or text, then its sacredness is said to have something to do with the teachings of a religion. The origin lies in the Latin root "sacrare" from "sacr" or holy and from Late Middle English archaic past participle "sacre" which means "to consecrate". On the other hand, the word "Grove" is defined as "a small orchard" or "a group of trees".

From the above one can deduce that a "Sacred Grove" may be a group or a cluster of trees connected with a revered god or goddess and when mentioned in teachings of religion the sacred character of the groves becomes implied in the reverence with which such f teachings are held by the people.

Sacred Groves have been variously defined.

– Indian Ecologist M. Gadgil and Botanist L.D. Vartak (2002) state that "sacred groves are tracts of the most valuable of legacies from the primitive practices of nature conservation".

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- Indian Indologist D. D. Kosambi (1962) stated
- "Sacred Groves is an age-old tradition where a patch of forest or water body is dedicated to local deities and none is allowed to cut plants or to kill animals or any form of life. The institution of sacred groves dates back to pre-agrarian hunting gathering phase of human civilization and is known to thrive in most parts of India."
- Leading Indian Anthropologist – J.J. Roy Burman (2003) states
- "Sacred Groves refer to patches of forests dedicated to deities often fiery ones. In their pristine form, nobody is allowed to enter them and lift anything from these areas including leaf litter. Women are not permitted to enter these areas quite often. Sacred Groves conceived this way seem to be repositories of gene prots and biodiversity and are thus considered to be part of ethno environment management."

Study of Sacred Groves worldwide has been conducted mainly by Botanists, Environmentalists and Ecologists. There are no Sociological Studies on the topic and very few Indian Anthropologists have devoted themselves to studying this concept. Among they who have done, mention may be made of Dr. J.J. Roy Burman and Dr. K.C. Malhotra, who have conducted in depth studies on the topic. While most anthropologists have focused largely on the cultural and social dimensions of sacred groves, the environmentalists highlighted the ecological dimensions. Botanists are interested in the flora of the grove, in particular, the rare and endemic species that they harbour, while Biologists delve into the animal diversity and biogeography of the groves.

From a Sociologist's viewpoint, the definitions taken together point to this – The Sacred Grove is very closely tied up with the social life of the local people for these reasons:

i. The people feel protected, inspired and healed by their presence.
ii. The groves instantiate the rule of the local deity who reigns completely. For example, in the groves where the village goddess is the presiding deity ruling over the tribal and rural area in Thane and Palghar districts, she owns all: the trees, the rocks, and the flora and fauna around her.
iii. The groves instill the rule of order in the people as tabos and traditions are followed for fear of invoking the anger of the deity. These traditions and social values have been followed by the local people for generations and has helped to conserve the groves.
iv. The groves help the people settle down as annual rituals, ceremonies and sacrifices are performed by the villagers to appease the protecting deity and for the benefit of the village, the crops, the fields and forests.

v. The grove is very much entwined with the socio-economic, cultural and religious life of the tribal people which defines their cultural identity in many ways. These groves are cared for by the local community as they consider them to be of fundamental value.

vi. The Sacred Grove is a meeting point for many tribal and rural caste communities. It pulls them together and establishes a bond between the varied divisions of the communities e.g. in the Korthud Village of Jawhar Taluka, Palghar District, it is believed that the village is the origin of the Tiger God (Korthuba). Varied divisions in the rural and tribal community like the Warli's, Malhar Koli's, Kunbi Marathas and Katkari's congregate here for the annual festival to venerate the tiger god before they begin their agricultural work.

The author would define a sacred grove as "A patch of forested land, maybe small or large, dedicated to a local deity or deities, generally believed to be fierce, left untouched by the local people for socio-religious reasons. This patch may have rare trees, medicinal plants and endemic species of birds or animals. Such patches, in their pristine condition, which the local people want to conserve, contribute immensely to the bio diversity of the nation."

Sacred Groves connect the local people with their fields, forests and with one another. Collective worship in the grove, annual festivals celebrating sowing and harvesting, and other practices of communal get-togethers bring the people in close contact with each other. The annual cycle of seasons in nature being a dominating factor in their lives, the agricultural and forest activity begin with obeisance to the deities in the groves. This worship and placating of deities is carried out so that they have good days of rain, a good harvest and good health. Any disruption in the annual cycle will impact their survival.

There are varied local terms in India for sacred groves from region to region.

Table 1
Varied Local Terms for Sacred Groves in India

State	*Local Name for Sacred Grove*
Andhra Pradesh	Pavithravana
Arunachal Pradesh	Gumpa forest
Assam	Than, Madaico
Chhattisgarh	Sarana, Jahera
Goa	Devrai, Devgal, Devavan
Himachal Pradesh	Deobhumi
Jharkhand	Sarana, Jaherthan
Karnataka	Devarakadu, Kans, Nagabana
Kerala	Kavu
Maharashtra	Devrai, Devrahati, Deosthan, Mandir

State	*Local Name for Sacred Grove*
Manipur	GamkhapMauhak
Meghalaya	Ki Law Lyngdoh, Ki Law Kyntang, Ki Law Adong
Mizoram	Mawmund, Safety Reserves
Orissa	Jahera, Thakuramma
Rajasthan	Oran, Vani, Shamlat deh, Devbani
Sikkim	Gumpa forest
Tamil Nadu	Kovilkadu, Sthalavriksha
Uttaranchal	Devvan, Bugyal
West Bengal	Harithan, Santhal Burithan, Jahera

II. EXTENT OF SACRED GROVES IN INDIA

Sacred Groves are found all over India. Till date, there is no real comprehensive study cataloguing sacred groves of the entire country. Malhotra, Gokhale and Chatterjee (1998) documented about 22968 groves. However, they estimate that the actual number of groves in India could range from approximately 1,00,000 to 1,50,000.

In 2007, Malhotra, Gokhale, Chatterjee, Srivastava documented about 23,018 sacred groves in India.

Maharashtra State is estimated to have approximately 3000 documented sacred groves (Gadgil and Vartak, 1976). However, a study by Dr. Sanjay Deshmukh through The Bombay Natural History Society, 1999, estimated around 5000 Sacred Groves in Maharashtra. These were found largely along the Western Ghats which is acknowledged to be one of the biodiversity hotspots of the world. District wise distribution of sacred groves in State of Maharashtra reveals that they are found largely in the districts of Kolhapur, Pune, Raigad, Ratnagiri, Sindhudurg, Satara and Thane. These groves, separated by districts and milieu, are dedicated to different deities.

Till date, there have been only two comprehensive studies that have documented sacred groves in Thane* District. The first was conducted by Gadgil and Vartak (1976) which documented 21 groves. The second study was conducted by Dr. Sanjay Deshmukh (1999) who documented 32 groves. There is no ready available data on sacred groves with the Forest Department or Government.

On finding no clear record of Sacred Groves in Thane and Palghardistricts, the author scoured 11 Talukas in Thane – Palghar district area, searching in the remote interiors, villages, surroundings near highways and also in small town areas. Overall, 85 groves were covered. Some of these were in pristine condition, but a large section of groves was depleting and in urgent need of reforestation. It was observed that there is a situation of "Temple over Grove" viz. retaining the temple area only and cutting the other trees for agriculture, brick kilns, firewood etc. The author feels that many more groves can be detected in Thane and Palghar districts. Though 85 were covered, given the funds and a supporting team, the estimated detection is almost 1500 groves.

III. RELATIONSHIP BETWEEN THE SACRED GROVE AND THE SUPERNATURAL

According to Lissner (1961) there is in human beings a strange and inherent urge to quest their way further towards the unattainable. This is their spirituality which constantly leads them on towards a goal which is far beyond their reach. That goal is the Supernatural. Innumerable myths, countless thousands of legends and vast numbers of religious cults, all testify to the enormous energy which humans have devoted to the spiritual side of their lives. People are not content to merely eat, sleep and work, but are moulded and permeated by spirituality. All civilizations of mankind that have endured were rooted in religion and a quest for the supernatural. Without faith, religion and God, civilizations cannot be conceived.

Applying Lissners view to the sacred groves of Thane and Palghar Districts, the author feels that it is the same spirituality that has enabled many of the groves to remain in their pristine condition.

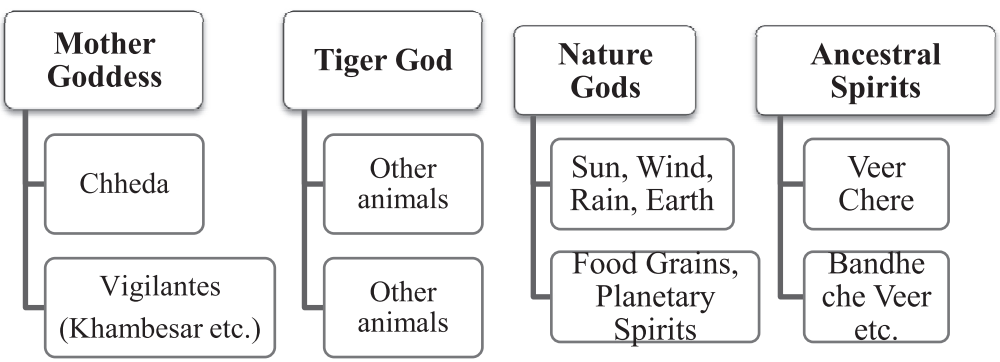
Sacred Groves are the local people's attempt to approach the supernatural, to bridge the divide between human beings and Nature. The deities that they are dedicated to are the mediators between the human beings and the Nature.

The relationship between the sacred grove and the supernatural is very close. It is also a very unique relationship. The author, expecting the relationship to one of fear, was rather surprised to note the high level of affection the tribal people and local caste communities have for their deities in the sacred groves of Thane and Palghar Districts of Maharashtra.

IV. PANTHEON OF DEITIES IN SACRED GROVES OF THANE AND PALGHAR DISTRICTS OF MAHARASHTRA

Based on Primary Data from the field, the author was able to classify the Pantheon of Gods, worshipped in the sacred groves of Thane and Palghar districts by the tribal people and by the local caste communities, into the following:

Figure 1
Classification of Gods Worshipped in the Sacred Groves of Thane and Palghar Districts



Theauthor studied communities covering over the 85 sacred groves who were largelyWarli, Katkari, Thakur, Malhar Koli, Mahadeo Koli and Kokna (among tribal) and Kunbi, Agri, Neo – Buddhist and Bhanushali (among rural).

A bird's eye view indicates that the pantheon of the sacred groves in Thane and Palghar districts comprises of a number of deities. Some of these are fierce, easily prone to anger, and the local people are careful not to incur their displeasure while worshipping them. Others are benevolent, loving and giving and yet others are vigilant and protective. Local people firmly believe that their deities must be constantly appeased in the correct manner; else some calamity will befall them. Thus, each deity of this vast pantheon has its own characteristics and role to play. Some deities are carved on wood and others are rough carvings on stone. Yet others are simply stone lumps of varied shapes and sizes. All of these are smeared with red lead symbolizing blood offering.

The Classification of deities in the Sacred Groves of Thane and Palghar districts, according to the author, may be linked to the Energy and Nutrient Flow in an Ecosystem

Figure 2

The Energy and Nutrient Cycling Flow in an Ecosystem

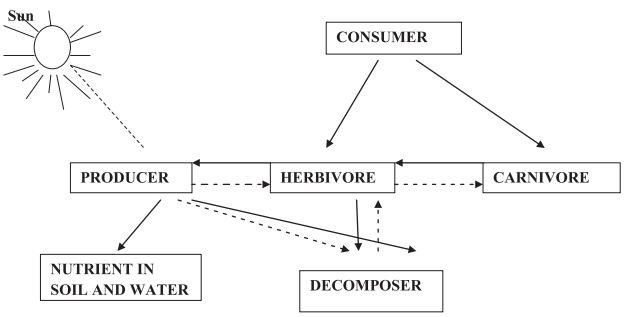
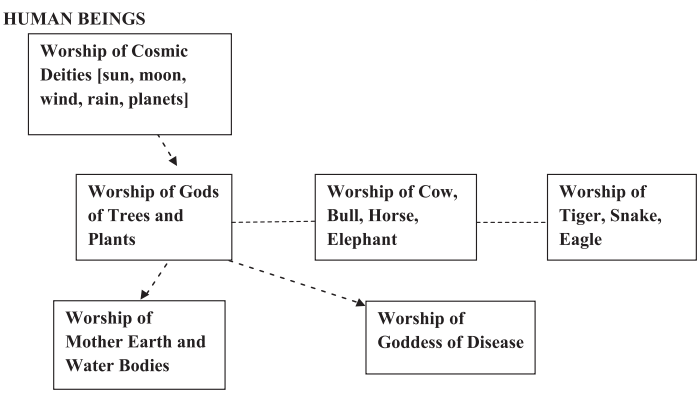


Figure 3

Classification of Deities vs. the Energy and Nutrient Cycling Flow in the Ecosystem



According to the author's analysis, worship of cosmic deities (sun, moon, wind, rain, planets) is at the top of the classification. Below is the worship of trees and plants who are the primary producers on whom life depends. Next is the worship of herbivorous animals (the primary consumers) that are used for agricultural work and on whom the local people are dependent for their survival (cow, bull, horse, elephant). Also counted in this is the worship of carnivorous animals (tiger, snake, eagle) to placate them so that they should not eat their animals and people. Still lower in the hierarchy of Gods is the worship of Earth and Water deities' viz. the preserver of nutrients in soil and water. Worship of the goddess of disease helps ensure that the decomposers should not harm them.

The local people are not much educated. Despite this, they have understood that they are on the top of the biomass pyramid and quite in control of the producers and consumers even though this control is rather limited. They are aware that they must utilize the energy resources with some respect and humility. They realize that if during the use of resources, they commit mistakes it may affect the entire nutrient cycle. Hence, it's the conclusion of the author that the worship of these forces indicates an understanding of the fact that in the god's pleasure or displeasure depends their own survival.

V. REIGNING DEITIES OF SACRED GROVES (WITH REFERENCE TO THANE AND PALGHAR DISTRICTS)

As depicted in figure 2, the classification of deities in sacred groves of Thane and Palghar districts form the pantheon of gods worshipped there, and they are the reigning deities of the sacred groves.

They have been analyzed by the author in detail below.

Gaondevi – (The Mother Goddess or The Village Goddess)

Any visitor to a village in Maharashtra State in India may be surprised to note that the temples of the great gods of the Hindu Trinity viz. Shiva and Vishnu are not given as much importance as the tiny shrine of the local goddess viz. Gaondevi or Gramdevi.

She has many names which will perhaps not be found in any textbooks on Hinduism. But she is a "Mother of the Earth" and is directly responsible for the fertility of the fields and that of the surrounding villages. Basically, she is the guardian of the village and the one to whom the local people turn in times of distress. She has her festivals and her responsibilities. It is possible that her function has not changed over 5000 years or so.

Kosambi (2008) has studied Mother Goddess Cults in great depth. In his book "Myth and Reality", he states that "every village in Maharashtra has at least one mother

goddess cult". According to him, the mother goddesses must have had a separate cult from the beginning before the male god appeared on the scene. Kosambi feels that the food gatherers – predating the land settlers -worshipped a goddess whereas the male god appeared on the scene with pastoral living.

According to the author's study, out of 85 groves, 38 (44.71%) were dedicated to the Mother Goddess. Another 38 (44.71%) were dedicated to the tiger god. It is important to note that in the number of male deities, the tiger god is also included. (See table no. 1 below)

Table 2
Number of Male and Female Deities the Sacred Groves are Dedicated to

Deity	*Number*	*Percentage*
Grove dedicated to female deity	38	44.71
Grove dedicated to male deity	43 (38 = tiger god) (5 = other male deities)	50.58
Others	04	4.71
Total	85	100.00

The author found that Gaondevi is the reigning deity in approximately 44% of the groves studied. She is a deity in her own right. Her shrine is found generally on the outskirts of the village or on the crossroads before the ways diverged in different directions.

Images of Gaondevi

Mother Goddesses are innumerable. They have no images in iconic form. They are represented by numerous shapeless stones daubed with minium or red lead. They are found under trees, near rivers or rocks. None of them have a male consort or a "husband". This, according to Kosambi proves their antiquity.

Names of Gaondevi

Often the deity is called "Ai" (The Mother in Marathi language) without any name. Sometimes she is called "Amba – bai" (Lady Mother, very close to the classical Ambemata) or "Ladu – bai" (Dear Lady) or "Kalu – bai" (Dark Lady, very close to the classical Kalimata).

Kosambi also states that at times there are fantastic names for the goddesses which are not to be found elsewhere at all. E.g. "Tukai", "Jokai", "Satiai".

The author also came across such names across Thane and Palghar Districts. For e.g. Anahishiai (The Unseen Mother), Maandpa Devi (Goddess on a Pedestal), Taakmai Devi (The Giving Goddess, very close to the classical Annapurna or Goddess of Food).

The "Saathi – Aashra"

Often the Mother Goddess become the Saathi Aashra (The Seven Apsaras or Seven Heavenly Sisters). In Thane District, the author came across a village called Saatgaon in Shahpur Taluka. This village was named after the Seven Celestial Sisters or Saathi Aashra. The Mother Goddess of Saatgaon was called Anahishi Devi (one of the seven celestial sisters of the Sahyadris. The other six goddesses were spread over various talukas of districts in Maharashtra. Their names are Vajreshwari Devi, Renuka Devi, Ambika Devi, Mahalaxmi Devi, Kalika Devi and Dharaee Devi.The local people did not know the names of all the seven celestial sisters of the Sahyadris. The author obtained these whilst interviewing the local priest at the famous Vajreshwari Devi Temple of Gunj Kathi Village, Wada Taluka in Thane District. The seven celestial sisters are also known by the name "Sapta Shrungi Mata". (Mother Goddess in Seven Mountain Peaks). All the seven goddesses were to be found in sacred groves on mountain tops. The forest tracts were preserved by the local people as portions of earth dedicated to their name.

Open to the Skies

In most of the villages across Thane and Palghar Districts, the stone icon representing Gaondevi was open to the skies, with no permanent roofing. The roofs were generally makeshift ones, mainly made of bamboo, cane and hay. Asked why so, all the villagers across Thane and Palghar had the same story to relate. They stated that as the legend goes, Mother Goddess has warned them that if they want to construct a temple with a roof for her, it has to be of wood. Moreover, the wood has to be that from one single tree only and the temple should be constructed overnight. If these instructionsare not followed, calamity will befall the village. People will suffer. There will be diseases, deaths and crop failure. Hence, the local villagers all stated firmly that what the Mother Goddess wants is a "Hirva – Mukut" (A Green Crown) and a thicket of trees as her home. Thus they are very keen on preserving the sacred groves and are evenreluctant to cut down any branches of the trees surrounding the groves.

Goddess at The Crossroads or at The Fringe of The Village

Mother Goddess shrines are also found generally at the edge of the village (called "vesh" in Marathi language). Local villagers are of the view that this is necessary because she keeps vigil and, along with the Chheda who is her protector, she protects the village from harm and from evil forces. All the village ceremonies begin from the edge of the village after taking the blessings of the goddess.

Kosambi (2008) mentions "Goddess at the Crossroads" in his book. The author noticed this in several areas of Thane and Palghar districts especially in Dahanu Taluka of Palghar district.

The crossroads had two large wooden poles in the centre about 5 – 6 feet away from each other. At the bottom of the pole was the stone icon of the mother goddess. All village activity began from here.

This area at the crossroads was also important if there was an epidemic. The villagers had to go around the village with a pot taking the epidemic into it and go to the crossroads where the person from the next village took the pot and followed the same procedure in his respective village. The pot was then destroyed at the last crossroad with a ceremony.

R.E. Enthoven (1912) in his book "Folklore Notes" has stated that during an epidemic this ceremony at the crossroads would last at least a week. Offerings of coconuts, sour lemons, cooked rice and curds were made on the last day. Animal sacrifices of chicken and goat were also made with the beating of drums and much ceremony at the boundary of the village.

Goddesses at the crossroads are believed to be fierce deities. This view perhaps originates from the fact that the local people had no other form of protection in the remote interiors.

The local people's worship of and reverence for the mother goddess is very deeply religious. It reflects their need for security in a world that is uncertain and where the struggle for survival is a continuous one. Many of the religious and social taboos point to the fact that the goddess demands that they protect and preserve the forest and trees if they are to receive her blessings.

The Chheda – "Rakshak" or the Protector of the Mother Goddess

All the Mother Goddesses have a "Rakshak" or a protector. This protector is called "Chheda" or "Chhedoba" (Protective Father). The Chheda is represented in wooden or stone form, also daubed with red lead. The Chheda is a vigilante and not a consort. He is a male deity and is believed to be very fierce. He is also the absorber of evil and all negative forces. 44% of the sacred groves studied by the author dedicated to Gaondevi also had Chheda icons, either next to the goddess or outside the temple area. The Chheda is generally feared by the villagers and has to be placated with animal sacrifices twice a year viz. before sowing begins in July and before harvesting in October.

The Tiger God (Waghoba, Wagheya, Waghdev)

The Tiger God is another prominent deity in the pantheon of gods in the sacred groves of the tribal and rural people in Thane and Palghar districts.

The Tiger is Revered as the Protector of The Forests

There are several stories in Indian Mythology about tigers having tremendous powers. They are shown fighting dragons, creating rain, keeping children safe and having healing powers.

The author found 45% (38 nos.) of sacred groves dedicated to the tiger god out of the 85 groves covered. Most prominently, it was the Warli tribe and the Malhar Koli tribe who worshipped the tiger. They believe that the tiger is the greatest of gods. Every harvest season they donate part of their harvest to the tiger god as a symbol of life and regeneration.

It is believed by the tribal people of Maharashtra that Korthud Village in Jawhar Taluka of Palghar District is the birthplace of the tiger god who is called "Korthuba". According to the legends, Korthuba (the tiger god) was born to a virgin girl from Ozharpada, a hamlet in Korthud village. The miracle baby tiger cub was very naughty and harassed all the villagers. So, they begged him to go into the mountainous forest and protect it. They promised to worship him and take good care of him. He agreed to do so. Since then, every tiger god icon faces a mountain or a forest.

Korthud village is a center point for tiger god worship in the Sahyadri region. Villagers from various talukas travel long distances over several days to reach Korthud Village before the harvest festival. No harvest festival begins without worship of the tiger god.

R.E. Enthoven (1912) has also mentioned "The Wagh Baras" ceremony conducted for the protection of cattle and forests. This ceremony is a feast dedicated to the tiger god. Grain is collected from each family and is exchanged for rice and pulses (tur dal). "Dal – Bhat" (Cooked rice and tur dal) and "Kheer" (milk and rice pudding) is cooked in the jungle. A "naivedya" (offering) is made to the tiger god before the food is eaten by the men and boys of the forest villages. Women do not attend this feast.

The tiger god is believed to be a very fierce deity. The local people carrying out tiger worship stated that they have to be very careful in their worship or else the tiger would be angered. Since the tiger is the King of the Jungle, everything in the forest… the trees, the animals and all the water bodies belong to him. As long as the tiger protects the forest, the local people believe they are safe. But if the forest is not protected, they will lose everything, since their livelihood depends a great deal on what the forest offers to them as their means of food and shelter.

During the Interviews, a large number of tribal and local caste communities (240 respondents out of 500) made a statement which the author felt was necessary to analyze –

"If the tiger dies, we die……"

The above statement of the people brings out a few points of analysis.

i. The tribal people and local caste communities are aware that the tiger plays an important part in environment (forest) protection.

ii. If trees were cut down and the buffer zones destroyed, the tiger is threatened. As human beings encroach into their territory, the tigers face the danger of being the hunted.

iii. If tiger numbers fall, other animals (primary and secondary consumers) whom the tiger hunts will proliferate and the trees, shrubs and grass (which are the primary producers of energy) face the danger of reducing greatly, as these animals forageon them. Consequently, man will not have enough food in the course of time. If the tiger is protected, the primary and secondary consumers and the producers are kept in balance. The buffer zones thus remain intact.

iv. It is not surprising thus, that the tribal people and the local caste communities are very much opposed to the use of these buffer zones for residential purposes.

v. Though it is only the tiger that is worshipped, other carnivorous animals like leopard and panthers are also called "Wagh" by the local people though they are not revered. The tribal and local caste communities believe that the tiger controls all the animals. Worship of the tiger will reduce the leopard and panther attacks and also keep the forest intact.

vi. There is a close relationship between the local people, the agricultural fields, the cattle and the tiger.** a) The tiger eats cattle, poultry. He is the king of the jungle and as such the owner of the same. He can turn into a man-eater when older and can kill the people and their children. b) For six months of the year, the local farmers take up other jobs at construction sites etc. During this time, they send their cattle into the jungle to graze and herd them back in the evening. There is no one to mind the cattle during the day. c) The marginal farmer would be handicapped without his cattle and cannot sow the seeds for the rice grains without ploughing his field. Thus, they have to pray to the tiger to 'protect' their cattle and not eat them.

Ancestral Spirits ("Veer Chehre" or Heroic Faces)

Ancestors are regarded by most tribal and rural people as 'The Guardians of the Clan'. The local people's control over their environment is limited by their inability to prevent natural calamities and uncertainties plaguing their lives and homes. They naturally want to establish good relations with their ancestors from whom they have inherited certain techniques and the understanding of whatever cosmic powers control the order inhering inNature. These are the powers that provide food, clothing, shelter and children but they can also bring calamity and suffering. Thus, they must be placated correctly.

Worship of Ancestral Spirits is an important aspect of both tribal and rural culture. The local people of Thane and Palghar districts believe that ancestors are a

link connecting them with the supernatural and, thus, the ancestors have to be given respect and worshipped in the same way as they would their gods and goddesses. Among the local tribal people and the caste communities, the deity "Veer" is a deified ancestor. Veer is the local Marathi term for 'hero'. The ancestor is regarded by the local people as a hero… a very influential member of the clan. The local people are very grateful for the effort put in by the ancestors in procuring land, tending it and taking care of the family over their lifetime for so many years. Here, it is important to look at the Viewpoint of Colchester (1999), who says, **"**Indigenous people's ancestral territories are not just their economic base, these lands are intimately bound up with their cosmologies and identities as communities and peoples. The landscape that they occupy is at once their home and the sacred abode of spiritual beings whose presence explains the functioning of the visible world. They see themselves as stewards holding the land of their ancestors in trust for future generations."

The author came across several groves dedicated to ancestors**.** In some villages, the ancestral abode was called "Zaghe che Veer" or "Bandhe che Veer" (the heroes of the area/place). Three such heroes' areas were on agricultural ground and hence there were no groves around. Some were installed along with the main temple grove.

During the worship of annual harvest, the local people offer prayers to the ancestors who will take care of the family, the property and the children.

In 8 out of the 11 villages studied by the author, the local people offered prayers to ancestors to protect them and the village.

Saakhra Village

In Vikramgad Taluka of Palghar District, outside the main Gaondevi temple but inside the grove, there are small figures etched on the rock surface. They resemble 'Memorials'. They are dedicated to the previous owners of the agricultural land who have served the land and the family well, or who may have died an unnatural death. Villagers stated that their spirits were embodied in the rock memorials and kept alongside Gaondevi so that thespirits could be at peace. At least six such stones were noticed.

Shelavali Village

In Shahpur Taluka of Thane District, near the steps of the Khandoba temple located on Mavilgad Fort (about 1000 feet above sea level), there are 'Samadhi' stones under trees at intervals away from each other. These are smeared with red lead. They are ancestral spirit groves of those ancestorswho were the watch keepers of the temple and of Mavilgad Fort. They are called 'Darodekar'. They were killed while protecting the fort and temple so they are the 'Veer', the brave vigilantes who are worshipped today. The trees in the groves are preserved in their memory.

Deherze Village

In Vikramgad Taluka of Palghardistrict, in the main Gaondevi temple of the village, there is an ancestral spirit part of the temple, where the author counted about 85 stones daubed with red lead. The stones are not placed in any order. Thus, one had to tread very carefully, even if one was barefoot, for fear of stepping on a spirit stone icon. The caretaker priest stated that these were memorials of owners of agricultural land who are placed near Gaondevi to prevent ill from taking over after death and to keep their souls at peace. Only each respective family recognizes the stones and conducts regular rituals individually.

Korthud Village

In Jawhar Taluka of Palghardistrict, the ancestral spirit grove was noticed on a raised area of about ½ guntha***on agricultural land. The villagers called the memorial area "Bandhe che Veer" (Heroes of the Land). As many as 65 flat rocks/stones areinstalled, each belonging to a particular family from Korthud Village, representing their respective ancestor. One family can place more than one stone if they wish. Images are carved on the stones and daubed with red lead and rice paste. Only the family members know their own stones.

Chaas Village

In Mokhada Taluka of Palghardistrict, these spirit icons are located outside the temple of Lord Hanuman (ancient God of Wind)which the villagers stated was over 500 years old. There are seven stone icons which the villagers call "Veer Chehre" (brave vigilante ancestors) who are the brave men of the village and whose spirits keep vigil over the entire village.

Bathane Village

In Vasai Taluka of Palghar district, the author came across a very unusual grove dedicated to Cheroba (Father of many faces), Suryadev(The Sun God) and Waghoba(The Tiger God). In this grove, on the floor of the shrine were several lumps of stone daubed with red lead and garlanded with flowers. Some stated that they were Bathane Chehre (ancestors of Bathane Village) and others were of uncertain origin. There is also one stone icon with a flag post called 'Khambesar' (Spirit of the Flag Post) under a tree. This is the "Vigilante Spirit' of the village.

All are revered by the villagers.

Kasatvadi Village

In Jawhar Taluka of Palghar District, outside the temple in the grove dedicated to the Tiger God (Waghoba), there are icons of Veer Chehre (Brave Heroes). The villagers

stated that they were the influential people of the village who had passed away. They are revered as the vigilantes who will warn the gods of any approaching dangers and ultimately keep dangers out.

Durwaz Village

In Durwaz Village, Palghar Taluka of Palghardistrict, this researcher came across a grove dedicated to Gaondevi and the tiger god, Waghoba. In the same grove, there were several stone icons daubed with red lead on the floor, all representing the ancestors of the family who owned the grove.

Nature Gods

The realization of the cosmic order and the observation that "all flesh is grass" may point out that whatever is responsible for the order of nature is not human or animal but something superhuman and super animal – though this force may be given many human and animal characteristics. Nature worship indicates belief in cosmic powers which human beings must try and appease and influence if they must eat, live and procreate.

In the sacred groves studied, two realms are clearly distinguished for nature worship:

i. The Sky
ii. The Earth

Deities of the sky are generally male viz. Sun God, Moon God, Rain God, Planetary Gods.

Deities of the earth are generally female viz. Earth Goddess, Goddess of Food, Corn Goddess, Goddess of Flowers, River Goddesses.

The author observed that the annual cycle of nature is a dominating factor in the local people's lives and, thus, is a focus of religious and magical attention. For example, sowing time and Harvest time are the two great occasions of the year. They are celebrated with festivals and rituals intended to ensure a good crop.

All customs and traditions of the local people revolve around Nature. Since their major activity is farming, immense respect is shown towards Nature and wildlife. In Thane and Palghar Districts, before the sowing season, worship of the Sun God (Suryadev)****, Rain God (Naarandev, Pausdev) and Mother Earth (Himayi Devi) takes place with offerings and prayers by each village, all worshipping together, in community worship. Among the Warli Tribals of Maharashtra State, the Goddess of the fields (Savari Devi) is offered prayers. The harvest season is celebrated by glorifying the tiger god (Wagh Dev) and the Goddess of grains (Kansaari Devi).

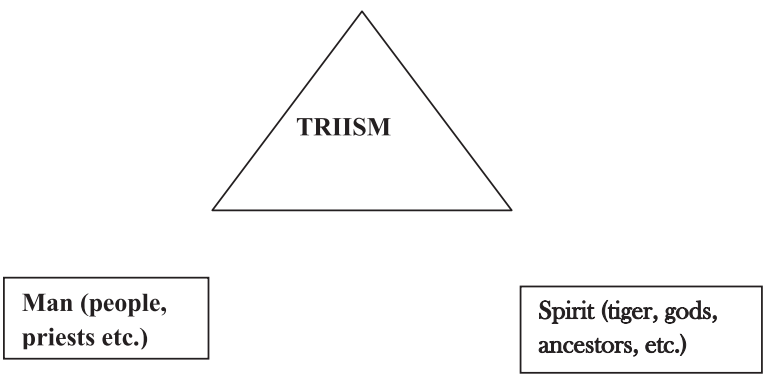
Tribhuwan and Tribhuwan (1999) in their book, "Tribal Dances of India", have explained that the various songs and dances are symbolic of the nature gods that the

people are trying to appease. For e.g. the Warli Tribal Dance called "The Kambad Dance" symbolizes the dance of the rain god "Naarandev" to placate the goddess of food grains "Kansaari Devi", so that she should germinate and grow.

VI. THE INTERRELATED TRIAD

At this point, L. P. Vidyarthi's Model on The Nature – Man – Spirit Complex becomes important. According to L.P. Vidyarthi, when technology is simple, dependence on spirit and nature is greater than it otherwise would be. Applying this model to the sacred groves of Thane and Palghar districts, the author is of the view that the worship of the vast pantheon of deities by the local people across the sacred groves indicates a Deep Triangle of Interdependence and Interrelationship between a) The Sacred Groves b) The Deities c) The Local People. The author would term this as The Interrelated Triad

Figure 4
The Interrelated Triad

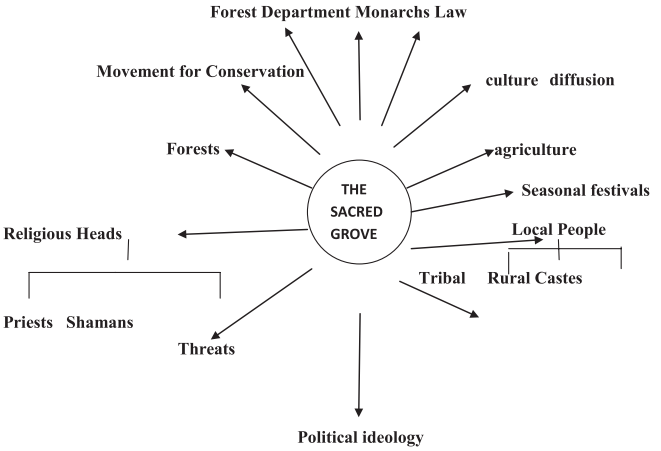


'Man' would refer to the local people of Thane District, both tribal and rural communities. 'Nature' refers to the Sacred Groves and the forest cover of Thane District. 'Spirit' refers to the varied deities that the groves are dedicated to, some fierce and malevolent and others kind and benevolent. The relationship between the three leads to a culture that emphasizes on conservation of the environment and preservation of biodiversity.

The following diagram illustrates the role of the sacred grove as a web of relationships which lead to the conservation of biodiversity.

A Symbolic Web of Relationships – Unveiling Culture Through The Sacred Grove

Figure 5
Unveiling Culture through the Sacred Grove



The author noted that the local people in and around the sacred groves had a very close and deep relationship with the grove, with the deities and with one another. This is a relationship that is not limited only to festivals and ceremonies, but has a direct link with survival. In a world of uncertainty, the link with the cosmic deities gives the local people security. They feel protected and healed and, in turn, they also protect the groves.

A myriad of relationships emanate from the interactions in and around the sacred groves. Through these relationships of sharing, a culture pattern becomes visible. This is a pattern that Morphs via a movement towards the protection and preservation of the sacred groves and thus of biodiversity.

Religious Beliefs and Mythsthus play a very crucial role in environment conservation. In a traditional society like that of the tribal and rural communities, divine legitimatizing is necessary in order to control people's actions. Animistic/ Totemic religion also provides a background for the observation of such rules. Fear of deities, whether the deity is the village goddess, the tiger god, the chheda or the ancestors, is an effective means of social control. Thus, traditional religion aims at preservation of the entire ecosystem.

Priests both tribal and rural who have laid down strict rules that connect the deities to environment conservation also play an important role. A deep respect for priests among rural and tribal communities prompts them to follow conservation norms without questioning the reason behind the practices such that these practices become part of their lifestyle. Thus, if the priests have said that the trees bleed if cut, then no one touches the trees. If the priests have stated that those who cut trees will vomit blood, no one will touch the trees. If the priests have stated that the tiger will

not harm the people, but will protect the jungle, then the people believe that this is so.

The Sacred Grove is the centre point of religious activity in the village. Two important festivals are celebrated here – both having a deep connection with agriculture. The first is before the sowing and planting begins in July and the second is when the harvest is reaped in October. The entire village gathers at the grove and pays respects to the deities before beginning any work on the fields.

Two Spheres viz. Fields and Forests exist in a mutually complementary and beneficial manner. Traditional systems and beliefs which are found among the communities living in and around the sacred groves have a significant bearing on the conservation of the groves and the forests, and thus help in protecting biodiversity.

Such traditional religious practices help to preserve forests. As long as they still hold sway in many aspects of life, they will influence sacred grove and forest preservation. However, if fear and respect of deities and spirits weaken, which is what is happening today, then some other ideological support is required as an apt substitute to Animism. This should be an ideology that helps the tribal and rural people to strengthen their traditional forms of forest management and conservation.

At this point, the view of Dr. J.J. Roy Burman in his book "Sacred Groves among Communities" (2003) is important. He points out by logically explaining that the sacred groves of the Western Ghats, by themselves as separate entities, do not contribute to conservation of the environment. It is because the local people feel the need to preserve them as part of their ancestral tradition, that they remain so. Also, he states that "such groves symbolically bring human societies closer to nature".

According to him, they are revered because of their association with the supernatural forces and deities like Gaondevi, Waghoba, and Chheda, whose overwhelming presence in the groves is very strong. Thus, "The Sacred Groves ensure cosmic ties of human beings with nature and breed a prudent use of it".

Despite the culture of preservation, sacred groves are faced with threats today.

VII. COMMON THREATS

Destruction of Groves for Dams, Roads, Highways and Industries

Today, the rapid growth of industrialization and urbanization is leading to the establishment of industries, accompanied with townships in remote areas. Dams are built and roads are widened to join the highways. Mountains are dug up for mining purposes. Such activity has caused a large number of sacred groves to be destroyed and felled. For e.g. the construction of the Kudos dam in Thane District has affected the perennial water flow near several sacred groves. Another example is where the Surya

River that used to flow along the Barkat Deosthan at Theronda Village in Dahanu Taluka of Palghardistrict now dries up after the rains.

Still another example shows that when forests were felled for the building of the Western Express Highway in Mumbai, the lush grove of Ambemata Deosthan at Sasunavghar, Vasai Taluka, Palghardistrict, was cut down and the temple is now visible from the highway.

Government's Ignoring the Local Community's Traditional Management and Allowing Commercial Forestry Operations to Develop

In several areas, it has been observed that the government does not place much value on the traditional management of the sacred groves by the local communities. Thus, the forest department takes over the area and commercial forestry operations are allowed to develop.The local people then lose their customary rights of forest management. Also, often monoculture planting is taken up by the management like Teak (*Tectonia grandis*), Rubber (*Ficus elastica*), or Australian Acacia (*Acacia auriculiformis*). These are trees that soak up the nutrition and this affects the biodiversity.

Encroachments by Migrating Communities

There are instances where outside communities encroach into the sacred grove area. They do not harbour the same sentiment as the local people and view the grove more as an area to obtain resources rather than an abode of the gods. Thus, the grove comes under threat of depletion.

Groves thrown Open to Pilgrims and Tourists

The integrity of many groves with regional or pan – Indian character has suffered due to the influx of a large number of pilgrims and tourists.

For e.g. in Ashagad Village of Dahanu Taluka of Palghar District, the Santoshimata Grove has become a pilgrim centre. As a result, the place is teeming with tourists and the grove loses itsimmaculate nature and is not given so much importance. Around the shrine, tourists have dirtied the area with plastic bags, paper and stale food thrown here and there. Stalls at the entrance on both sides of the road make the area very crowded.

Land on which groves standis not declared as forestland

In many areas, the land on which sacred groves are located is not declared as forestland. Thus, it is not protected by the government. It is owned by individuals, families, clans or villages privately. Unless strong measures are taken to protect such groves, they face a danger of depletion. Due to pressure on land, many of these groves have been converted to agricultural land for cultivation purposes.

Political Interference in the Sacred Groves

A grove that is of special tourist attraction, like in Ashagad, or Mahalaxmi Temple in Dahanu Taluka of Palghardistrict, becomes not only a cultural heritage site but it is economically very productive. Politicians often clamour for ownership of the same. Or they want a role in the maintenance. Especially in groves that are run by trusts, politicians have a major say. This interference in the keeping the grove up and runningcan lead to neglect of the grove.

No Effective Legislation with Respect to Sacred Groves

Though there are several Acts for protection of Biodiversity, Forests, and Wildlife – nowhere are sacred groves mentioned in any section of the Acts as a separate unit for special protection by the law. As a result, many owners are free to sell, cut and deplete the grove at will.

Illegal Felling of Trees

Despite the rules and codes of conduct against cutting down of trees, illegal felling take place for various reasons like the collecting of firewood, making houses and handicrafts, clearance for brick kilns etc. For e.g. in Bathane Village of Vasai Taluka in Palghar District, the sacred grove of Cheroba is depleting largely due to the setting up of brick kilns by the owner.

Impact of Idol Worship

Several groves are threatened due to impact of idol worship. Here is a situation where the temple is becoming more important than the grove, and idol worship more important over nature worship.

For e.g. in Gorhe Village of Wada Taluka in Thane District, the grove dedicated to Sri Ram and Sri Laxmi Narayan [found by Gadgil and Vartak in 1976], was around 37.6 hectares long and 9.86 hectares wide. Today, there is no grove left at all. The village has become a semi township and the area has been reconstructed into concrete temples. Only five or six trees remain in the entire area.

For e.g. in Takwal village of Palghar Taluka in Palghardistrict, the researcher observed that the temple of Taakmai Devi had been completely cleared off of the trees, and a large permanent structure has been built around the cave where the deity is given form in rock etchings on the walls of the cave.

No Separate Government Fund for Preservation, Promotion and Maintenance of Sacred Groves

All the sacred groves come under the surveillance of the forest department. However, since many of them are privately owned, the government has no separate record of

the same. Thus, they are managed by locals, though they may belong to the forest department. The locals on their part state that the government does 'nothing' to help them maintain the groves.

There are very few studies focusing on the significance of these groves as models of biodiversity conservation due to their traditional animistic beliefs.

VIII. CONCLUSION

Culture is historically developed, learned and shared behavior, which is socially transmitted from generation to generation by word of mouth through the processes of socialization and enculturation. The author would argue that local people belonging to both tribal and rural caste communities work together for a common cause viz. preserving biodiversity.

Thus, sacred groves may be interpreted in terms of the people's relationship with these patches of forestlands by intertwining the cosmic beings, village deities, ancestral spirits and various other gods and goddesses, free moving spirits and energies.

The question is how Sustainable is this Belief System and Culture Pattern that has preserved biodiversity to this extent?

The pace of modernization today is impacting the lives of tribal and rural people. Traditional systems that have protected groves till date are being altered. Values are changing and with all this the "Aura of Sacredness" that protected the environment is also declining. The younger generation has new ideas wherein the profit motive and commercialization of the sacred grove is becoming more important to them for survival.

In the face of grave threats to the forest tracts, unless some quick measures are taken to support the local tribal and rural people in their endeavour to save their forest tracts, society stands to lose the last vestiges of biodiversity. Biodiversity is the fibre of the planet that makes life possible. If a nation loses its biodiversity, it stands not only to lose its wealth but also its future.

Notes

* Thane District was divided into two parts in 2014 viz. Thane and Palghar. The above studies by Vartak etc. were carried out before 2014 and hence mention Thane only.

** Dr. Robin Tribhuwan in his Film –"Rice Rituals of the Warlis", has clearly brought out the fact that the entire life of the Warli revolves around rice. If his cattle were attacked by the tiger, he would be totally handicapped and would not be able to cultivate rice. Thus, the survival of the farmer is at stake.

*** 1 guntha = 33 sq. ft. x 33 sq. ft. = 1089 sq. ft.

**** Sun worship is an ancient world religion. In Hinduism too, the sun god (Surya Dev) is an ancient and revered deity. He is chief of the "Navagraha" (the nine classical planets) and is depicted as

riding a chariot harnessed by seven horses which represent the seven colours of the rainbow or the seven days of the week. He presides over "Sun" day.

References

Chaphekar L.N., (1960), Thakurs of the Sahyadri, Oxford University Press, London.

D'souza, Alphonsus, (2005),Traditional Systems of Forest Conservation in North – East India, The Angami Tribe of Nagaland, St. Josephs Offset Press, Sonaiguli, Guwahati, Assam.

Durkheim, Emile (1976), The Elementary Forms of the Religious Life, Allen and Unwin, London, (1912).

Encyclopedia of World Religions, (1975),Octopus Books Ltd., London.

Enthoven R. E., (1915),Folklore Notes, Vol. II, Konkan, British India Press, Mazgaon, Bombay.

Roy Burman, J. J., (2003), Sacred Groves among Communities, Mittal Publications, New Delhi.

Kosambi D. D., (2008), Myth and Reality, Studies in the Formation of Indian Culture, Popular Prakashan, Mumbai.

Lissner Ivar, (1961), Man, God and Magic, Jonathan Cape, London.

Mann R.S., (1981) (Ed): Nature – Man – Spirit Complex in Tribal India, Concept Publishing Co., New Delhi.

Parrinder Geoffrey, (1974), (Ed): Man and his Gods: Encyclopedia of the World's Religions, Hamlyn.

Nadkarni Amrita (2013): Sacred Groves and Environment Conservation – A People's Movement, (Ph. D. Thesis), Tilak Vidyapeth, Pune.

Savadi Arun, (2007), Our Environment, Nirali Prakashan.

Tribhuwan R.D. and Tribhuwan P.R., (1999), Tribal Dances of India, Discovery Publishing House, New Delhi.

Tribhuwan R.D. and Savelli L., (2003),Tribal Masks and Myths, Discovery Publishing House, New Delhi

Report on Biodiversity and Sustainable Development, (2008), BNHS, CEC, Goregaon (East), Mumbai.

Vartak et al., (2004), Focus on Sacred Groves and Ethno botany, Prism Publications, Chembur, Mumbai.

Internet References:

http://www.hinditech.co.in/news - detail.php? Enews_ Id=62&back=1

http://www.fliptalks.com/ft/lifestyle - of - the – warli – tribe

http://en.wikipedia.org/wiki/solar - deities

http;//ignca.nic.in/kmsh0003.htm

http://www.iloveindia.com/history/ancient - India/gods - goddess.htm

http://www.esamskriti.com/essay - chapters/worship - of - god - as – Mother – in – the – Indian – tradition

http://www.kidsfortigers.org

http://hinduwebsite.com/siva/ancientforms.asp

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Can Inclusion of Humanities be a Silver Bullet Solution to Address Problems in Health-Care Education? A Dental Academician's Perspective

Viswa Chaitanya Chandu*, Srinivas Pachava** and Viswanath V***

The most frequent criticism from patients about the limited time that the doctors are sparing to interact with them highlights the unfortunate shift of the profession from a solemn duty aimed at alleviating the suffering to a financially rewarding line of work. Education at dental colleges focuses on the technical dental practice with limited scope for holistic understanding of the subjects in need. It is less often realized by the dental students that addressing oral health problems of a subject or improving oral health status of a community needs more than technical competency and academic performance. This paper explores the need for inclusion of humanities in dental education in light of the rising public cynicism, creation of incompetent graduates, and the psychologically demanding nature of the dental profession. It is felt that dental graduates are being prepared for the future exclusively technically and therefore incompletely. There is a dire need for inclusion of humanities in the dental curricula. A practical framework for the integration of humanities in dental education is proposed here. The outcomes of humanities in dental education are graduates with humane perspectives, high spirits, substantial clinical acumen, scientific temper, moral reasoning, social responsibility, and political insights who could make the world smile in a real sense.

Keywords: *Dental education, health care, humanities, public cynicism*

I. INTRODUCTION

In this overachieving world, the unfortunate reality is that the educational systems are not growing into creativity, but out of it. In Sir Ken Robinson's words, "we are actually getting educated out of creativity". The rather mechanistic conception of education predicates on the idea of academic ability which unfortunately narrows down the focus to standard disciplines[1]. The essence of education, if education is the body of knowledge received and assimilated by the student in his/hers thoughts and acts, is to develop a basic understanding for things and, thereafter, to explore further

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in quest of knowledge waiting to be discovered and, hence, which have value as ideas sourced in originality and inter-disciplinary lines of thought. This requires moving away from the getting accustomed to routine algorithms of tutored thinking and its *deja vu* of narrow vision to the engaging in constant exploration of multi-disciplinary thought on things, to progress towards building a broader and more comprehensive understanding of the extant body of knowledge.

II. DENTAL EDUCATION AROUND THE WORLD

It is beyond doubt that dental education forms the foundation for a country's progress in dental science. Owing to disparities in the cultural, social, and economic contexts, the prerequisites for gaining admission into dental schools / colleges and the rendition pattern of dental education varies across countries. The degrees awarded after graduation from dental schools / colleges are also different in different countries. It is therefore obvious that the curricula followed in these countries are different with lucid variations in the duration of these courses [2]. Consequently, an attempt to bring any universal change in global dental education is supremely demanding.

Dental educational institutions are facilities providing clinical care to people, carrying out research in advancement of knowledge, and imparting holistic education to students of dentistry. While it is certain that these three are not mutually exclusive and cannot be, it is also true that there are other facilities like community hospitals which provide clinical care, and there are institutes that exclusively perform research like National Institute for Dental and Craniofacial Research (NIDCR). However, it is the education that is the sole responsibility of educational institutions and therefore must be considered not just as one of the responsibilities, but it's the most important responsibility [3].

III. THE FUNDAMENTAL UNDERSTANDING OF HUMANITIES

Humanities are the lens through which the world around can be better viewed. They are the stories, the propositions, and the expressions which bring people close to making sense of their own lives and the world which they live in. From times immemorial, human beings have been using literature, art, music, history, language, and philosophy to comprehend and document the world [4]. These aforementioned modes of creative expression are some of the disciplines that are conventionally discussed under the umbrella of humanities. The beauty of humanities is that they introduce us to new people, places, and ideas beyond what unprocessed imagination can do. The highly acknowledged skills of intellect and imagination, creative thinking, independent evaluation, tolerance to different ideologies, critical self – cognition are often regarded as the outcomes of exposure to humanities courses. To put it in a nutshell, the way of science is logical and pragmatic; the way of humanities is one of immersive contemplation based on intuition, creativity, sympathetic understanding, and indwelling.

Educationally, the humanities can develop critical conceptualization and analysis of personal and professional values, and the instinctive, deliberative capabilities of empathy, collegiality, and team work. Individuals with exposure to humanities courses can adapt to work environments rather swiftly and deliver to the extent of their potential. While humanities refer to a plethora of disciplines relating to processing and documenting the human experience, the humanities as applied to health care in particular can be discussed under three broad elements [4]:

i. *The Classical Humanities:* These include literature, philosophy, ethics, and culture. They aid in the development of ethical judgment, a sense of social justice, and a respect for persons, all of which are of unsurpassable importance to health care professionals.

ii. *The Social Sciences:* Anthropology, psychology, economics, history, political science, linguistics, international relations, and communication can be discussed under social sciences. These contribute in development of a comprehensive ideology about health care and its delivery in the context of the individual, the family, the community, the health care team, the nation, and the world.

iii. *The Arts:* Literature, film, and visual, performance arts comes under the arts and they help in developing and nurturing the skills of self-learning, observation, analysis, empathy, and self-reflection. The arts component of humanity is of special importance to dentistry owing to the nature of work involved.

The fundamental understanding of humanities includes the appreciation of the fact that science and humanities, values and technology are not incompatible. They converge in the clinical decisions; they are both essential, though different, ways of knowing the realities of illness, healing, and health [5].

IV. CHALLENGES FOR INTEGRATION OF HUMANITIES IN DENTAL EDUCATION AND COUNTER ARGUMENTS JUSTIFYING THE INCLUSION

While inclusion of humanities in medical education was proposed and fragmentarily executed since 1948 [6], the proposition was much less discussed among the dental fraternity affirming the fact that the topics and concepts which start first in medical field will take time to be adapted to dentistry. Despite the afore-stated advantages of inclusion of humanities in health care education, there are different viewpoints in this regard, and there has also been formidable resistance against their inclusion [7]. Some of the many arguments against inclusion of humanities in dental education are enlisted below, together with the counterarguments justifying their inclusion.

Challenge: What is the rationale for inclusion of humanities in dentistry which is a science?

Counterargument: The argument questioning the rationale behind inclusion of humanities in dental education is a sheer misunderstanding of the nature of health care practice, in general, and dentistry, in particular. Dentistry, or any health care profession, belongs to humanities as much as it belongs to science. The conceptualization of dentistry exclusively as a science holds the hazard of creation of technically driven entrepreneurs. Humanities offer insights into the human condition, suffering, personhood, community responsibility, and a historical perspective of dental practice, and have a place in dentistry beyond doubt.

Challenge: There is no place for inclusion of humanities in the already overloaded curriculum.

Counterargument: With genuine empathy towards the argument that the curriculum is already overloaded, the assertion is that it is equally important to realise whether the curriculum is serving its very purpose or not. The inclusion of humanities in the curriculum not only helps in betterment of the dental treatment outcomes of patients who are treated by better abled dentists but also assuages the critics who have long advocated this inclusion. There has long been a criticism from supporters of humanities in health care education that the integration of humanities was never complete and there was always a tendency to quarantine humanities from health care subjects, even when included [8]. Since there is no space for humanities in the overloaded curriculum, it will be wise to resort to problem-based integration of humanities teaching within each of the subjects of the existing dental curriculum rather than teaching it as an alienated peripheral discipline.

Challenge: Funding for this sort of development is a problem.

Counterargument: It is true that the funding necessary for inclusion of humanities courses in health care education is often derived from the income generated by the clinical departments [9]. Funding is absolutely necessary for the successful implementation of any program, and it is important that the educational experts convince the managements of dental schools / colleges to realize the benefits of humanities in their endeavor of creating responsible dentists. Efforts should be made both at regional and national levels to bring policy changes, financially supporting the integration of humanities in dental education. Advocacy and lobbying become the vital activities in this quest of convincing authorities and policy makers.

V. HUMANITIES IN DENTAL EDUCATION: AN ABSOLUTE NECESSITY

It is important to understand that the dental profession is bowed down with a multitude of challenges in recent years. There is a dire need for the dental education system to undergo progressive metamorphosis in order to negotiate these challenges [10]. An attempt has been made here to group many of the challenges faced by the profession under three headings as follows:

i. *Public Cynicism:* There has been rising public cynicism and enormous dissatisfaction with the health care profession as a whole. Doctors are increasingly being recognized by public as over-materialistic, and deprived of the qualities of empathy and compassion, which warns the profession of the precarious chance for slow erosion of public regard for health care professionals [11]. The most frequent criticism from patients about the unduly limited time that the doctors are sparing to interact with them highlights the unfortunate shift of the profession from a solemn duty aimed at alleviating the suffering to a financially remunerated and technically demanding line of work [12]. In today's world, doctors are increasingly being referred to as greedy entrepreneurs and indifferent technocrats with little appreciation for the fact that disease involves the person as much as his organs and tissues. Zhong Nanshan, former president of Chinese Medical Association, opines that the absence of humanities is the prime reason why doctors are being mistrusted by public [13].

   It is true, though unfortunate, that there has been not enough emphasis on nurturing ideals and service attitude among dental students as there has been on testing and grading. This not only results in unjust competitiveness, anxiety, and stress, but also leads to traumatic divestment of ideals, which refers to transformation of students from the ideals with which they got attracted to the profession in the first place to distancing from ideals. In this context, inclusion of humanities, the disciplines of philosophy and literature in particular, in dental education has that immaculate potential to inculcate the humane touch among future dental professionals, indoctrinate empathy for patients, and reinforce their moral ideals. Moreover, the expectations and ideology with which students enter the profession can be sustained and reinforced.

ii. *Creation of Incompetent Graduates:* Reemphasis on the fact that the expression 'competency' does not just refer to technical and academic competencies is essential at this juncture. The expression also refers to the ability of the dental students to communicate with their patients, to develop scientific temper, to think and act critically, to work in an interdisciplinary environment, to get equipped with the skills required for scientific communication, to understand cultural values, traditions, health related beliefs, and attitudes of people from diverse cultural backgrounds, and to be well aware of the role he / she is going to assume in the future. Studies suggest that there is very limited emphasis on interpersonal communication in the dental curricula worldwide [14]. It is less often realized that dentistry, and for that matter of fact, any health care profession, has been situated between science and technology, on one hand, and the needs of the suffering human beings, on the other. The connection between technical

and moral questions in clinical decision making, and the preparation to be both objective and compassionate in a scenario are not being taught.

Also, dental students from countries where English is not the first language are not nourished with effective scientific communication skills, resulting in journals providing language refining services. This forms a strong argument for the integration of humanities in dental education. Principally, the disciplines of history, psychology, ethics, and communication embrace the potential to make students competent from the sense of ability to handle patients but also connect with them as humans in need of doctor's understanding and time. .

iii. *Stress, Anxiety, and Suicidal Ideation:* Research suggests that dental students are prone to tremendous amounts of anxiety and stress, and the causal relation that curriculum has in this regard cannot be denied [15, 16]. A few reports highlight dentistry as a profession which is highly prone to its students committing suicide compared to other professions, and identified stress as the major cause for this tendency [17]. Recent studies confirm burnout and depression among dental students, and highlight the suicidal ideation [18].

Also, there is growing insecurity among dental students about their careers, at least in countries like India and Japan, particularly in light of deficient policy actions with regard to dental manpower planning based on the service needs and utilisation patterns. The growing insecurity can be cited as one of the reasons for depression among dental students which clearly is undesired. Another concern is the diminishing ethical standards among students in health care professions with regard to various aspects of academic life [19, 20].

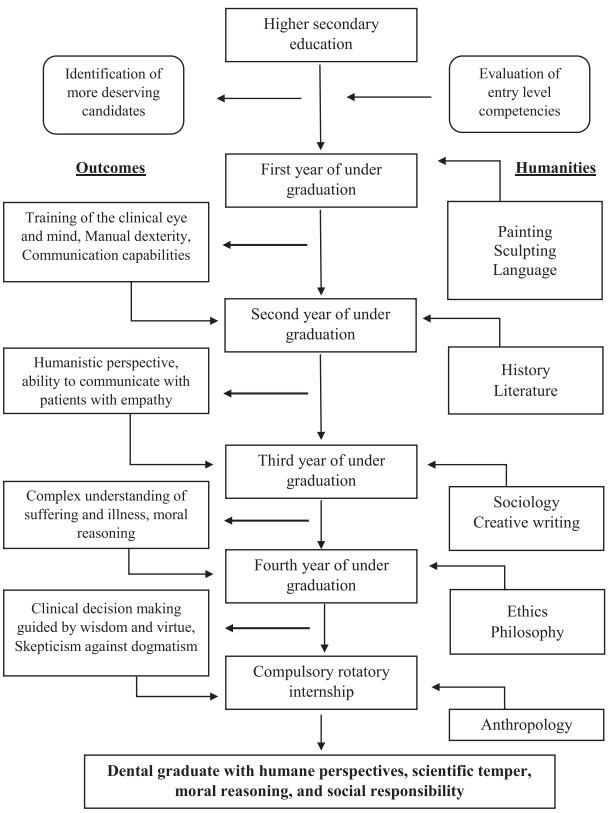
The aforementioned challenges bring up an argument criticising the current framework of medical and dental education. Some experts suggest that integration of humanities in dental education goes a long way in the endeavour of creating humanistic, high-spirited, and competent dental health care professionals. However, it is erroneous to postulate that humanities never existed in the curricula of dental education as every scientific element taught in dental schools / colleges have indisputable contribution from humanistic components. The truth is that humanities are not being stressed to the extent necessary, with adverse consequences to the professionals and the profession.

VI. PRACTICAL FRAMEWORK FOR INTEGRATION WITH POTENTIAL OUTCOMES

Though integration of humanities in dental education has increasingly been receiving theoretical support, its practical application was never complete partly owing to the challenges already stated and partly owing to the complacency in formulating an executable framework [21]. An attempt has been made here to propose a practical

framework to integrate humanities with assertions on possible outcomes. However, as previously mentioned, the curricula in dental education across the world are very diverse from the viewpoint of each place having its own needs and hence a different curriculum; and, a universally acceptable framework cannot be proposed with distinct variations in the duration of these curricula. Therefore, the framework is proposed to suit the dental education in India and other countries which follow similar curriculum.

The integration of humanities in dental education must start from the admission process itself with enough emphasis on competencies like social and interpersonal skills, desire to learn, service orientation, and adaptability at entry level. It is important to highlight at this point that the necessity and relevance of inclusion of humanities in dental education increases only when Indian scenario is exclusively considered, owing to the exceedingly high oral health inequalities requiring just distribution of dental professionals across the country, not to mention uniform disbursal of dental care based on doctors' ability to adapt to patient needs not limited to his socioeconomic condition. Ironically, these inequalities must be understood in light of the fact that there are 313 dental colleges in India at present and the dental educational system in the nation produces around 30,570 graduates each year [22].



Integration of humanities in dental education is certainly essential in India more than anywhere else and could be considered as an upstream approach in reducing the geographical imbalances in distribution of dentists, socioeconomic disparities in utilization of oral health services, and consequently oral health inequalities. In post graduate curriculum, the emphasis must be placed on preparing students on how to think critically, present research effectively, and argue rationally. Application of knowledge through humanities in ethical decision making can be evaluated at the post graduate level. The disciplines in humanities suggested above must be taught liberally, inter-linked with dental science scenarios creating rounded vision and robust approach to patient care, and not as distinct disciplines. The intention in integration of humanities in dental education is not to master the humanities, but to realize the philosophical assumptions that underlie the practice of dentistry and to indoctrinate humane values among future dental professionals besides equipping them with necessary competencies.

VII. CONCLUSION

Health is a social, economic and political issue and, above all, health is a fundamental human right. Educational institutions play an influential role in creation of health care professionals who work for this fundamental right of people. Despite the significant negative influence of the oral health problems on the quality of life, utilisation of oral health services has never been optimal around the world. Moreover, there is growing cynicism among public about the predominantly financial and technically driven attitude of dental professionals. What has happened to the ability of dentists to interact with their patients with humanistic attitude and empathy, to understand the patient as a whole with regard to their social, economic, cultural background with meticulous detail about how exactly the condition affects their personality? The answer to these questions lies in the way the dental graduates are prepared for the future: exclusively technically and, therefore, incompletely. The outcomes of humanities in dental education are inculcating graduates with humane perspectives, instilling high spirits, imbibing of substantial clinical acumen, forging of scientific temper, assimilation of moral reasoning, disbursal of social responsibility, and using of political insights all of which could make the world smile in a real sense.

References

TED. (2007, Jan 24). Do schools kill creativity? | Sir Ken Robinson [Video file]. Retrieved from: https://www.youtube.com/watch?v=iG9CE55wbtY.

Wang, YH., Zhao, Q., Tan, Z., (2017), "Current differences in dental education between Chinese and Western models", *European Journal of Dental Education,* Vol. 2, No. 4, pp. 43-9.

Gunderman, R., Lanzieri, C., (2006), "The Need for the Liberal Arts", *Journal of the American College of Radiology*, Vol. *3, No.* 12, pp. 904-6.

Zimmerman, T., Marfuggi, R., (2012), "Medical humanities role in medical education", *World Medical and Health Policy,* Vol. 4, No. 2, pp. 1-11.

Pellegrino, E.D., (1982), "The humanities in medical education", *MOBIUS*, Vol. 2, pp.133–41.

Bleakley, A., (2015), "When I say…the medical humanities in medical education", *Medical Education, Vol.* 49, No. 10, pp. 959-60.

Meakin, R., (2002), "Medical Humanities in undergraduate medical education – moving on", *J Med Ethics: Medical Humanities,* Vol. 28, pp. 32.

Stempsey, W.E., (1999), "The quarantine of philosophy in medical education: Why teaching the humanities may not produce humane physicians", *Medicine, Health Care and Philosophy,* Vol. 2, pp. 3-9.

Halperin, E.C., (2010), "Preserving the humanities in medical education", *Medical Teacher*, Vol. 32, pp. 76-9.

Balis, S.A., Rule, J.T., (1999), "Humanities in dental education: A focus on understanding the child", *Journal of Dental Education*, Vol. 63, No. 9, pp. 709-15.

Gadre, A., Shukla, A., (2016), *Dissenting diagnosis. Voices of conscience from the medical profession,* Random House India, Gurgaon.

Hooper, R., Rona, R.J., French, C., Jones, M., Wessely, S., (2005), "Unmet expectations in primary care and the agreement between doctor and patient: a questionnaire study", *Health Expectations*, Vol. 8, No. 1, pp. 26-33.

Li, J., Qi, F., Guo, S., Peng, P., Zhang, M., (2012), "Absence of humanities in China's medical education system", *Lancet,* Vol. 380, pp. 648.

Wener, M.E., Schonwetter, D.J., Majurat, N., (2011), "Developing New Dental Communication Skills Assessment Tools by Including Patients and Other Stakeholders", *Journal of Dental Education*, Vol. 75, No. 12, pp. 1527-41.

Lennon, M.A., (2002), "Drink, drugs and depression in dental students", *British Dental Journal*, Vol. 192: 636-45.

Ravi, S.R., Neelima, P., (2016), "Prevalence of anxiety among newly admitted dental students: A cross-sectional study", *Indian Journal of Basic and Applied Medical Research,* Vol. 5, No. 2, pp. 515-20.

Lang, R., (1984), "Stress in dentistry: it can kill you", *Journal of Canadian Dental Association*, Vol. 50, No. 7, pp. 539-41.

Galan, F., Rios–Santo,s J.V., Polo, J., Rios–Carrasco, B., Bullon, P., (2014), "Burnout, depression and suicidal ideation in dental students", *Medicina Oral Patologica Oral y Cirugia Bucal*, Vol. 19, No. 3, pp. 206-11.

Mubeen, S.M., Qu, A., Ghayas, R., Rizvi, S.H., Khan, S.A., (2017), "Knowledge of scientific misconduct in publication among medical students", *Education for Health,* Vol. 30, pp. 140-5.

Chatterjee, C., Srinivasan, V., (2013), "Ethical issues in health care sector in India", *IIMB Management Review*, Vol. 25, No. 1:49-62.

Neidle, E.A., (1982), "Bringing humanities into dental education. A modest experiment", *Journal of Continuing Education in the Health Professions,* Vol. 2, No. 3, pp. 89-104.

Yadav, S., Rawal, G., (2016), "The current status of dental graduates in India", *The Pan African Medical Journal*, Vol. 23, pp. 22.

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Engaging Ambedkar on Inclusive Discourse: Countering Exclusion towards Social Reconstruction

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B. R. Ambedkar drafted the Indian Constitution reconstructing society largely affected by caste abhorrence, deprivation and suffering by envisioning the Fundamental Rights and indicating the Directive Principles to legislate, protect and promulgate equality in all spheres of life and equal opportunity in all fields of endeavour for all thereby sowing the seeds for an inclusive society. Given that in contemporary times the identity-based conflicts, cultural and religious tensions have initiated much debate on 'inclusive societies', Ambedkar was far ahead of his time in already having thought of it. Taking cues from this pioneering contribution of Ambedkar, this paper is a study to analyse Ambedkar's vision and draw lessons from the progress he achieved, if at all, to advance our efforts at developing the inclusive society where social groups excluded for various pretexts, such as SC/ST, tribes, women, religious minorities and other similar groups, find in India their true home where they are building their society and removing the puzzling haplessness, if any, in their birth that tells them they are lesser than what their consciousness instructs. It is an attempt to locate the recent debate/discourse on inclusive society which brings together a wide range of issues concerning questions of social justice, fairness, social integration, social cohesion and social inclusion by engaging, upholding and leveraging the ideas of Ambedkar on inclusive society for our citizens standing at par with a world pondering liberty, equality and fraternity paving the way for a just, progressive society.

Keywords: *Caste system, Graded inequalities, Integration, Cohesion, Inclusion and social democracy*

"Our battle is for Freedom. Our battle is not for few economic and political gains. Our battle is for the reclamation of Human Personality…. My final words of advice to you is educate, agitate and organize, have faith in yourselves and never lose hope.

—Dr. Babasaheb Bhimrao Ambedkar[1]

I. INTRODUCTION

Engaging Ambedkar on inclusive discourse is towards revisiting his emancipation projects. The greatness of Ambedkar lies not just in his countering exclusion and providing a way out for social reconstruction but by his carrying out the mission of

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emancipation, by himself. Ambedkar's inclusive tone is in 'associated life' between members of society founded on liberty, equality and fraternity. He envisioned a free social order which maintains all modes of social endosmosis.

Ambedkar speaks of the yearning of the oppressed to recover their lost humanity. It was in the people's exercise of choice for equality, not the government's mandate for charity. For him, individual is the 'end' to the quest for identity inhering in himself, and if the aim of society is the growth of the individual from narrow, personal motives towards a generosity of outlook and visionary of mind then the objective to achieve that aim is the development of his [her] personality to inculcate free thought and independent action deviating from society's charted selfish ways and towards betterment of Man. The buzzword of an inclusive society of contemporary academic and public discourse reflected in the statement quoted of Ambedkar that is much ahead of times.

Having reached a conclusion that made caste the root cause of the exclusionary nature of Indian social system, Ambedkar struggled lifelong for its annihilation. Being a Dalit himself, he made an all-out effort to change the hierarchical structures of Indian society divided along the fault lines of caste, mainly, but also creed and poverty; and, worked for the restoration of equal rights/justice to the marginalized for the sake of resolution of the social problems of fear and hatred of the privileged against the underprivileged. Towards his goal of effectively countering the problem of exclusion towards social reconstruction, he opted for peaceful and constitutional methods. But before engaging Ambedkar within inclusive discourse, it is imperative to have a graphic presentation of social exclusion and inclusion debates that have taken course in the past and the contemporary periods.

II. SOCIAL EXCLUSION AND STRUCTURAL LOCATION OF DALITS IN INDIAN FRAMEWORK

Let us begin with the term 'social exclusion', situating it within the Indian social framework. In India, exclusion revolves around the societal hierarchical interrelationships and its institutions that have been instrumental in excluding, discriminating, isolating, and depriving some groups on the grounds of caste identities. The organizational scheme of the caste system, or the Hindu social order, is based on the division of people into social groups (or castes) in which the civil, cultural, and economic rights of each individual caste are pre-determined or ascribed by birth and made hereditary by norm. Moreover, social exclusion for Dalits is an ascribed status, that is, a privileged preemptive mindset used to excluding Dalits dating from the past. It is this make-up of social exclusion which has created extreme form of inequality for Dalits in Hindu social order as the ones who came to be constitutionally known as Scheduled Castes, and politically as Dalits. Here, the ascriptive nature of exclusion revolving around the caste system particularly needs to be understood and

conceptualized. The Hindu caste system which had its origin in the times dating from Manusmriti places untouchables at the bottom of the caste hierarchy. What does this theorization actually mean? It implies that the caste system involves the denial of not only equality between and freedom of individuals, but also divestment of the basic human rights, particularly of the low caste untouchables which acts as the barrier for everyone's personal development. The primary unit in the Hindu society is caste, and hence, the rights and privileges (or the lack of them) of the individual are on account of his/her being a member of a particular caste (Ambedkar, 1987).

Thus, due to the inherited, graded ranking, and the hierarchical nature of the caste system, the entitlements to various rights become narrower and narrower as one goes down in hierarchical supremacy along the ladder of the caste system. These are the people who are poor, neglected, ill-treated, excluded and deprived. The practice of caste-based exclusion and discrimination thus, inevitably perpetuate failure of rights of access and entitlements, not only to economic rights, but also to civil, cultural and political rights.

According to historical sources, Dr. Ambedkar was possibly the first one to have used the term 'exclusion' in India while defining the wretched condition of the marginalized section of Indian society. He was the first to use the term '*Bahiskrit*', a Sanskrit / Hindi word, meaning 'excluded'. He used this term for the first time in 1924, when he established the organization *'Bahiskrit Hitkarini Sabha'* (Society for Serving the Interests of the Excluded). Ambedkar launched the fortnightly '*Bahiskrit Bharat'* (Excluded India) in 1927 where he used the term *Bahiskrit* for ex-untouchables known as Dalits now. Later Ambedkar used the exact term 'Exclusion' in 1930s while highlighting the exclusion of Dalits and Other Backward castes from Government Services in India. Ambedkar being aware of the exclusionary nature of the depressed classes of all kinds of ownership, management and production caused by their caste location, had envisioned transforming boycotted India going bythe term for ex-untouchables (*Bahiskrut Bharat*) into enlightened India (*Prabuddha Bharat*) where he presupposed a quality life based on 'social values of freedom, liberty, equality and justice'.

III. SOCIAL INCLUSION DISCOURSE WITHIN HISTORICAL AND CONTEMPORARY CONTEXT

Even in earlier times there have been protest movement against the evils of caste system and social inequalities to help bring structural changes in the existing social order of Hindu society through peaceful means of non-violence and humanistic appeals.

To start with mention must be made of the Charvakas movement, whose espousers were materialists and fought for equality. However, the movement could not survive

for long. In fact, the movement for social inclusion which was started with Charvakas's materialism as the base for their fight changed its shape during Buddha period to take on a humanistic appeal. However, the Buddhist movement in India, that chose the Middle Path as a basis to fight against social inequalities, didn't survive in the land where it had originated. After Buddha, social justice or social inclusion movement continued with its life enhancing thoughts in the form of a religio-devotional movement initiated by Narayana Guru from Kerala, Basaveswara from Karnataka, and Kabir preaching the truth of equality of human beings. In fact, Narayana Guru of Kerala constructed special temples for untouchables who were denied entry into other temples.

Further, Mahatma Jyotiba Rao Phule aspiring for social inclusion started special schools in 18th century for excluded sections like women and Dalits who were otherwise denied education. Phule had fought strongly against the dominant culture.

In the case of India's achieving social inclusion the seed lay in hers uprooting the caste-based inequalities and discrimination and, thereby, dividing all resources of the society in proportion to their population. In a nut shell, distribution of the resources without discrimination is social inclusion.

The outcome of social inclusion movements in the history resulted in providing 50% reservation to the backward communities in 1902. In the Kolhapur province, the Chatrapathi Sahu Maharaja introduced reservations to backward communities in his state and implemented reservations in education, as well as employment, whereas Babasaheb Bhimrao Ambedkar was successful in granting reservations in education and employment sectors as a constitutional right which will be discussed and analysed extensively later on in this paper.

After all these struggles involving social inclusion to arrive at countering social exclusion and, therefore, to reconstruct society could not yield the expected results. The goal of social inclusion is yet to be realised and remain unachieved.

With time, policy discourse shifted from exclusion to 'inclusion,' an apparently more positive or affirmative term that is now all-pervasive. The ideas are by no means opposites, but are used in a way that signifies opposites.

Thus, the question is this: how is the term social inclusion understood in the contemporary times? Social Inclusion is defined as a process by which efforts are made to ensure equal opportunities for all, regardless of their background, so that they can achieve their full potential in life. It thereby means making all groups of people within a society feel equally valued and uniformly important to the society.

The question now is this: how to make the concept of social inclusion operational, even in the face of resistance, to change? Indeed, in some cases, social exclusion is

purposefully pursued as it serves vested interests. Given this scenario, the challenge for policy makers and social scientists is, therefore, to find ways to promote an inspirational yet realistic set of policy measures geared towards a 'society for all.' This revolutionary thought calls for a paradigm shift in people's thoughts and actions in order to recognize the value, importance and dignity, of each person, not only as an ethical norm and moral imperative, but also as a legal principle, a societal goal, and ultimately, a personally impelled practice in everyday life. In 1995, The World Summit for Social Development in Copenhagen was held which showed its commitments for improving human conditions by stating that "No human being should be condemned to endure a brief or miserable life as a result of his or her class, country, religious affiliation, ethnic background or gender" (Mingst, Karns & Lyon, 2018:3).

IV. CONTEMPORARY DEBATE ON INCLUSIVE SOCIETY

Moving ahead, now, let us situate and examine the discourse exclusively on inclusive society in the contemporary international and national framework.

In 1995, in Copenhagen, the World Summit for Social Development was instrumental in describing an inclusive society as a "society for all, in which every individual, each with rights and responsibilities, has an active role to play" (UN, 1995). Such an inclusive society must be based on respect for all human rights and fundamental freedoms, cultural and religious diversity, social justice (Ibid). It further expatiated that it is not only the right to education or the right to political participation but, actually, the taking part in the process of society's building up and actual participation in it which is more important. Individual involvement in the process of building the society by which the society is managed, ordered and represented is most important for creating an inclusive society.

An inclusive society is based on the fundamental human rights value, that is, "all human beings are born free and equal in dignity and rights". They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood2couched in its vigorous words what Ambedkar's ideas on fraternity is all about.

It is a society in which all members, regardless of their backgrounds, are able to and motivated by their wish to participate in civic, social, economic and political activities that gives an inclusive society. Also, an inclusive society is one that over-rides differences of race, gender, class, generation, and geography, and ensures inclusion, equality of opportunity as well as capability of all members of the society to determine an agreed set of social institutions that govern social interaction[3].

To create and sustain inclusive societies, it is critical that all members of society are able and motivated to participate in civic, social, economic and political activities, both

at the local and national levels. A society where most members, if not all, feel that they are playing a part, have access to their basic needs/livelihoods, and are provided with the opportunity to participate in decision-making processes that affect their lives, is a society that will best foster principles of inclusiveness (UN, 2008:10)

After analysis, it is observed the concept of full participation in all aspects of life forms the most important part of the definition of social inclusion. Now the question arises why the focus on full participation? It is because there is often exclusion and inequality in the process of social inclusion which impedes total, unmitigated participation of all in society's process of building itself. In several ways, inequality is one of the major impediments in creating 'a society for all' to the extent that it reflects the exclusion of certain groups such as Dalits. And that is why participation becomes most significant, as it indicates an active involvement in the process, not merely limited to having access to society's activities, but in engaging in and consciously deciding their outcomes thereof, and building and maintaining a social network.(UNDESA,2007)

Thus, participation also creates a sense of responsibility towards others, a community or an institution, and influences decisions or enables individuals to have access to the decision-making processes (Breton, 2017). Undoubtedly, social inclusion is a rights-based approach to social exclusion in making the questions of who, what and how very crucial in achieving the complexities of the process of social inclusion.

Who: The question 'who' specifically focuses on groups subjected to discrimination and suffering from disadvantages and exclusion. Such groups include dalits, children, minorities and women etc.

This paper focuses on caste –based exclusion and discrimination. Addressing the question 'who', we find that in the Indian social system Untouchables, the Shudras, are placed at the bottom of the hierarchy and are the most excluded lot. They are known as Dalits today. These are the people who are poor, excluded, ill-treated and deprived.

Ambedkar finds that the Hindu scheme of social structure is based on the four Varnas or Chaturvarna. Ambedkar (1916) says:

"In India, he analyses that there is no society at all. We have multitudes of societies based on caste. People are not born as humans. They are born into castes and imbibe such notions of mind which do not allow humane interaction among them…."

It breeds inequality and serves as a base of the caste-system. Indian society is a gradation of castes forming an ascending scale of reverence and a descending scale of contempt, a system which gave no scope for the growth of the sentiment of equality and fraternity so essential for a democratic form of government. He further says, "Caste system is not merely a division of labour. It is division of labourers, it is a hierarchy in which the divisions of labourers are graded one above the other. In no

other country is the division of labour accompanied by this gradation of labourers"[4] (Ambedkar, 1936:22).

In his writings, Ambedkar tried hard to show the mechanisms of the caste system and clarified the origin of untouchability in order to support his fight for equality. He believed that the lower castes were not in a position to overthrow their oppressors because of two reasons, mainly internalised hierarchy; and, the very character of caste-based inequality. The internalisation of hierarchy was largely due to what M.N. Srinivas referred to as the sanskritisation process which was already identified by Ambedkar long back.

What: The term 'what' questions the practices and policies creating and perpetuating exclusion. In addition to tracing the sources of exclusion, it further discusses what needs to be changed. It focuses on analysing the inequalities, discriminatory practices, and unjust power relations that are the root causes of human rights and development challenges, as well as the processes that exacerbate exclusion and, ultimately, lead to social fragmentation and conflict. Focusing on 'what' we find the dalits had been excluded from illuminates the various human rights a dalit must have to realize his full potential viz. social, economic and political rights including the right to education and employment. They constituted the traditionally forced and customary undignified and mortifying labour due to their birth in the untouchable castes. These people were forced to live on the outskirts of the villages and towns in the areas towards which the wind blew and sewage flowed. Their houses were dirty, dingy, dark, and unhygienic full with poverty and squalidness. The kind of inequality inherent in the caste system is called 'graded inequality' by Ambedkar in a very perceptive way. In response to the highly discriminatory and exclusionary caste-ridden social system that utterly devalued human dignity of shudras and untouchables, Ambedkar stood determined to eradicate social, educational, and cultural disparities of the lower castes. He was of the view that as long as there was a caste system, there would be outcastes too.

How: With respect to identifying the necessary measures that need to be taken – the 'how' question comes into play. Before taking up the issue of how it needs to be analyses as to what makes some societies more inclusive than others? That is, what are the basic or fundamental aspects for creating and maintaining an inclusive society in practice? As discussed above, the debate on inclusive society defines a society based on the fundamental human rights value, that is, 'all human beings are born free and equal in dignity and rights'. An inclusive society to take place in actual practice, must have in place the legal, regulatory and policy frameworks that must be inclusive. It must sustain and promote a just and inclusive process in all areas of their implementation. Further, it must ensure equal access to basic education, public space, facilities and information, as well as respect for all and accommodativeness to diversity and cultural

pluralism. And this what the contemporary framework of Human Rights Based Approach (HRBA) through its goal of all men and women's participation at every stage of the programming process, particularly of those who are being disadvantaged, that it emphasises the accountability of the state and its institutions with regard to respecting, protecting and fulfilling human rights within its jurisdiction which has been continuously being emphasised upon. Both national and international discourse levels instill respect for all human rights, freedoms, and the rule of law as fundamental requirements to social inclusion. Every member of the society, no matter what is his or her economic resources, political status, or social standing, must be treated equally under the law.

V. AMBEDKAR FUNDAMENTALS FOR CREATING AN INCLUSIVE SOCIETY

Addressing the issue of the inclusive society with the question 'how' is very pertinent and, herein, we can engage Ambedkar on inclusive discourse. Ambedkar (1949) states, "We have in India a society based on the principle of graded inequality which means elevation for some and degradation for others". This made Ambedkar was thoroughly convinced that unless a casteless and classless society is created there will be no progress in India. This requires a social reconstruction and Ambedkar was very clear about the means to bring about this change.

If this were the status of society's upbringing of its members, which is based on caste divisions, then how can such a society be termed as an inclusive society? Ambedkar was thoroughly convinced that unless a casteless and classless society is created, there will be no progress in India; for progress needs a social reconstruction, and Ambedkar was very clear about the means to bring about this change. For one, he took up the reconstruction of Indian society on the foundations of democracy as a 'mode of associated living' as stated above. Ambedkar stressed that 'Reconstitution of the society' by annihilating caste and its ideological notions is the cure.(Ambedkar, 1916: 51) To bring about this reconstitution of society, Ambedkar explains that "a human society should have instilled early in its organic filaments, an attitude of respect and equality towards fellow human beings. In an ideal society, there should be many interests consciously communicated and shared. There should be social endosmosis" (Ambedkar, 1979: 42&66).

No doubt his ideas, and ideals of inclusive society revolved around the welfare of humans, and that was to be achieved through social and political means; which is what is being discussed in contemporary times' inclusive discourse. He fought against social and political injustice. His struggle was to consolidate Dalits and to make them aware that they too were human beings and have the right to lead a happy life in society.

Secondly, Ambedkar fought not only for equal status of Varna, but for social, economic and political equality, as well as equal opportunity to all and, that were his goal or mission of inclusive society.

Having taken the leadership for the emancipation of Dalits, Ambedkar declared (1936),

"Unless the social order is changed, no progress could be achieved. The community cannot be mobilized either for defense or for offence. Nothing can be built on the foundations of caste. No nation, no morality".

To incorporate these thought-provoking ideas, Ambedkar actively led processions for Dalit community-building and made a demand for separate electorates for them. In fact, his vision was entirely different from his contemporary leaders.

Ambedkar's ways to address the problem of untouchability was more practical than the others of his times who put emphasise on education of Dalits. Others had hardly analysed the socio-economic causes of theirs (the Dalits) having an inferior position, and which was degrading further in the society. He himself belonging to the untouchables, Ambedkar was familiar with the depth of their socio-economic problems and well equipped to fix them. His ideas and programmes set forth concrete proposals for the removal of untouchability and the empowerment of the downtrodden.

He tried to mould social inclusion movement in the caste annihilation movement by crossing all hurdles and giving shape to a democratic movement. Achieving social inclusion is nothing but uprooting the caste. He made dalits realise their full potential by fighting for their social, educational and political rights.

Thirdly, it is important to bear in mind that Ambedkar not only believed in reordering the existing society but he practically undertook this project. Ambedkar in his grand scheme of reconstruction of Indian society, fought for the rights of representation of the Dalits as their democratic rights. In order to establish an inclusive society, Ambedkar looked at democracy, not as a political arrangement, but as "a mode of associated living. The roots of democracy are to be searched in social relationship, in terms of the associated life between the people who form the society. (Ambedkar,1979:73-75) Further, he defined democracy as a "form and method of government where revolutionary changes in the economic and social life of the people are brought about without bloodshed". (Keer,1962:480)

He holds that a democratic way of life cannot be conceived without an ideal society, where the idealisation lay in forging a way of life which recognizes liberty, equality and fraternity as the principles of an elevated system of brotherhood. These principles of liberty, equality and fraternity are not to be treated as separate items of a trinity. (Ibid) These principles are the foundation stone of Ambedkar's social reconstruction

project. It can be rightly pointed out that Ambedkar's Social Democracy is what the contemporary inclusive society discourse is focussing on. Social Democracy is a social system which is based on right relations between man and man in all spheres of life.

As the chief architect of India's Constitution, Ambedkar got it shaped clearly on the values of justice, liberty, equality, fraternity and dignity of man and based on which were incorporated legislations for equality in all spheres of life and equal opportunity in all spheres of human endeavours. These three principles formed the very basis of Ambedkar's concept of social justice or just social order. Thus, to leverage Social Democracy in practice, and to shape the contours of a democratic and inclusive society, the country had already formulated through reservations the underprivileged's representations in society's framework of justice and equity. Ambedkar took the task of securing social justice for all the socially and educationally backward classes in the country, under the mandate of a new Constitution. The Directive Principles strive to create a Welfare State and a just social order. Making the State responsible for social change, Article 38 contains the essence of these principles in these words: "The State shall strive to promote the welfare of the people by securing and protecting as effectively as it may a social order in which justice-social, economic and political –shall inform all the institutions of national life"[5].

Liberty

In Annihilation of Caste, Ambedkar introduces the concept of liberty as the right to life and limb and also as the right to property and the right to choose one's profession. (Ibid:61) In the later texts he reflects on the concept by bringing out other aspects of it. In philosophy of Hinduism[6], he discusses the conditions which make liberty possible: social equality, economic security and knowledge.

In Hindu social order, he classifies liberty into civil liberty and political liberty and elaborates on it as classified into civil liberty, or the liberty of movement and liberty of speech which is the same as freedom of opinion and freedom of action and, where freedom of action when fully realised implies absence of exploitation, suppression , unemployment and poverty. On the other hand, political liberty consists in the right of the individual to share in the framing of laws and in the making and unmaking of governments. Hence, about the concept of liberty, we can say that it does not change substantially but only gets clarified and refined.

Equality

Equality may be an unattainable reality but nonetheless one must accept it as the governing principle. A man's power is dependent upon (1) physical heredity, (2) social inheritance or endowment in the form of parental care, education, accumulation of scientific knowledge, everything which enables him to be more efficient than the savage, and, finally, (3) on his own efforts. In all these three respects, people are undoubtedly unequal (Ambedkar,1979:38-39).

However, the question is, whether we should consider them unequal as human beings because they occupy different positions in this society.

Fraternity

He highlights fraternity as the root of democracy, and says that without fraternity other ideals of democracy like equality and liberty cannot endure. To explicate fraternity is to say that without it liberty and equality would destroy each other. If, in democracy, liberty does not destroy equality and equality does not destroy liberty, it is because at the basis of both there is fraternity. Fraternity is , another name for democracy[7] visualised not merely as a form of Government, but as primarily a mode of associated living, of respect and reverence towards fellow human beings.(Ibid:48-49&283)

However, these principles are not to be treated as separate items in trinity. They form a union of trinity in the sense that to divorce one from the other is to defeat the purpose of democracy – the co-existence of divergent minds in harmony and fellow-feeling. Without equality, liberty would produce the supremacy of the few over many. Equality without liberty would kill individual initiative. Without fraternity, liberty and equality could not become a natural course of things like love between men resuscitated by generosity of spirit of brotherhood. To uplift a benighted society botched down in conservatism and rigid societal order, Dr. Ambedkar demanded for justice to untouchables and other weaker sections of the society via making provisions in the Indian Constitution.

So let us consider in brief how Ambedkar tried to operationalise his social reconstruction based on this trio of liberty, equality and fraternity. It was no other than the slogan of 'Educate, Agitate and Organise' which became the symbol of the movement for the liberation of the depressed / marginalised classes. This slogan also facilitated the bringing out of how Ambedkar perceived the complexities of power of knowledge in relation to social change/ social reconstruction.

Education here implies an awakening of the self or consciousness which he considered indispensable for the individual to realise the condition in which he/ she is constituted. It rather connotes a deschooling of the minds which had been schooled in the traditional knowledge system. Schooling in the 'Brahminic tradition' produced the individual in the context of the historically constructed ways of reasoning which was primarily based as the principles of inclusion/exclusion. This has resulted in the creation of a social order built entirely on the rules of graded inequality. Therefore, the kind of education Ambedkar envisaged embodies a range of values, priorities and dispositions that freed the mind about how one should see and act in the society or world, not to reinterpret but to reconstruct it. Education when it enables the individual to see his/her realities, results in an agitation. That is, it charges the individual with resentment of the injustice he/ she is bound to suffer and thus drives him/ her to actions to resettle what had been settled wrongly. Thus, to be educated is not to be disciplined according to the established regimen of remembering and forgetting; it is not assuming identities normalised through discursive practices and of the history of the predictable Hindu mythology. Education

should develop the consciousness that enable the individual to see how he/ she has been constituted in an abstract, unreasoned and socially identified manner suitable to the established order. Therefore, Ambedkar wanted the Dalits to become conscious or self-reasoned about their conditions and to agitate against the established order through organisation of their political power. He perceived education as power and looked for this power to be developed among the Dalits and to enable them apply knowledge to intervene in social life. Thus, Ambedkar's contemplation of education as an instrument of social change would enable the Dalits to have vision and revision, and to act against the forces that perpetuate their dehumanising conditions. In this sense, his trio slogan of action, 'Educate, Agitate and Organise', with its focus on the faculties of thinking, feeling and action of the social person, epitomises the philosophy of Social Democracy, bolstered by the ideals of 'Liberty, Equality and Fraternity', underlying the Ambedkar movement. If each word of the slogan is analysed, it can be aptly observed that according to his philosophy the word 'educate' implies creation of a liberating consciousness, which is not just formal education but conscientization process. Similarly, 'agitate' does not only mean 'sangharsh', or protest in physical term, but also mental stir from unquestioning acceptance of the status quo and agitation of mind towards an elevated understanding of what constitutes consciousness, and that is to question the thought and arrive at answers that impel one towards a fulfilling existence. This questioning or critical reasoning ultimately brings awareness which enables a person to change his/her understanding of an issue. Ambedkar always believed in the argumentative capability which reflects a person's thinking prowess and his ability to reach the truth and identifying it through a process. This implied challenging the idea of accepting the uncontested notions of society. Finally, to 'organize' provides the lesson of social unity.

Ambedkar's social reconstruction project which inseparably is intertwined with awakening of the masses, emphasised the centrality of education in the construction of modernity in India. His engagement in the deconstruction of the inegalitarian Hindu social order and upper caste hegemony made him realise that education is a powerful instrument in the process of emancipation of the Dalits. He realised the instrumentality of education as a process of liberation for the Dalits from the indoctrination, domestication and domination to which they had been subjected by the Hindu society.

In 1923 Baba Saheb founded *'Bahishkrit Hitkarni Sabha* to spread education among the maginalized and to improve their economic conditions. He gave the slogan: 'Educate-Agitate-Organize'. He launched the social movement for the annihilation of caste system and restoration of caste-less Indian Society. Ambedkar wanted the depressed class to raise their educational standard so as to make them aware of their own situation. He wanted them to appreciate their level of aspirations to the level of highest Hindu so as to be in a position to use political power as a means to an end.

Therefore, he adopted a four–pronged strategy for empowering the dalits. In his four-pronged strategy, the very first step was to educate the Dalits, so as to make them aware of the prevailing evils in the path of their development. He emphasized that Dalits, themselves,

have to come forward in educating their own people. For the purpose, he established the People's Education Society and started the first educational Institute in Bombay. Baba Saheb emphasized self-respect, fearlessness and education of the Dalits to end the innumerable atrocities and untold discriminations towards the untouchables which was prevailing form centuries past. He accepted education as the only weapon in the hand of Dalits to realise their dream of upliftment. All through his life he worked arduously for the purpose for empowering Dalits by establishing a variety of educational institutions at all levels viz. primary, secondary and higher education.

His mind was engrossed with the social amelioration, political enlightenment, economic well-being and spiritual awakening of the downtrodden. He had a strong belief in the equal rights for man and woman, in the dignity of an individual, in the up-gradation of standards of life and certainly, in peace, harmony and security in every sphere of human life.

And for this, Ambedkar struggled for about forty years and sought a religion that could deliver the Dalits from the bondage of social evil. However, Ambedkar, in the later years, became the ultimate visionary to restore the Dalits' human dignity and give them a respectable place in society. Ambedkar identified the functioning of moral order, observance of Constitutional morality, as the conditions for the successful working of democracy. "Society must have either the sanction of law or the sanction of morality to hold it together.Without either, society is sure to go to pieces" (Bharathi, 1998:44).

VI. BUDDHISM FOR ESTABLISHING MORAL SOCIETY AND NEW SOCIAL ORDER

How can a society claim to be democratic or egalitarian if the basis of its social order has the sanction of a religion which talks of social stratification was a big question before Ambedkar. Being a great visionary, he in the advancing years of life offered an alternative in the form of Buddhism for establishing moral society which could be termed as new social order. He tried to visualise Buddhism in the light of the social perspective for which he tried to find the answer to the question: Did Buddhism teach liberty, equality and fraternity? And he found the inclusion of the trio principles of liberty, equality and fraternity in Buddhism. For Ambedkar, religion performed a social function. He made the welfare of human beings his centre of concern.

Religious traditions instead of purporting philosophy and theology were to concentrate on ensuring conciliation and dignity to human beings which comes with social equality. Consequent upon this, Ambedkar found the means to develop essential social and moral conscience of the society for establishing the democratic society in Buddhism. Further, he found solace in this religion, which could really recognize, understand their sufferings and misery, and give respect to the humanity. He wanted to see the birth of a new society-the birth of free human beings.

VII. CONCLUSION

Ambedkar's concept of social justice stands for the liberty, equality and social justice for all human beings. He stood for a social system which is based on the right and just relations between man and man in all spheres of life. Ambedkar wanted the Dalits to be acquainted with their own conditions and have aspirations to raise themselves at par with society's members. He wished them to be in a position to use political power as a means to an end. Ambedkar had tried all kind of strategies from memorandum, writings to direct action and movement for emancipating the Dalit from this oppressive social system. He also believed that law is an important powerful weapon to fight against discrimination. In the political domain, he promoted separate electorate, party building and public policies like reservations whereas in the social domain, he was in favour of reforms at the grass root level – education being his first goal – and reforms by the state – as evident from the Hindu code bill.

Without Ambedkar's intervention for bringing appropriate measures of material empowerment and emancipation of the downtrodden, they would never be able to get their rightful place in nation. It was Ambedkar's strenuous political challenge and struggle which compelled the State to realise the national significance of the problem of the scheduled castes/ Dalits. Consequent upon these struggles, the State espoused certain measures which significantly contributed in the direction of developing and reinforcing the social foundation of the country.

The entire philosophy of Ambedkar revolves around the creation of an egalitarian social order wherein there would be no place for graded inequality and oppressive social hierarchies of high and low, pure and polluted, savarna and avarna. His grand mission for reconstruction was to transform India from Bahishkrit Bharat to Prabuddha Bharat, an Enlightened India with New Identity, New Personality and New Social order.

Notes

1. Dr. Babasaheb Bhimrao Ambedkar proclaimed to the have the have-nots at one of his historical speeches on 18th July, 1942 in Nagpur. Quoted by Dhanajay Keer, Life And Mission: Dr. B. R. Ambedkar, p.351
2. Social justice refers to the principles, values and belief that every individual and group is entitled to as fair and equal treatment, which is necessary for the achievement of a society in which all people have equal access to rights, not only under law, but in all aspects of life, and all people get an impartial share of the benefits as well as carry a fair share of the responsibilities of society
3. Article 1 of Universal Declaration of Human Rights. The Universal Declaration of Human Rights (UDHR) 1948 is a milestone document in the history of human rights.
4-. Annihilation of Caste is an undelivered speech written in 1936 by B. R. Ambedkar, an Indian writer, activist, politician who fought against the country's concept of untouchability. The speech was prepared as the presidential address for the annual conference of Jat-Pat Todak Mandal of Lahore in 1936, for which Dr. Ambedkar was invited. The views expressed regarding annihilation of caste which depend on religion, in the historical speech prepared by Dr. Ambedkar for the conference, were unbearable to the reception committee. Hence, Dr. Ambedkar was requested

by the committee to make certain changes in his speech but Dr. Ambedkar denied to-do so. As a result the conference was cancelled. Dr Ambedkar had self-published 1,500 copies of the speech in May 1936.

5. Article 38 of Indian Constitution.
6. This book is included in Writings and Speeches vol 3 as chapter1. This book is critically examine the philosophical position of the Hindu religion.

7- The fundamental elements of his concept of democracy, in short, were liberty, equality, fraternity, reason, human experience, the rule of law, natural rights and an emphasis on the individual in social relationships. For Ambedkar it is the feeling of fellow being.

References

Ambedkar, B.R (1916). *Castes in India: Their Mechanism, Genesis and Development*, in Vasant Moon (ed) BabasahebAmbedkar : Writings and Speeches, Vol-I, Bombay, Govt. of Maharashtra, (reprint 1979) .

Ambedkar, B.R (1936). Annihilation of Caste, Arnold Publishers, New Delhi, (1990reprint) pp. 47-84.

Ambedkar, B.R. (1949). "Speech at The Constituent Assembly of India", Indian National Congress, November 25. [https://www.inc.in/en/media/speech/speech-at-the-constituent-assembly-of-india]. Accessed on December 20, 2018.

Ambedkar, B.R.(1979).*Castes in India:Their Mechanism Genesis and Development*, Paper read by Ambedkar before the Anthropology Seminar of Dr. A.A.Goldenweizer, the Columbia University, New York, U.S.A. on 9th 1916,Dr. Babasaheb Ambedkar: Writing and Speeches, Vol.1, compiled byVasant Moon, Education Department, Government of Maharashtra.

Ambedkar B.R. (1987), *Philosophy of Hinduism* in Vasant Moon (Ed) "Dr. Babasaheb Ambedkar: Writings and Speeches" Vol.3, Govt. of Maharashtra, Bombay. pp. 1-94.

Bharathi, K.S (1998) The Political Thought of Ambedkar(Encyclopaedia of Eminent Thinkers), Vol 9, Concept Publishing Company,Nagpur.

Breton Raymond. (2017).Social Participation and Social Capital University of Toronto ttp://canada. metropolis.net/events/civic/rbreton_e.html accessed on July 10, 2017.

Karen A Mingst, Margaret P. Karns, Alynna J Lyons, (2017) The United Nations in the 21st Century: Dilemmas in the World Politics. Routledge, New York (first published by West view Press), p.3.

Keer, Dhananjay. (1962). Dr.Ambedkar: Life and Mission, Popular Prakashan, Bombay.

UNDESA. (2007).Summary of E-dialogue on "Creating an Inclusive Society: Practical strategies to promote social inclusion", organized by DPSD/UNDESA, 23 May - 17 June, 2007.

United Nations. (1995). The Copenhagen Declaration and Programme of Action : World Summit for Social Development, New York .

United Nations. (2008).Report of the Expert Group Meeting "Promoting Social Integration" 8-10 July 2008, Helsinki, Finland , United Nations, department of Economic and Social Affairs , Division for Social Policy and Development,http://www.un.org/esa/socdev/social/meetings/egm6_social_integration/documents/egm6.report.pdf, accessed on July 11, 2018. p 10.

Book Review

NUDGE

Improving Decisions about Health, Wealth and Happiness,–Richard H. Thaler, Cass R. Sunstein, Yale University Press, New Haven & London

INTRODUCTION

The book begins with an Introduction and is divided into five major parts- Humans and Econs, Money, Health, Freedom and, finally, Extensions and Objections. The Introduction mentions an experiment carried out by Carolyn (a hypothetical friend of the reader and a director of food services in a large city school system) in which she shows how the way of displaying the food changes the choices made by the kids. The authors designate Carolyn the "Choice Architect' who influence or 'nudge' the food choices people make by changing the context; while they espouse the movement of 'Libertarian Paternalism' in which paternalists are they who make easy the choices made by people by helping them preserve their freedom or liberty. The libertarian aspect deals with the 'freedom of choice' and qualifies paternalism to mean 'liberty-preserving'.

The need for a Nudge arises because real people don't think like Econs (Homo-Economicus); rather, they are Humans (Homo-Sapiens). Econs make perfect and unbiased forecasts, that is, they are systematic; whereas, Humans are fallible, prone to errors, and their decisions are flawed and biased. 'Status quo bias' says that the humans stick to status-quo and prefer to go with the default options in a situation where they are faced with multiple choices between picking a default (recommended feature) and making a custom choice. It's human nature to stick with the default choices. Thus, nudges are for Humans where they are free to choose while going with the preferred decision in a predictable situation mandated by *a posteriori* experience; and Incentives are for Econs, who respond to externalities like falling tax to buy more now but not to nudges like saving now and buying later, even at the cost of giving up pleasure, to avert a crisis like rising prices as demand grows. This book highlights how Nudge can be used to improve the decisions made by people by improving the number of choices (Just Maximize) and a little bit of interference (Libertarian Paternalism). Authors list various examples of improving the choice architecture like - designing user friendly environments, choices made of health insurance and retirement benefits etc.

PART I: HUMANS AND ECONS

Chapter 1: Biases and Blunders

The authors start off the chapter with the figure of two tables. They illustrate by asking us to hazard a guess about the dimensions of the tables how Humans can make errors

in judgment that makes one table bigger than the other when they are actually the same table but projected differently. The authors put their weight on 'How individuals can systematically go wrong' and how a better understanding of ways Humans make decisions when faced with choices bring us new aspects of human thinking.

Some of the ways to decision-making are controlled by the Automatic System (associative and spontaneous) and the Reflective System (controlled) and the tools are rules of thumb, optimism, framing, "above-average" effect of optimism, "loss-averse" nature, and status quo bias which establish the inter-play between the two systems. Amos Tversky and Daniel Kahneman (1974) mentioned three Rules of Thumb (Heuristics) - Anchoring, Availability and Representativeness. Again, the 'Above Average' mentality of the majority in a situation of where they must perform is very prevalent. People are also 'loss averse' in a situation of gain or loss. The fact that man is loss averse in a choice-making situation tends to produce inertia/status-quo as they avoid making changes when, in fact, change would produce better results. This is called the Status-quo bias: (i) preventing making changes (inertia) and (ii) the lack of attention (going along with status quo). For example, the status quo bias is visible when the TV shows are scheduled in a way such that once the viewer starts with a show he sticks to it, even though he could switch over to other channels but towards which he is inattentive by the 'carryover effect' of TV viewing. Thus, defaults are strong Nudges. Again, framing can be explained with the two statements of the doctor- "of one hundred patients who have this operation, ninety are alive after five years." and "of one hundred patients who have this operation, ten are dead after five years." as the Automatic System reacts with alarm to the latter.

Chapter 2: Resisting Temptation

Temptation is an inbuilt nature of human beings. The behavioural economist George Loewenstein (1996) refers it to as 'hot-cold empathy gap'. The two main characteristics of an individual are- a far sighted 'Planner' and a myopic 'Doer'. The Planner is influenced by the Reflective System and the Doer by the Automatic System.

'Doers' are difficult to control and they fail the efforts of 'Planners'. The planner sets an alarm for 6.15.AM but the doer doesn't let him get out of bed till 9.00 AM. An example of government's Self-Control strategy is Daylight Saving Time where the clock is set one hour forward and people enjoy the extra hour of daylight in the evening while going to bed one hour before saving fuel.

Mental Accounting can be a strong mechanism in resisting temptation. Economic theory considers money as 'fungible' but mental accounting considers it as non-fungible and assigns money for different purposes which cannot be infringed cutting down on temptation

Chapter 3: Following the Herd

'Econs' are not influenced by their surroundings. They are unsociable beings whereas 'Humans' are affected by other human beings. Social influence can be an important method to Nudge and can happen in two ways–(i) first, involving information, and (ii) second, involving peer pressure. Groups which are unanimous have the strongest Nudges even on wrong decisions, given that individuals try to align themselves to Group Norms. Conformity to social norms and fashions comes out of the belief that most people think that others are paying attention to their actions. This phenomenon, commonly referred to as 'Spotlight Effect' (used by Tom Gilovich) might influence individual behaviour but the reality is quite different. People are paying less attention to other's behaviour.

Chapter 4: When Do We Need a Nudge?

The nudges should be such that they are most likely to be helpful in guiding the behaviour and less likely to inflict harm. The authors in this chapter highlight certain examples and the need for Nudges in the specific situations.

Example* 1*: Benefits Now-Costs Later

Investment goods like exercise, flossing and dieting; and Sinful goods like smoking and alcohol need Nudges.

Example* 2*: Degree of Difficulty

The difficult tasks need Nudges, like spell checker for pronouncing Mihaly Csikszentmihalyi.

Example* 3*: Frequency

Practice makes tasks easier. Many tasks can be repeated like learning to play tennis but certain tasks like choosing a college, choosing a spouse, buying house and cars can't be repeated. These choices can be made better by Nudges.

Example* 4*: Feedback

Feedbacks are powerful Nudges. The actions for which feedbacks are available are likely to improve in future in comparison to actions for which these are not available.

Example* 5*: Knowing What You Like

Most people know about what they like or prefer but where there are many choices it becomes difficult. Nudge can be fruitful.

Chapter 5: Choice Architecture

Automatic System perform faster than the Reflective System. In a class taken by Thaler, most people pull the large and vertically mounted wooden handles to open the door.

The architecture has failed to acknowledge the human psychology. "Flat plates say 'push me' and big handles say 'pull me', so don't expect people to push big handles!"

Most people prefer to 'do nothing' and in most cases choose default options. There are two policy options-'Opt-In' and 'Opt-Out'. The two policy options lead to two different outcomes. Since human beings make mistake, a well-designed system will have guessed all situations and prepared itself to respond to contingencies. If you don't wear a seat belt, an alarm goes on, if you forget to switch off headlights, automatic switches are there which turn it off after some duration. Thus, the best solution to reduce errors is to give 'feedback' and incorporate those feedbacks in system operation.

The movement from choice to welfare requires 'Mappings'. Different treatments for a disease come with different methods, different costs and different side-effects. The comparison between options requires 'mapping'.

According to the author the six principles of good choice architecture are:

- Ncentives
- Understanding mappings
- Defaults
- Give feedback
- Expect error
- Structure complex choices

NUDGES

PART II: MONEY

Chapter 6: Save More Tomorrow

Savings has always been problem for the Americans. Their spending is more than their savings. To increase the savings the authors suggest two plans- 'Automatic Enrolment in Savings Plans' and 'Save More Tomorrow' program. The standard theories of economics assume that people are capable of projecting how much they are going to earn and how much they intend to save for the future. That's the standard theory for the 'Econs'.

The people should be Nudged to make enrolments to join different plans. Failure to join different plans is proving to be a loss for the people. An important method to increase enrolments is the default option. The authors mention another programme, the 'Save More Tomorrow' programme. The programme is designed based on the five psychological principles- People think to Save More but never do so, Self-control restrictions can be performed better in future, Loss aversion, Money illusion and Inertia. Nudging can be very helpful.

Chapter 7: Naive Investing

Investing money is an important decision which people take during their lifetime. Appropriate mix of stock and bonds can increase the rate of return. The amount to be invested in stocks and bonds varies for Econs and for Humans. An Econ would make lengthy calculations to know the risk to be taken for a specific return whereas the Humans base their decisions on 'short-term fluctuations' and 'Rules of Thumb'.

Even the most seasoned investors find it difficult to decide where and how their money is to be invested. They resort to 'Rules of Thumb'. When Nobel Laureate Harry Markowitz (founder of modern portfolio theory) was asked how he invested his money, he said "I should have computed the historic covariance of the asset classes and drawn an efficient frontier. Instead.....I split my contributions fifty-fifty between bonds and equities." This is 'diversification heuristic'.

Chapter 8: Credit Markets

The chapter analyses three important credit markets- mortgages, student loans and credit cards. Shopping for mortgages was easy earlier. Teaser rates (low rates for a period and high thereafter), varying fees, prepayment penalties etc have further complicated the decision. Improving the choice architecture can guide people to make better and informed choices. Next, the credit cards are used widespread, are very convenient for payments, and avoid currency inconveniences like finding loose change. But if you are not careful they can be prove very addictive too in engaging in indiscrimate buying behaviour. If credit card companies start sending details of the payments made, then the holders can better know what they are paying for.

Chapter 9: Privatizing Social Security: Smorgasbord Style

The Swedish social security plan is 'pro-choice'. It aims to maximize choices. The George W. Bush government aimed at partial privatization of social security plans. The default options are one way of Nudging but the contention is whether 'Active Choosers Make Good Choices?' When the default options are compared to the options chosen by active choosers, it was found that the choices made by active choosers are not awesome.

PART III: HEALTH

Chapter 10: Prescription Drugs: Part D for Daunting

The President Bush's prescription drug coverage was called Part D. The reason, according to Bush, why they want it to be implemented is 'that they felt it necessary to provide choices to meet the needs of the consumer'. President Bush stated that "The more choices you have, the more likely it is you'll be able to find a program that suits your specific needs.

Random plans can be assigned to the most vulnerable. The random plans can be unlucky for people who don't fit in the plans. Choosing and comparing plans along many major dimensions is a daunting task. There can be various methods of Nudging people. Some of them are-*Intelligent Nudging &Recap*

Chapter 11: How to Increase Organ Donations

Most donors are people who have been declared 'Brain Dead'. In United States for organ donations explicit consent rule applies. People willing to donate have to take concrete steps to demonstrate they want to be donors. This has deterred many donors from registering because of the inertia effect.

'Routine Removal' is one of the important Nudges. The state has ownership over the organs of the individuals and state has right of removal over it. Another policy is of 'Presumed Consent' which is libertarian. All the citizens are considered to be donors unless they show their unwillingness of not donating.

Chapter 12: Saving the Planet

Aggressive steps can be taken to protect the environment. Several steps have been taken to protect the environment. The actions have gone well beyond the Nudge. The regulators have used command and control of the situations with little freedom of choice. The government has to intervene as people are not willing to assign voluntary agreements. The incentives are not properly aligned and the better feedback options can make people ponder over their environmental actions. The two main choice architects are then- Incentives and Feedback.

The two incentives proposed in the environmental domain are taxes or penalties. A tax on greenhouse emissions is one example. Another example is cap-and-trade system. In this system a country that pollutes are sold 'rights' or a cap to allowable pollution which they can trade in the market with another country which has a comparatively higher cap and thereby must pay for increased pollution. Averse to paying more, a country that must pay for rights to increased pollution inhibits its pollution mind set and controls its emissions. A better feedback system along with better information and disclosure can be a powerful Nudge to control emissions.

PART IV: FREEDOM

Chapter 13: Improving School Choices

According to Milton Friedman 'if school competes, kids win'. The school's choices should be increased. The rich parents already have choice of the schools; it is the children of poor parents who will be benefitted the most. An average parent doesn't know all the schools available and in most cases stick to the status-quo. Neighbourhood schools are the most preferred one. A better design of curriculum can also be a good

way to Nudge. For example the students willing to graduate from San Marcos High have to complete an application to the Austin Community College. This definitely increased the college enrolments from the school.

Chapter 14: Should Patients be forced to buy Lottery Tickets

Healthcare has been an important issue in all the Presidential elections of the United States. To make each and every citizen be accessible to affordable healthcare is a daunting cost because of the heavy costs involved in the healthcare treatments. The patient and doctor should be free to make agreements. The author takes the example of the patient's right to sue. The patient's right to sue increases the cost of medical expenditure incurred. 'Patients are effectively forced to buy a kind of lottery ticket, one that might be worth anything from millions of dollars to nothing, but that is, on average, worth no more than 60 cents for every dollar spent'. Choice architects should be designed in such a way that freedom should be incorporated in it. The insurance plans should be with or without the right to sue.

Chapter 15: Privatizing Marriage

The author in this chapter discusses the oldest institution i.e. marriage. The author proposes that marriage should be privatized. When state grants marriages a licence, it gives both material and symbolic benefits. A historical reason for the institution of marriage is to restrict exit. It is Humans who need to have control against impulsive decisions. The Econs put everything under control.

According to the authors many institutions are working in the absence of any legal sanction like friends, churches, employees etc. The author mentions few proposals which could be powerful Nudges for couples. The people should be free to decide their terms of agreement. If the agreements favour the man, then the law should also respect it.

PART V: EXTENSIONS AND OBJECTIONS

Chapter 16: A Dozen Nudges

In this chapter the author lists various mini nudges which he thinks are as important as the main Nudges. These are:

Give More Tomorrow: People wish to donate a lot more than they actually do. It is because of inertia that many times they fail to do so. People should start giving donations soon.

The Charity Debit Card and tax deductions: The author proposes the idea of 'Charity Debit Cards' which are debit cards issued by banks for donations. This helps the donors to maintain a record of their donations and claim tax benefits easily.

The Automatic Tax Return: Automatic tax filing could save lot of man hours and money spent in tax preparations.

Stickk.com: Commitments are hard to keep and even harder to follow. Stickk.com can be used for keeping these commitments. It enlists two ways to make commitments: financial and nonfinancial.

Quit Smoking without a patch: A person opens an account with the CARES (Committed Action to Reduce and End Smoking) and deposits a dollar till six months. After six months a urine test is administered and if the test confirms of non-smoking, he gets his money back.

Motorcycle helmets: People who don't wish to wear helmets should be allowed to do so. Special licences should be issued to these people and they should be allowed to take risks.

Gambling self-bias: There are people who lack self-control. A special program of enrolling in the "No-Entry" list at the casinos by the gamblers would help control this bias.

Destiny Health Plan: If a person commits to an exercise and improves his health he earns 'Vitality Bucks' which can be redeemed for airline tickets, hotel rooms, magazine subscriptions etc.

Dollar a day: Teenage girls who have a baby and avoid getting pregnant are offered 'dollar a day'. This program has considerably reduced teenage pregnancies.

Filters for air conditioners; the helpful red light: Changing air conditioner's filter is a task which has the tendency in most people to be given up to forgetfulness. A signal such as red light can remind people for the same.

No-bite nail polish and Disulfiram: People who wish to control their bad habits should buy unpleasant products which control these habits. For example people with nail biting habits should buy bitter nail polishes or use Disulfiram in alcoholic drinks. Disulfiram provokes alcoholics to throw the drinks and have a hangover as soon as they start drinking.

The Civility Check: Most people send strong messages to their friends, and relatives when angry. The author proposes to develop a 'Civility Check' which will caution people before sending such messages like 'Warning: This appears to be an uncivil email. Do you really and truly want to send it'?

Chapter 17: Objections

In this chapter the author addresses the objections by listing them. Authors think that sceptics argue that once little paternalism is allowed it eventually will lead to coercion and bans. Authors believe that if the proposals are making people to save more, eat healthy, and choose better then the proposals shall continue.

The choices are designed to favour the architects more than the clients. Governments and its employees are often captured by the private-sector interests whose representatives are trying to nudge people in ways that will promote their selfish goals. The government's officials should be monitored. The details of political contribution received should be put on web sites.

Chapter 18: The Real Third Way

The major claims made in this book are these - Nudges are everywhere, choice architects are pervasive and unavoidable and libertarian paternalism is not an oxymoron. This book proposes a 'Third Way'. The libertarian paternalism offers a real 'Third Way'.

Salient Points of the Book

1. Endowment Effect: People tend to value items more just because they own them. Thaler further analysed the Loss Averse behaviour of an individual with the two concepts of Willingness to Pay (WTP) and Willingness to Accept (WTA).
2. Mental Accounting: People tend to overcome complex cognitive limitations by simplifying the environment. This leads to suboptimal decisions. Limited cognition affects the spending, saving and other behaviour of individuals. This theory answers 'How do people think about money?' The answer is that people make piecemeal decisions based on their limited cognition rather than comprehensive decisions.
3. Hedonic Editing: People try to integrate losses and cancel them against gains. Advance purchases are thought of as investments rather than purchases (Shafir and Thaler 2006). Decoupling consumption and spending in this way reduces pain of buying (Hedonic Editing).
4. Planer-Doer Model: Individual is both a myopic doer and farsighted planner. A doer is concerned with current utility and a planner with lifetime utility. The futuristic planner will restrict the doer to reduce current consumption but this involves a psychic cost.
5. Libertarian Paternalism: Individuals not always work in their self-interest. Certain individuals wish to quit smoking but find that they are unable to do so. Similarly saving for long term may be restricted because of other short term assignments. These problems according to Thaler and Sunstein can be answered with the help of minimum invasive policies which motivate individuals to work in their interest.
6. Social Preferences: Social Preferences play an important role in economic decision making. Thaler designed laboratory experiments such as dictator games for measuring social preferences. Prospect theory was silent on how reference point was determined.

7. Prospect Theory: The prospect theory explains the actual behaviour of an individual under risk. The main elements of Prospect Theory are:
   - Individuals derive utility not from wealth they possess but the gain or loss they come across with some reference point
   - Individuals are loss averter.
   - Individuals exhibit diminishing sensitivity to gains and losses

Ontological and Theoretical Belief regarding the issues

Authors believe that every decision ranging from the most trivial ones to the most important ones can be precisely understood by Nudge. These Nudges need to be effective in increasing the freedom of choice through the use of better 'Choice Architecture'. People's choices are greatly influenced by the way the alternatives are presented to them. The stakeholders (Governments, Institutions etc) are only to act to provide guidance which the author mentions as 'libertarian paternalism'. Authors believe that the 'Humans' are biased, take wrong decisions; can be influenced by others, etc. but the 'Econs' are super humans who make rational choices carrying out long mathematical analysis and with a detailed insight for each action. The Nudges are to be used in different aspects of health, wealth and freedom. The use of Nudge aims to make to make people healthier, wealthier and wiser.

On an epistemological note, the theoretical underpinning it provides is in terms of making wide range of behavioural assumptions other than the one positive economics relied upon viz. Rationality, Self-Interest and Objective Optimization. In that way, the book extended the behavioural agenda outlined by different Nudges that induces the decision making. Therefore, it extends the agenda but doesn't offer a solution.

Standard Method Used

Authors have made certain propositions. These propositions are made based on the past analysis or authors own observations of the society. For each proposition made, there are numerous examples cited to support it. The examples cited are used to substantiate the propositions. The narratives cited are from the day-to-day life of the people of United States.

Method of Analysis

Authors have made no use of linear argument. They are using Non-Linear type of argument. The propositions made depend on narratives and observations. Authors have also used micro-narratives within the major narrative to make propositions. Most of the propositions are not verified; however, for a few of those propositions, the authors have quoted experiments conducted by them or by others. Behavior of

individuals is explained by short stories and implicit lessons to be taken from these hypothetical stories. Authors have tried to verify alternative ideas of those impulses which Nudges to Act. The directed content analysis of various resources is used to frame and predict rational behavior of individuals.

Type of Data

The data mostly used are secondary in nature; including the studies conducted by other scholars and propositions they made. With a few exceptions, the examples quoted are also taken mostly from the American society. Based on the different data sources, implicit meanings are derived to predict the behavior of individuals. The data is not pure empirical. Some examples used by authors are too trivial and out of place which cannot be used to make generalized observations.

Place in the Literature

The book adds to the overall literature in the form of adding new dimension to the traditional way of viewing human behavior and thinking. One Nudge will result into one set of Economic principles and therefore this will be a trend setter in future research.

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