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Urbanization in a 'Least Developed' Country

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Divergence of opinions exists regarding the role of urbanization in national development especially in developing countries. Ethiopia, classified by the UN as a 'least developed country' is one of the least urbanized countries in the continent of Africa but is experiencing the highest rate of urbanization. The pattern of urbanization is uneven in terms of regional and population size distribution of towns and the urban system is functionally unarticulated having weak rural-urban and urban-urban linkages. Simultaneously urban areas are expanding due to natural increase as well as rural-urban migration, the latter being driven out by a languishing rural-agricultural sector. Rural-urban migration is putting high pressure on urban areas unable to offer jobs, shelter and services to the new migrants. Slum and squatter settlements are expanding, urban informality is growing, land speculation is rampant and the urban environmental conditions are becoming bad to worse. The present paper discusses these aspects of urbanization and urban growth and concludes with the initiatives taken by the government to ameliorate the situation.

Keywords : Urban informality, Slums and squatters, Level and rate of urbanization, Urbanization of poverty, Urban sprawl, Dysfunctional urban geographies, Urban environment

Introduction

Urbanization, as a process, involves the multiplication of points of population concentration as well as increase in the size of individual urban concentrations (Gibbs, 1966).As such urbanization, as a consequence of either or both of the factors, means that either the proportion of population living in urban places is increasing or the urban population is increasing at a faster rate than the total population or both. Usually rural to urban migration is the moving force behind the continuous and complex process of urbanization. It is continuous in the sense that it involves moving to urban centers of various sizes, becoming urban, shifting from farm sector to other non-farm economic pursuits common in urban centers and corresponding change in behavioral pattern (Clyde, 1956). It is a complex process in the sense that it involves the transformation of society including some drastic changes in social, economic, functional and geographical patterns and socio-spatial linkages. Urbanization represents a revolutionary change in the whole pattern of social life. Itself a product of basic economic

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and technological development, it tends in turn, once it comes in to being, to affect every aspect of human existence (Davis, 1955). Urbanization process over a longer period of time is generally described by a sigmoid curve. The rate of change is slow in the beginning in a traditional and economically backward economy. There after it accelerates and rises steeply during the early stages of rapid economic development and tapers off gradually when a substantial level in economic progress has been achieved and the proportion of urban population tends to approach the saturation point (Davis, 1962). In this paper an attempt has been made to present an account of urbanization and urban centers in a country (Ethiopia) classified by the UN as the 'least developed'. It examines the historical development, present scenario and salient features of urbanization and urban centers in Ethiopia using the limited data available from various sources. Some data collected by my M.A. students (W. K. Bassaye & G. T. Yohannes) and Ph.D. students (Zafu Assefa, Degu Bekele and Zemenfes Gebregziabher) have been used to supplement the description of salient features of urbanization and urban centers.

Ethiopia: A 'Least Developed' Country

Eastern Africa, with only 25.6 per cent of its total population as urban, is the least urbanized region in the continent (40.4 percent urban) and Ethiopia, with 19.5 per cent of its population as urban, is one of the least urbanized countries in the region. However Ethiopia is urbanizing very fast (4.89 per cent/ year) and the present EPRDF government of the country, being aware of the phenomena is making all out efforts to turn urbanization and urban growth in to a positive force to transform rural-agricultural sector, to promote urban–industrial growth and to ensure an equitable and sustainable pattern of development through good (urban) governance and by developing efficient and effective spatial and functional linkages and by building the capacity in the public sector at all levels.

The least developed economies are those which are the most impoverished and vulnerable in the world characterized by low gross national income, weak human assets and high degree of economic vulnerability as expressed by agricultural production and exports and low contribution of manufacturing and modern services to the GDP. Ethiopia, the oldest independent country of Africa (except the Italian occupation during 1936-41), is beset by its land-locked location. It is the second most populated country of the continent with low per capita income (current US $ 470 in 2013) but one of the fastest growing (10.4 per cent in 2013) non-oil economies of the continent. It had about 29.6 per cent of population below national poverty line and the level of unemployment was 24.9 per cent in 2011. The contribution of industrial sector to the GDP is little more than one-tenth and the sector provides employment to about 5 per cent of the total workers. The CO2 emission (a crude measure of industrial and urban growth) was 0.1metric ton/person (2010). Ethiopia is classified in 'low' category in terms of Human Development Index (HDI), a comparative measure of life expectancy, literacy, education and standards of living. With a HDI of 0.435 (2013) Ethiopia ranked 173rd in the world and 38th in Africa. The population is growing at the rate of 2.6 per cent/ year and 44.0 per cent of its population is in 0-14 year age group. The literacy rate was 39.5 per cent in 2007.The primary school enrolment was

Table 1 : Urbanization Level and Rate of Urbanization

Regions Continent Country	Per cent of Population residing in Urban Areas			Average Annual Rate of Change of the Urban Population		
	2010	2015	2020	2005-10	2010-15	2015-20
World	51.6	54.0	56.2	2.20	2.05	1.84
More Developed Regions	77.1	78.3	79.3	0.77	0.60	0.52
Less Developed Regions	46.1	49.0	51.6	2.75	2.56	2.26
Least Developed Countries	28.9	31.4	34.0	4.00	3.97	3.80
Sub-Saharan Africa	35.4	37.9	40.4	4.07	4.01	3.83
Africa	38.3	40.4	42.6	3.55	3.55	3.42
Eastern Africa	23.5	25.6	27.9	4.28	4.51	4.35
Ethiopia	17.3	19.5	21.8	4.64	4.89	4.64

Source-World Urbanization Prospects: The 2014 Revision

87.0 per cent (2006) and the life expectancy at birth was 63 years (2012). Less than half (42.2 per cent in 2012) of the rural population had access to an improved water source. The level of urbanization was 19 per cent in 2014 against 40 per cent for the continent. It increased to 19.5 per cent for Ethiopia and 40.4 per cent for Africa in 2015. However the urban population was increasing at the rate of 4.89 per cent/ year against 3.55 for Africa, the highest among all the continents. The level of urbanization in Ethiopia is lower than East Africa and the least developed countries and much lower than Sub-Saharan Africa and Africa. The relative position has neither changed since 2010 nor it is likely to change by 2020 (Table.1). The average annual rate of change in urban population continues to remain the highest in Ethiopia vis-à-vis other regions. It is more than twice the world average. The size and the spatial distribution of urban centers is lop-sided, a characteristic feature of an underdeveloped economy. About 21 per cent of the total urban population was concentrated in Addis Ababa, the 95th largest city of the world. It is 11 times larger than Mekele, the 2nd largest city of the country. As per CSA population estimate for 1 July 2012 Mekele is the second largest city (286,600 persons) while Dire Dawa is down to the 3rd place (273,601 persons). More than 70 per cent of the towns in Ethiopia are small having a population of less than 5,000 persons however they together contain only one-fifth of the total urban population of the country. The two regions of Oromia and Amhara have almost two-thirds of the total towns of Ethiopia while four peripheral regions of Gambela, Harari, Benishangul and Afar together have less than 5 per cent of the total urban centers. The rural-agricultural sector remains underdeveloped though agriculture sector provides employment to 85 per cent of total workers and contributes about 47 per cent to the national GDP and accounts for about 60 per cent of the total exports of the country. Small urban centers have weak functional linkages and service provisioning capacity and thus have failed to

promote the process of agricultural modernization and rural transformation. These small towns lack economic viability and administrative efficiency. Urban informal sector is disproportionately large and urban environmental conditions are in a deplorable state.

Urbanization in Ethiopia: The Historical Perspective

The present pattern and character of urbanization and urban settlements in Ethiopia needs to be interpreted in its historical context extending back to the pre-Christian era. Some centers sprang to prominence at least two millennia before under the patronage of kings and monarchs. However, not much is known about these centers as none could survive for a longer period. As such it is quite difficult to present a consistent, continuous and coherent account of these early periods. Most probably Yeha had been the earliest one i.e. circa 5th century B. C. or even earlier. According to one account the kingdom of D'mt (Damot) with its capital at Yeha lasted from circa 980 BC to circa 400 BC It had the distinction of being the first known capital of Ethiopia and the birth place of country's earliest civilization. After its collapse in 5th century BC the region became dominated by several smaller kingdoms till the Aksumite kingdom emerged at about the beginning of the Christian era. It flourished for about six or seven centuries and achieved its greatest power during the period from 4th to 6th century AD. Historically urbanization dates back to the period of Aksumite kingdom which flourished before the 4th century AD (Report, 1996). Some scholars lend support to the view that Axum did function as the capital of Aksumite kingdom since the 1st century AD. There developed important towns serving as centers of commerce, administration and culture. The Kingdom dominated the major trade routes of Africa and Asia. However, the introduction of Christianity during the 4th century and the rise of the Islam and the Arab influence in the 7th century stood witness to its' waning power and prosperity. As a result the Aksumite kingdom underwent a prolonged period of decline. Earlier centers such as Yeha also continued to flourish (Fig. 1).

The capital at Aksum was abandoned most probably by mid 7th century and Amhara was established as new power center in Agew territory. The southward expansion continued for a few centuries. In about 1137 the Zagwe dynasty came to power in the Christian highlands of Ethiopia. Their capital at Adefa in the Agew district of Lasta became known as Lalibela. During the last quarter of the 13th century the Zagwe ruler was driven away by the king of the Solomonic dynasty. Amhara again became the geographical and political center of the Christian kingdom of Ethiopia. The kingdom strengthened its contacts with the Mediterranean states, the Middle East and Europe. Urban settlements like Debre Libanos and Debre Birhan developed before 1500 AD. During the 16th century another type of urban civilization flourished under the suzerainty of Gonder dynasty at Gonder. Harar, Bahirdar and Jimma were exceptionally historic towns and their growth was significant in their respective regions. Urban centers like Entoto, Debre Tabor and Mekelle might have functioned as the capital of Ethiopia or of some regions for some short duration before the 19th century. However, it is almost certain that the urbanization in Ethiopia prior to the 19th century was very limited and sporadic because of the

Fig.1

nature of rural economy and village community, low level of trade and transport, lack of peace, difficult terrain conditions and the frequent transfer of military headquarters by the kings and feudal nobilities. During the 19th century and there after the powerful monarchs namely Tewodros II, Yohannes IV and Menelik II gradually reintegrated different regions of the Gonder kingdom into a modern state and resisted several challenges to their united kingdom.

Many scholars are of the view that the present form of urbanization in Ethiopia started in the 19th century during the period of Menelik II. The relative improvement in the road and communication system encouraged people to move to new areas and establishment of a few new centers. Addis Ababa was by far the most important. Some significant changes in forms

and functions of few urban areas occurred. During the early years of the 20th century many new nodal points and new centers serving the coffee growing areas had come up and the old towns such as ancient capitals and former regional centers were revived. However, according to some authors, the most severe handicap towards the growth of urbanization in Ethiopia has been the lack of enough water supply and power (Winid & Reta, 1968). The process of urbanization got a big boost when the Djibouti-Addis Ababa railway link was completed in 1917. A number of towns developed in the region served by this railway line. The development of transport and communication system, growth of construction industry and upcoming factories played a significant role in the evolution and development of some towns. The Italian occupation (1936-41) provided much needed impetus to the process of urbanization in the country. The process of urbanization accelerated as there was large scale exodus of people to relatively safer urban centers. the building of all-weather roads by the Italians, and establishment of new towns and the weakening of the rural social structure which was undergoing a transformation process. It is pertinent to mention here that colonizers, in general, developed the urban system and the transport network in their colonies without due consideration to the economic viability of the system, the economic needs of the territories and the objective of developing a well-articulated national urban system. The Italians during their short period of occupation established a large number of new towns, broadened the economic base of the existing towns without questioning the economic viability of the towns for the regions concerned or without due regard for building up a functionally integrated national urban system (Addis Ababa Report, 1996). After the Italian occupation the national government modernized the administration, introduced the tax reforms and land management and launched the program of economic development. These measures accelerated the process of urbanization in Ethiopia.

Urbanization in Ethiopia: The Present Scenario

The Central Statistical Agency (CSA) defines urban areas as 'localities with 2,000 or more inhabitants'. However in practice all administrative capitals (regional. zonal and woreda headquarters) and also localities with urban dwellers' association as well as localities whose population is primarily engaged in non-farm activities are defined as urban areas. As such a suitable geographical location, existence of administrative offices of the government and availability of basic social services and off farm economic activities are also considered to supplement the population criteria. In 1940 only about 3.0 per cent of the total population of Ethiopia lived in urban centers. This proportion increased to 8.5 in 1967, to 9.7 in 1970, to 11.4 in 1984 and to 14.6 in 1993 and to 16.08 in 2007. The pace of urbanization has not been uniform since 1960.The rapid urban expansion during 1967-75 was largely fuelled by rural urban migration while a relatively slower rate of increase in urban population during the period 1974-85 was mainly associated with natural growth of urban population. The population of

Table 2: Ethiopia: Size Distribution of Towns

City Size	Population	1960	1994	2007
Super Large Cities	> 1 million	—	1	1
Large Cities	500,000- 1 million	—	—	—
Medium Sized Cities	200,000-499,999	1	—	3
Large Towns	100,000-199,999	—	3	7
	50,000-99,999	—	9	16
Medium Sized Towns	20,000-49,999	5	30	61
	10,000-19,999	5	69	145
Small Towns	5,000-9,999	20	123	208
	2,000-4,999	43	294	325
	<2,000	310	396	161

Census-1984,1994, 2007;Surveys-1960,1995: Tsegaye & Malmberg (2010)

relatively new towns (Akaki, Arba Minch, Awasa, Bahir Dar, Jijiga, and Shashemene) increased almost three times during 1967-70 while the population of some eight other urban centers more than doubled during such a short period. Awasa, Arba Minch, Metu and Goba were newly designed capitals of administrative units. Awasa, located along the Addis Ababa-Nairobi highway, was capital of Sidamo. Newly planned town of Bahir Dar on lake Tana was a growing industrial center and the site of a technical institute. Akaki and Ased also were industrial centers. Jijiga and Shashemene developed as centers of communication and services. Metu had been an important coffee market and the capital of Illubabor province during 1978-95. The cities of Addis Ababa, Dire Dawa and Debre Zeyit experienced moderate growth. Harar, Dessie, Debre Markos and Jimma recorded rather slow growth as the potential migrants were attracted to larger centers situated near these cities. Land reforms introduced in 1975 provided opportunities to the rural population to stay in rural agricultural villages. There was a decline in rural-urban migration during 1975-80 because of travel restrictions as well as lack of employment, shortage of water as well as law and order problem in some urban centers. All the towns received a large influx of migrants during 1988-91 because of intensified warfare. Hailemariam & Adugna (2011) are of the view that rural-rural and rural-urban migration declined but urban-urban migration increased during the period 1984-1999. This resulted in overcrowding, housing shortage, unemployment, over taxed urban services and growing urban informality in Ethiopian urban areas..

As per United Nations estimate (2015) the urban population is about 19.5 per cent of the total population of Ethiopia and it has been increasing at the rate of 4.89 per cent per year. The present pattern of urbanization in Ethiopia is uneven as regards the size distribution of towns, regional distribution of number of towns

Table 3 : Ethiopia : Regional Distribution of Towns By Size (2007)

Regions	>100,000	50,000-100,00	20,000-50,000	<20,000	Total
Tigray	1	2	7	64	74
Afar	—	—	—	28	28
Amhara	3	4	11	190	208
Benishangul	—	—	1	12	13
Gambela	—	—	1	6	07
Harari	—	1	—	—	01
Oromia	3	5	24	343	375
Somali	1	—	4	64	69
SNNPR	1	4	13	131	149
Addis Ababa	1	—	—	—	01
Dire Dawa	1	—	—	1	02
TOTAL	11	16	61	839	927

Source : Compiled from the 2007 Census Data

and their size as well as the level of urbanization. The urban system is characterized by the absence of a well-structured urban hierarchy. The capital city of Addis Ababa enjoys a high degree of primacy and is 11 times larger than the 2nd largest city (Mekele). It is classified as the super large city in Ethiopian context (Table.2). Large cities (500.000—1 million population) are absent and there are only three medium-sized cities (200,000-499,999 population) and 7 large towns (100,000-199,999 population). Towns having <20,000 population constitute almost 90.4 per cent of the total number of towns and still smaller towns having less than 5,000 population each constitute 52.4 per cent of the total number of towns of the country. These small towns are economically not viable, have weak functional linkages, are generally under-staffed, have poor service provisioning capacity, suffer from poor tax revenue collection and are incapable of performing growth promoting functions. However, it is heartening to note the significant upward movement of towns to larger urban size classes and as a result the Ethiopian urban system is tending to become somewhat balanced and better articulated in future. Hallemariam & Adugna (2011) are of the view that small towns and medium-sized cities are experiencing unprecedented revival and economic renewal because of land shortages in rural Ethiopia leading to rural-urban migration. Many small towns are registering faster growth rates than large towns. The number of large towns increased from 12 in 1994 to 23 in 2007 and of medium size towns increased from 10 in 1960, to 99 in 1994 and to 206 in 2007. The number of small towns (2,000-9,999 population) increased from 63 in 1960, to 417 in 1994 and to 533 in 2007 where as the number of towns with < 2,000 population increased from 310 n 1960, to 396 in 1994 but declined to 161 in 2007.The regional distribution of towns is also very uneven (Table.3). The

Table 4: Ethiopia: Urbanization Level (% Urban) & Urban Population

Regions	1994 (%)	2007 (%)	Population Urban (000)	Regions	1994 (%)	2007 (%)	Population Urban (000)
Tigray	14.9	19.2	854	SNNPR	6.8	8.7	1,338
Afar	7.5	9.3	132	Gambela	16.7	19.4	49
Amhara	8.5	11.7	2,999	Harari	58.1	62.6	127
Oromia	10.6	13.5	3,691	Addis Ababa	98.7	100.0	3,059
Somali	13.9	17.3	768	Dire Dawa	68.3	75.0	308
Benishangul	7.8	10.0	64	ETHIOPIA	13.7	16.5	12,689

Compiled from 1994 and 2007 Census Data

central region of Oromia surrounding Addis Ababa contains more than 40 per cent of the total towns. Oromia (375), Amhara (208) and SNNPR (149) together have about four-fifths of the total towns of Ethiopia while the peripheral regions of Harari (1), Gambela (7), Benishangul (13) and Afar (28) together have only one-twentieth of the total towns. None of the towns in Afar region with inhospitable environmental conditions has population of more than 20,000 persons while those in Gambela and Benishangul regions have less than 50,000 population. The region of Harari, with its small size, has only one town of the 50,000 -100,000 size class. The growth of towns in the central regions of Oromia and Amhara may be attributed to development of physical infrastructures and social facilities, industrial developments, historico-political factors and their relatively favorable geographical environment. Oromia has benefitted from the urban-industrial overspill from Addis Ababa. Urban centers like Mekelle and Nazret have been rapidly growing because of political and administrative leverages so much so that the former has overtaken Dire Dawa as the 2nd largest city of the country. Dire Dawa has recorded faster growth earlier because of Addis Ababa-Djibouti rail link to become the 2nd largest city of the country.

There is interregional disparity in the level of urbanization as well (Table.4) The central region is the most urbanized followed by the north. The southern, the eastern and the western regions are the least urbanized. The urban regions of Addis Ababa and Dire Dawa are 100 and 75 per cent urban respectively. Peripheral regions of Afar and SNNPR are less than one-tenth urban while Benishangul is 10 per cent urban. Central region of Oromia has the largest urban population (3.69 million) with 13.5 per cent urbanization level and Amhara has about 3 million urban population with 11.7 per cent urbanization level. A higher level (62.6 per cent) of urbanization recorded in Harari and a relatively medium level (19.4 per cent) of urbanization recorded in Gambela may be attributed to the small size of the former and the sparsely settled small population of the latter. The level of urbanization has improved in all regions during 1994-2007. A gain of more than 4.0 percentage points recorded in Dire Dawa, Harari and Tigray may be because of growth of economic activities, transport

Table 5 : Addis Ababa : Occupational Structure, 2007 (10 + Year Population)

Paid Employees	67.76 (%)	Other employed persons	32.24 (%)
Private	29.76	Self-employed	27.00
Government	17.46	Unpaid family workers	1.27
Domestic workers	12.98	Apprentices,cooperative members, employers	1.01
Govt. parastatal	3.34	Others	2.96
NGOs, International employees	2.02		
Other employees	2.20		

Compiled from the 2007 Census data

improvement, political patronage and administrative reforms. The gain has been the least (1.3 percentage points) in Addis Ababa because of various diseconomies associated with excessive urbanization.

Salient Features of Ethiopian Urbanization

The national urban system is not hierarchically stratified and well articulated. There is only one *super large city* (in Ethiopian context), no *large city* and only a few *medium size cities* and *large towns*. There are a large number of *small towns* (Tsegaye & Malmberg, 2010). It is pertinent to mention that the population size is most often accepted as an important determinant of the type, nature and number of functions performed, employment opportunities generated and services provided by an urban center. The extent of functional integration and intensity of spatial interaction determine the role of an urban centre in promoting growth as well as in spatial diffusion of ideas and spread of innovations. As mentioned earlier the peripheral regions of Afar, Gambela, Benishangul and Somali have only a few towns, and mostly small ones, which provide limited services, employment opportunities and perform only administrative functions for their service areas which remain generally constricted because the urban-rural linkages happen to be weak. The small towns have been growing because of administrative reorganization and reforms as well as due to their natural increase and rural-urban migration. These small towns are not viable and in most cases have failed to promote growth and rural transformation. The slow pace and low level of urbanization in Ethiopia may partially be attributed to underdeveloped rural sector. Most of the towns function as centers of distribution of urban-industrial products, services and facilities. Tertiary activities (with informal component being somewhat dominant) are major source of employment and contributed about 43 per cent to the GDP of the country in 2009. The dominance of tertiary employment is clear from the table given (Table.5). A close perusal of the data pertaining to the occupational structure of Addis Ababa will enable the reader to safely conclude that the urban informal sector is quite significant. The process of rural-urban migration further

Table 6 : Ethiopia : Urban Housing Units, 2007

Regions	Rooms/ Housing unit	Persons/ Housing unit	Mud floor (%)	No bathing Facility (%)	No toilet Facility (%)
Country	2.10	3.9	66.0	87.1	28.2
Tigray	1.80	3.6	64.3	85.5	49.8
Afar	1.67	3.9	81.7	79.0	56.3
Amhara	1.94	3.5	86.6	93.0	37.2
Oromia	2.14	3.8	72.2	90.3	25.5
Somali	1.56	6.3	81.7	90.7	50.5
Benishangul	2.00	3.7	88.5	87.9	27.2
SNNPR	2.17	4.2	61.0	81.6	20.8
Gambela	1.73	3.8	83.6	90.2	56.3
Harari	2.00	3.5	45.8	86.1	20.4
Addis Ababa	2.42	4.2	40.0	79.7	14.2
Dire Dawa	1.81	4.1	39.6	86.9	19.9

Compiled from the 2007 Census Data

aggravates the phenomena of urban informality in small sectors like petty business, housing and wage employment. As per 2007 Census the migrants constitute 47.6 per cent of the total population of Addis Ababa. Migrants from rural areas constitute as much as 55.0 per cent of the total migrants. Female migrants from rural as well as urban areas outnumber their male counterparts. Female migrants account for 54.7 per cent of the total migrants. It may enable one to infer that these female migrants might be having an easy access to the urban informal sector for housing, casual wage employment, petty business and as street vendor in the ever expanding metropolis of Addis Ababa.

The housing conditions are equally bad in urban Ethiopia. According to 2007 Census data about 36.25 per cent of the urban housing units dump the waste in open space or behind the housing unit and another 25.89 per cent either burn or burry the waste. At the national level only 18.73 per cent of the total waste generated is collected by the municipalities. About 52.36 per cent of the total urban housing units in Ethiopia have no ceiling and another 40.04 per cent of the housing units use fabrics or polythene sheets as ceiling. In as much as 79.99 per cent of the total urban housing units the walls are made of wood or mud. This percentage is somewhat lower (76.89) in Addis Ababa. In as many as 90.84 per cent of the total urban housing units in the country the roof is made of corrugated iron sheets. This percentage is as high as 98.02 in Addis Ababa. The table shows some characteristic features of the urban housing units in Ethiopia and its 11 regions (Table.6). Majority of the urban housing units are small having on an average 2.1 rooms/ housing unit. It varies from 1.56 rooms in Somali to 2.42 rooms in Addis Ababa. It is relevant to

mention here that 44.3 per cent of the urban households have 6 or more family members. Though Somali has the smallest size of urban housing units however it accommodates the highest number of persons (6.3) per housing unit against the national average of 3.9 persons and the minimum of 3.5 persons per housing unit in Amhara and Harari regions. Nearly two-thirds of the total urban housing units have mud floors. This proportion is more than four-fifths in Benishangul, Amhara, Gambela, Afar and Somali regions. As expected this proportion is quite low in two urban regions of Addis Ababa and Dire Dawa. It clearly shows the ease of availability as well as the lower cost of building materials and a higher level of per capita income. At the national level bathing facility is not available in 87.1 per cent of the total urban housing units. This percentage is as high as 93.0 in Amhara and more than 90.0 in Somali, Oromia and Gambela regions. About 28.2 per cent of the urban housing units have no toilet facility. This percentage is as high as 56.3 in Afar and Gambela and 50.5 in Somali. As expected in urban regions of Addis Ababa and Dire Dawa it is 14.3 and 19.9 per cent respectively. The condition of urban housing is relatively better in regions having central location, larger urban centers, better transportation facilities, relatively easy availability of building materials and higher per capita income.

Urban growth in Ethiopia has been horizontal absorbing farm land, creating environmental, social and economic problems and making the development of infrastructure and provision of services much more difficult. A study of urban sprawl in Mekele city (Zemenfes, 2011) showed that the population of the town increased from 22,000 persons in 1965, to 96,938 persons in 1994 and to 215,914 persons in 2007 while the area of the city increased from 1,600 ha in 1984, to 2,304 ha in 1994 and to 7,400 ha in 2005. During 1994-2007 the population of the city grew by 122 per cent while during 1994-2005 the area of the city increased by 220 per cent. The density of population declined from 42 persons/ha in 1994 to 29 persons /ha in 2007. The population density in Addis Ababa declined from 124 persons/ha in 1975 to 62 persons/ha in 2011. The city has been devouring rural land at an alarming rate of 570 ha/year (Feyera, 2005).It has led to unnecessary destruction of local ecology. In Batu town (Oromia region) the gross urban population density is 23 persons/ ha. In Aleta Wondo town (SNNPR) the gross urban population density was about 39 persons/ ha in 2007. The low population density in towns of Ethiopia renders the provision of infrastructures and services much more difficult.

Towns in general and small towns in particular have weak economic base because of low productivity level of economic activities, dominance of informal sector, high rate of unemployment, low municipal revenue, underdeveloped municipal revenue sources, outdated tax policies and inefficient system of tax collection. The recurrent expenditures claim disproportionately larger share of municipal revenue in most of the municipalities leaving a meager amount for development works. At the national level about 33 per cent of the total urban population was below poverty line in 1995-96. It increased to 37 per cent in 1999-2000 and to 39 per cent in 2004-05. The rural poverty declined from 47 per cent to 39 per

cent during the same period (MOFED, 2008). About 2/3rd of the total population of Addis Ababa lives in slums experiencing the highest level of deprivation and vulnerability. About 51 per cent of the city population is not incorporated in the 'formal' economy of the city. As much as 36 per cent of the city population is living below the poverty line. (Zafu, 2011).There does not exist a well developed land information system (Cadaster). Housing demand far exceeds its' supply through the formal land allocation process in most of the Ethiopian towns. Hailu Hawaz (2010) found that in 2002 there were 14,500 households registered in the waiting list in Mekelle city to secure land through formal land supply system. The number of informal dwellings was 13,500 occupying 3,942 ha of farm lands which amounted to about 53 per cent of the total urban area of Mekelle. The phenomena of land scarcity, land speculation and understaffing of municipal offices lead to inefficient land utilization, loss of tax revenue to the municipalities, proliferation of slums and squatters and increase in cost of living and provision of infrastructure (Yohannes Gute, 2011). The municipal office of Batu town had a sanctioned strength of 123 employees but had only 58 employees in 2011.

In many Ethiopian towns municipalities are unable to implement urban development projects because of inefficient collection of tax revenue and ineffective enforcement mechanism. In Batu town only about 58.7 per cent of the total budget revenue from urban land rent was collected. In Aleta Wondo town the share of infrastructure plan was only 14.3 per cent of the total municipal budget in 2009-10. The average annual revenue collection during 2004-05 to 2009-10 was only 52.25 per cent of the planned revenue. It varied from 32.5 per cent in 2008-09 to 67.5 per cent in 2007-08. Worku in his field survey during March 2011 to assess the level of municipal services provided by Aleta Wondo town found that the percentage of respondents rating the services as 'weak' was 61.16 for water supply, 24.79 for municipal road network, 51.24 for solid waste disposal and 54.55 for electric power supply. The respondents attributed the weak status of services to lack of basic land information system, inefficient urban revenue mobilization initiative and lack of proper legal enforcement mechanism.

Concluding Remarks

The above discussion brings out clearly that the pattern and the pace of urbanization and the form of urban habitat in Ethiopia is not in tune with the development needs of the country. These suffer from various infirmities. The performance of Ethiopia in terms of MDGs has been quite impressive (Singh, 2012) and the Ethiopian economy has been one of the fastest growing non-oil economies of the continent of Africa however agricultural growth and industrial development are in an initial stage. Rural transformation remains still illusive. Small towns are numerous but are too small to become viable and larger urban areas are few and are bursting to their seams under excessive population pressure, financial constraints and administrative inefficiency. The national government is fully aware of the situation and is pursuing a strategy of Agricultural Development Led Industrialization

(ADLI) as well as a 'positive policy of urbanization' to remedy the situation. The government implemented a program of sustainable development and poverty reduction (SDPRP) during 2002-05, a plan for accelerated and sustainable development to end poverty (PASDEP) during 2005-06 to 2009-10) and a plan for growth and transformation (GTP) during 2010-11 to 2014-15 to promote a balanced development of the rural-agricultural and urban-industrial sectors. The national government formulated an urban development strategy with four basic objectives- support for SMEs, incentive for integrated housing development, improving access to services and strengthening functional and spatial linkages- to be achieved through good urban governance and by building capacity in the public sector at all levels and in all socio-economic sectors. Things are moving fast and the scenario is likely to improve in future.

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Housing Condition and Basic Infrastructural Facilities of Handloom Weavers – A Case Study

Tasneem Shazli and Abdul Munir

Housing which is one of the basic human needs after food and clothing, provides adequate shelter and significant socio-economic security. Along with the requirement of shelter, basic infrastructure facilities contribute a vital role in the development of quality of life. During the time of Moguls skilled Muslim weavers came to India and settled in Varanasi and nearby areas. Therefore weaving became the major occupation of Mubarakpur Town. It is gradually declining from last few decades due to economic and political reasons. The decline of handloom sector has adversely affected the socio-economic conditions of weavers. The objective of this paper is to assess the housing condition and infrastructural facilities of handloom weavers of Mubarakpur town in 2015. The study is based on primary data collected through a detailed questionnaire. Results show that housing condition and infrastructural facilities is not satisfactory in the town. The deteriorating situation is visible by going through the housing condition of the handloom weavers. The study further suggests some remedial measures for the development of housing status and infrastructure facilities of handloom weavers.

Keywords : Handloom industry, Handloom weavers, Housing condition, Indoor housing environment, Basic infrastructural facilities.

Introduction

From many years, since human being started to settle, the housing acknowledged as prime need. To live in an adequate shelter means more than a roof over one's head; it means to have a home, a place which protects privacy, contributes to physical and psychological well-being, and supports the development and social integration of its inhabitants – a central place for human life (Bonnefoy, 2007). Research on housing in the developing countries focused on the most immediate and visible housing problems: those of the urban poor, living in unauthorized houses, in slums and tenement housing nearer the center of cities, or the lower section of society (Rakodi, 1999). Housing status is one of the important indicator of regional development and portrays the socio-economic condition of a region; as it is both an economic and a social process which plays a tremendous role in the economy of the country (Beyer, 1965). The living environment of housing influences residential health (Jackson, 2003). Thus, A good

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quality of house represents vision of sound household environment, at the same time better residential condition and infrastructure facilities.

Infrastructure is the basic physical and organizational structure needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function (Wikipedia). It can be defined as "the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions (Fulmer, 2009). A basic infrastructural facility refers to the household facilities, such as durable goods, luxury commodities and services, water supply, sanitation etc.

Handloom industry is one of the oldest industries in India. It has provided livelihood to millions of rural people across the country for centuries. However, it was reduced to ashes during the colonial rule by the entry of cheap and quality cloth made in England. But after independence it started reviving due to the government intervention. At present, it contributes about 14 percent share of the total production of textile industry (Shaha, 2013). Historically, weavers were considered in high regard as skilled craftsman and artisans. A weaver's entire family is involved in the occupation of weaving. Despite several measures taken by government for the upliftment of handloom weavers, most of them are living in pathetic environment and are sustaining continuous losses. There are many problems of handloom weavers in the town like; involvement of middlemen, absence of proper marketing facilities, lack of raw material availability, inaccessibility of good quality yarn, electricity problem, and growing competition with power loom sector. The study region has also gone through all these problems and still facing the same issues in present time. The problem of Mubarakpur town is rooted in the beginning of twenty first century when the intra regional political conflicts has started which has led market downfall, consequently deteriorated the socio-economic condition.

Literature Review

The past decades has brought an increasing amount of research and numerous publications on the housing condition and its influence on health, education, infrastructure, income, mental psychology etc. An attempt has been made to give brief account of some research work related to handloom weavers; Rajkishore M. (1995) has critically examined the handloom industry and socio-economic conditions of weavers in Orissa. The study reveals that, due to lack of proper organizational efforts, the cottage industry is losing its attractive occupational status. Ayele G. & et al. (2009) have studied infrastructure and cluster development of handloom weavers in Ethiopia. The study shows that cluster activities can survive even in harsh environments with no institutions and limited infrastructure. The improvements in infrastructure can further boost labor productivity. Shaha N.V. (2013) has identified the problems and prospects of handloom industry in India. The study has formulated some policies based on socio-economic importance of the weavers in such a manner that the disadvantaged sector get the benefit on the other hand ensure the flourishing of the industry. Tawheed Yousuf et al. in 2013 have analyzed the socio economic profile of silk weavers of Srinagar city. The study reveals that the situation of the weavers is worrying as they are feeble due to illiteracy, financial

constraints, health problems, meager remuneration and poor Governmental support. An analysis of socio-economic status of handloom workers in India has been discussed by Devi (2014). The study found that the socio-economic conditions and standard of living of the handloom weavers in India is very poor. The study puts forward some policy options for improving the welfare of the handloom workers. Some of other important contributors are Srinivasachari (1965), Faridi & Fazli (2008), Devi (2011), George (2011), Ahmad & Nengroo (2013), Shazli& Munir (2014). There is a lack of direct fundamental research on housing condition and basic infrastructure facilities of handloom weavers. The present work attempts to portray the micro level analysis of housing and infrastructural status of weavers.

Study Area

The study region, Mubarakpur town is a municipal board in Azamgarh district. It is located at 26° 09' North latitudes and 83° 29' East longitudes at a distance of 13 kilometers northeast of the district headquarters (Azamgarh). This town comprises 25 wards. The town is located on alluvial tract of land in Ganga Plain of India. The town experiences a humid sub-tropical climate with an average annual rainfall of 1021.3mm. The total population of Mubarakpur town is 70,365 (2011 census) out of which 49% are males and 51% are females. This town is dominated by Muslim culture.

Aims and Objectives

The main objectives of the study are; 1) To analyze the housing condition, housing status and indoor housing environment of handloom weavers in Mubarakpur town. 2) To examine the basic infrastructural facilities possessed by handloom weavers of Mubarakpur town. 3) To discuss the problems of the housing in the city and some remedial measures for its betterment.

Data Base and Methodology

The present study is based on the primary sources of data collected by the author in 2015 through well prepared questionnaire, taking in to account of all the variables related to the housing status and infrastructural facilities of the study area. Mubarakpur Town has 6000 handloom households out of which 300 handloom households have been sampled for analysis. Random sampling has been applied in data collection for all the 25 wards. Care was also taken in the selection of handloom households that they should be truly representative of their wards. After collection of data, data were converted into the tabular form. After analyzing the tables and diagrams, inferences have been made pertaining to the housing status and infrastructural facilities of handloom weavers of the study area.

Result and Discussion

General Profile of Handloom weavers: The paper analyses the housing condition and infrastructural facilities of handloom weavers in Mubarakpur town. An overview of table 1 explains the general profile of handloom weavers, showing the distribution of sampled household population according to age, sex, religion, caste, marital status, educational status and educational level. The age structure shows that 34 percent respondents belong to 15 to 30 years of age group while almost half of the total respondents belong to 30 to 65 years of age group. 11 percent of the respondents were from juvenile while remaining 8 percent respondents belongs to senile age group. As far as the religion is concern, it has been

Location of Mubarakpur Town, Azamgarh in Uttar Pradesh

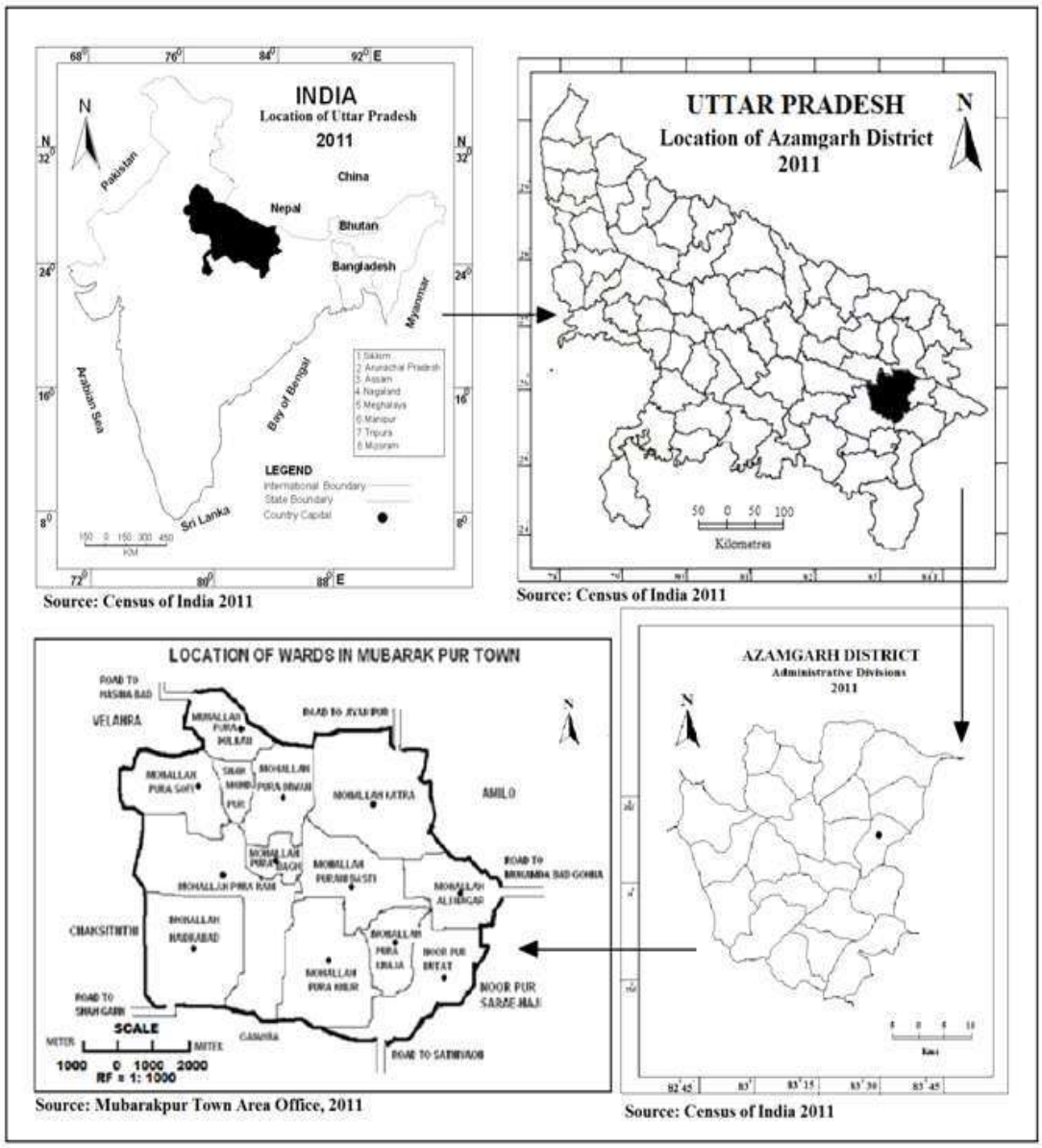


Fig. 1

observed that 93 percent of the total respondents were Muslim in the town while only 7 percent respondents were found Hindu. As regards the caste of Muslim weavers, the table reveals that 59 percent respondents were *Sunni* while 41 percent of them were *Shia*. It clearly shows that the town is dominated by

Table 1 : Distribution of the general profile of sampled households in Mubarakpur Town (2015)

Age Group	Percentage	Religion	Percentage Groups	Educational	Percentage Status
<15	11	Hindu	7	Literate	66
15-30	34	Muslim	93	Illiterate	34
30-40	22	Total	100	Total	100
40-65	25	Caste Wise Distribution of Muslim weavers		Educational Level	
>65	8	Caste	Percentage	Educational level	Percentage
Total	100	Shia	41		
Distribution of Marital Status		Sunni	59	Primary	25
	Total	100	Middle	17	
Marital Status	Percentage	Sex-Wise Distribution of respondents		High School	16
Married	62	Sex-Group	Percentage	Senior Secondary	26
Un – married	30	Male	74	Graduate	14
Widow	8	Female	26	Other cources	2
Total	100	Total	100	Total	100

Source: Based on Field Survey by the author, 2015.

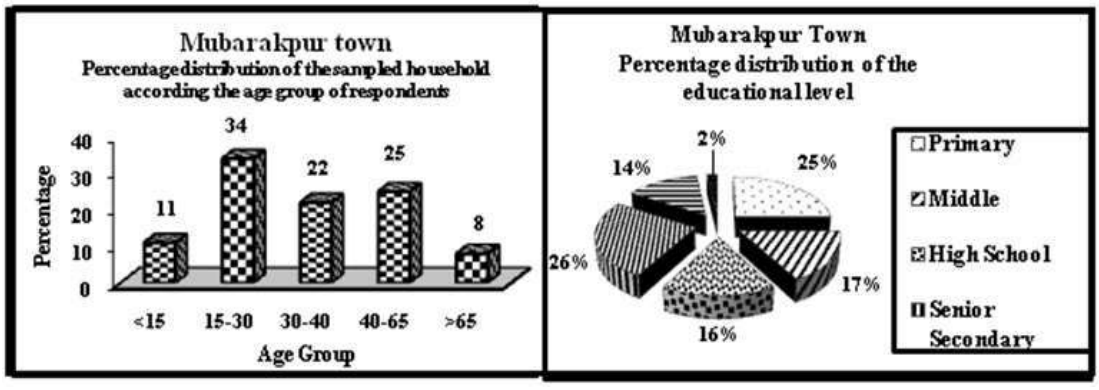


Fig. 2

Source: Based on field survey, 2015

Shia residents. The marital status of the town shows that 62 percent respondents were married. The reason was that the married people were found more interactive than the

Table 2 : Distribution of the sampled households according to the housing status of respondents in Mubarakpur Town (2015)

Status of House		Type of House		Number of rooms in the House	
Status	Percentage	Type of House	Percentage	Number of rooms in the house	Percentage
Own	84	Bricks/ Concretes	31	1	36
Rented	10	Semi-Bricks	37	2—3	48
Government	1	Semi-wood/ Jhuggi	18	3—5	10
Other	5	Wood/Jhuggi	14	>5	6
Total	100	Total	100	Total	100

Source: Based on Field Survey by the author, 2015.

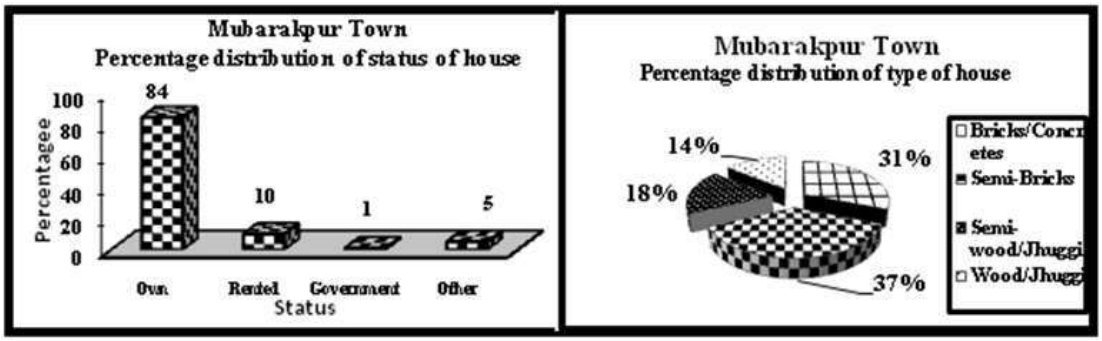


Fig. 3

Source: Based on field survey, 2015

un- married (30 percent). The educational level of the handloom weavers shows that 66 percent respondents were literate in Mubarakpur town. Majority of the old handloom weavers were considered as literate because they were able to read and write the urdu language. 34 percent of the total respondents were illiterate. It is observed that, one fourth of the total sampled handloom weavers were educated up to primary level. Almost one third of the total respondents were educated from primary to high school level. 26 percent of them were qualified up to intermediate and afterward dropout the school. 14 percent of the total handloom weavers were Graduate, belonging to young age group. Remaining 2 percent handloom weavers were educated in different type of courses.

Housing Status: Housing is one of the basic needs of man which provide adequate shelter and socio-economic security to human beings. Table 2 reveals the distribution of sampled households according to the housing status of handloom weavers. It is observed that 84 percent of the total sampled handloom

Table 3 : Distribution of sampled households according to indoor housing environment in Mubarakpur Town (2015)

Place of Cooking food		Type of fuel used for cooking	
Kitchen Type	Percentage	Type of fuels	Percentage
Separate Kitchen	38	Electric appliance/ Kerosene	17.8
Varandah	51	Wood/ Dry Leaves	39.9
Open Space	11	Coal/ Dung cake	14.1
Total	100	L.P.G	23.9
Does Smoke comes	Others	4.3	
inside from outside	Total	100	
Yes	54	Proper Ventilation	Percentage
No	46	Yes	41
Total	100	No	59
		Tota#l	100

Source: Based on Field Survey by the author, 2015.

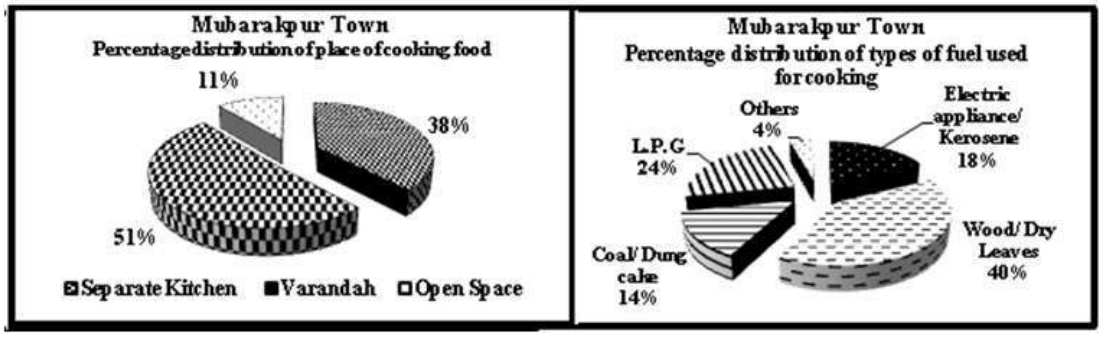


Fig. 4

Source: Based on field survey, 2015

weavers have their own houses. 10 percent of them live on rent. They generally belong to lower income group or migrated. As regards the type of house, 31 percent weavers have concrete house while 37 percent weavers reside in the semi-brick houses, remaining 32 percent weaver posses jhuggi to semi-jhuggi houses. As far as the number of rooms in the house is concern, it is observed that almost half the total weavers of the town have 2 to 3 rooms in their houses. The weavers of Mubarakpur town have large family size. This shows that the residents live in congested environment. 36 percent weavers have only one room houses, whereas 10 percent weavers lived in houses having 3 to 5 rooms within it. Only 6 percent

Table 5. Distribution of sampled households according to the Basic infrastructural facilities in Mubarakpur Town (2015)

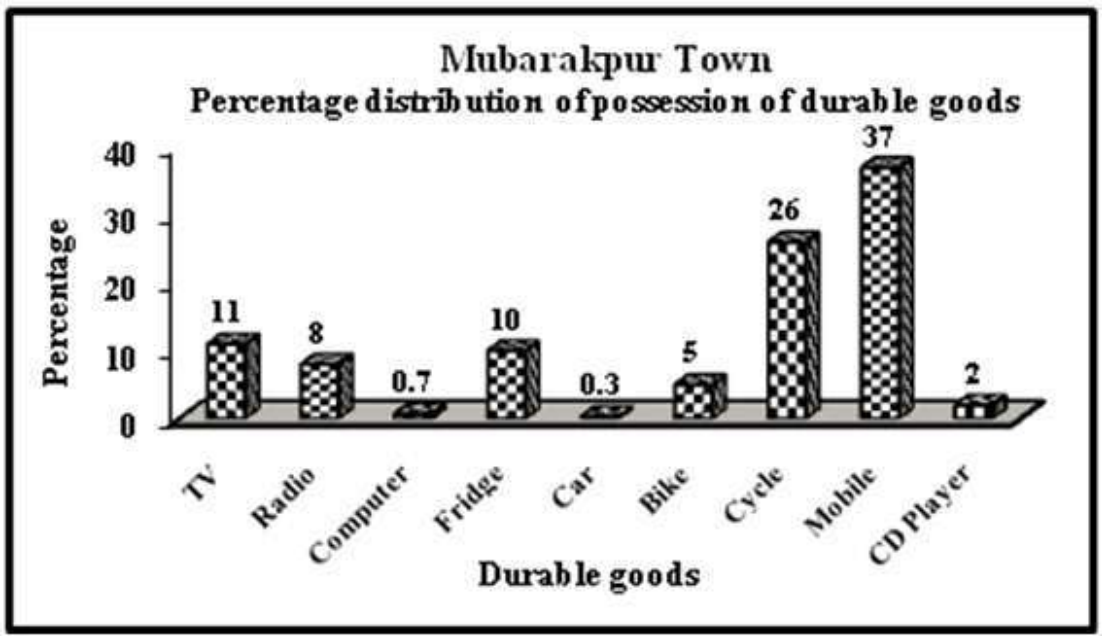
Possession of durable goods by weavers		Drinking Water Facilities	
Source of Water	Percentage	Durable goods	Percentage
		Well	—
TV	11	Handpump	79
Radio	8	Municipal Taps	21
Computer	0.7	Total	100
Fridge	10	Latrine Facilities	
Car	0.3		
Bike	5	Type of Latrine	Percentage
Cycle	26	Flush	4
Mobile	37	Field	6
CD Player	2	Public	8
Total	100	Private	82
		Total	100

Source: Based on Field Survey by the author, 2015.

weaver posses more than 5 room houses, some of them were multi floor.

Indoor Housing environment: The distribution of sampled households according to indoor housing environment has been shown in Table 3. The weavers generally spend more time within their houses for work. They posses one or two handloom either own or rented. The handloom sets are found in small rooms which are also used for residential purposes. Thus it becomes most important to keep eye on indoor housing environment of weavers. While considering the indoor housing environment of the weavers the factors which were taken into consideration was the place of cooking food, type of fuel used for cooking, proper ventilation and smoke condition. As regards the place of cooking food, it is observed that 38 percent weavers have separate kitchen while a large proportion (51 percent) cook in verandah as they don't have enough space for kitchen. 11 percent weavers cook their meal in open spaces. The weavers are not economically sound. 39.9 percent of the total sampled respondents use wood and dry leaves for cooking. 14.1 percent weavers use coal and dung cake as fuels for cooking. 17.8 percent weavers uses electric appliance like heater or kerosene stoves for cooking. Only 23.9 percent weavers have L.P.G, are economically better than others. The weavers were asked for smoke condition, 54 percent weavers said that the smoke frequently comes from outside, from neighbors' households or from adjacent streets. As far as the ventilation is concern, 41 percent weavers said that the ventilation is proper whereas 59 percent weavers found it improper.

Infrastructural Facilities: Infrastructure



Source: Based on field survey, 2015

Fig. 5

refers to the fundamental facilities providing commodities and services essential to sustain the societal condition. Table 5 portrays the distribution of sampled households according to the basic infrastructural facilities in Mubarakpur town. For this, basic infrastructure of weavers houses has been selected which clearly reveals the socio-economic condition of respondents. As far as possession of durable goods by weavers is concern, 37 percent weavers have mobile, 26 percent weaver have cycle, while 11 percent weavers have television. 10 percent of the total respondents possess refrigerator whereas 8 percent weavers have radio. The costly items such as car (0.3 percent), computer (0.7percent), Bike (5 percent), CD player (2 percent) are possessed by 8 percent of weavers. They have comparatively better housing and infrastructure. As regards the distribution of sampled household according to drinking water facilities, it may be seen that 79 percent weavers have hand-pump in their house and they avail drinking water by this. 21 percent weavers of the town have municipal taps and supply water connection. The table also shows the latrine facility of weavers. 82 percent weavers have separate latrine within their house. 8 percent weavers go to public toilet whereas 6 percent weavers go to open fields. Only 4 percent weavers of the town have flushed latrin.

Conclusion and Suggestions

The entire study shows that, the housing

condition of the weavers is not satisfactory. The town is largely dominated by Muslim community and almost half of the total Muslims residence belongs to Shia Caste. The weaving occupation started in Mubarakpur town since Moguls time when the skilled weavers from west Asian countries came to India and settled in eastern Uttar Pradesh. At present, In the number of handlooms, Azamgarh city occupies second place after Varanasi. The weavers of the town have contributed to the economic prosperity of India from long time. The town saw downfall in weaving occupation during the colonial rule, but the situation enhanced after independence. Early nineties saw the invasion of power-looms in the adjoining regions of the town, gradually reduced handloom occupation. The fast decline started after the intra Muslim riots in the town which has seriously hampered the trade.

The housing condition of weavers is affected by the continuous decline in handloom industry. Some weavers have better housing condition, still having lower economic status. The reason was told, that their income was better before some years, which has recently affected by socio-political reasons. The study shows that, the weavers have large family size; about three forth of the total sampled weavers have houses with one to three rooms. The space availability per person within the houses shows pathetic image. Some weavers live in joint family system within one house having 4 to five rooms. They also utilize their backyards as kitchen, sleeping purpose during the summer nights, as well as for keeping some animals & birds like goat, cow, buffalo and hen etc. Almost half of the total respondents use wood, coal, and dung cake as a cooking fuel, which leads to pollute indoor housing environment. As the weaving is household industry, the handloom used to be set in the living rooms and the rest half left space of rooms is used for residential purpose. The continuous weaving generates a chaotic environment of noise pollution. Thus the noise which prevails all the time reduces the hearing power especially of females and children, because they mostly spend time at home. They start to speak loud and hear loud voice. The financial constrain is a common problem among weavers. There is not enough income left to fulfill the infrastructural needs.

The root of the problem of handloom weavers goes to the declining handloom industry. For improving the housing status and infrastructural facilities of weavers, the policy makers should take some points into consideration. For example; (i) To generate awareness about diversification of products through vocational programmes; by this way they can boost their income. (ii) To develop sound channel of communication between small manufacturer and the ultimate consumer. (iii) To develop easy mode of transportation network for flourishing of this industry. (iv) To provide funds for the establishment of separate rooms where handlooms could be set out. (v) To provide regular and adequate supply of electricity for the smooth functioning of the industry. (vi) To establish the infrastructure like; qualitative schools, post graduate college, girl's school and college, centre of handloom training courses, vocational institutes, health centersgovernment hospitals etc. Thus, the current situation of housing and infrastructural

facilities of weavers of the Mubarakpur town could be coping out by applying proper management to stop the declining handloom sector.

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Composite Rank Index Method for Stratified Random Sampling in Social Science Research: A Micro-Level Case Study

Ashutosh Kumar and P.R. Sharma

In social science research, it is important to frame a sample design which is least biased to collect primary data in the field adopting Stratified Random Sampling which is very much appropriate for the classification and derive certain findings and results. However, in this sampling type, the method of stratification is a matter of confusion among the researchers. Methods adopted by the past researchers are not the same, rather they are less statistical. This confusion led me to try a fresh method in this regard for my research work. Further, I have gone through a 'Six-Steps Method' to determine different strata of Sample Units (followed by the Sample Size and Respondents Design) which is, perhaps, more appropriate for statistical analysis, scientific in nature than any other method of Stratified Random Sampling. The theme and area of the study for present case study is 'An Appraisal of Rural Development Programmes in Raghopur Block, District Supaul of Bihar'. The present paper is nothing but the illustration of this new method based on the 'Composite Rank Index'. If it is relevant, this study can also be used by others for determining the sample based on the requirements of their research objectives.

Keywords : Composite Rank Index, Rural Development Programmes, Respondents Design, Sample Size, Sample Unit, Six-Steps Method, Stratified Random Sampling.

Introduction

A research is a systematic process for searching out a new knowledge. All research is based on assumptions about how the world is perceived and how we can best come to understand it (Sharma, 2011:2). For understanding the real world events and processes or we can say of 'Universe' in research it is hard to go across the each and every events and processes of the existing Universe. Therefore, to inquire the whole Universe in cost and time affective view, the easiest way discovered by the scholars is the Sampling Method or Selection from the Universe. According to Kumar (2005:164) "Sampling is the process of selecting a few (a sample) from a bigger group (the sampling population) to become the basis for estimating or predicting the prevalence of an unknown piece of information, situation or outcome

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regarding the bigger group." Or, we can say a sample is a subgroup of the population you are interested in. Designing a sample is a part of 'Research Design' which is the plan for conducting a study. Zikmund (1988) has described research design as "a master plan specifying the methods and procedures for collecting and analyzing the needed information." In Ahuja's (2006) six-phases of research design, planning a sample is at third phase.

It is well known that a sample can never provide hundred percent accuracy in the information of any Universe. Sampling is a trade-off between certain gains and losses (Kumar, 2005). If a piece of information from the total sampling population is ascertained and if the method of inquiry is correct than the finding should be reasonably accurate. In case, if a sample is selected and used as the basis from which to estimate the total population situation, an error is possible. Therefore, tolerance of this possibility of error is an important consideration in selecting a sample.

Among the different types of sampling, random or probability sampling is widely used by the social-Science researchers due to more statistics by nature which make a chance of selection for all and hence, is more relevant for better result with least biasness. In the same way, the Stratified Random Sampling is mostly preferred method of sampling amongst the all types of Random sampling. In Stratified Random Sampling, one attempt is to stratify the population in such a way that the population within a stratum is homogeneous with respect to the characteristics on the basis of which it is being stratified. On the other hand, it is also important that the characteristics chosen as the basis of stratification are clearly identifiable in the Universe. After all discussion about Stratified Random Sampling, a question rises that, "Is there any appropriate statistical method for classification of the Universe into Certain Strata?"

In social science research, it is important to frame a sample design which is least biased to collect primary data in the field. Stratified Random Sampling is being used much appropriately for this purpose. However, in this sampling type the method of stratification is a matter of confusion among the researchers. Methods adopted by the past researchers (Ratawa, 2010; Jain, 2011; Sharma, 2012; and many others) are not the same, rather they are less statistical. This confusion led me to try a fresh method in this regard for my research work. I have gone through a 'Six-Steps Method' to determine different strata of Sample Units (followed by the Sample Size and Respondents Design) which is, perhaps, more statistical than any other method of Stratified Random Sampling. The theme and area of the study for present case study is 'An Appraisal of Rural Development Programmes in Raghopur Block, District Supaul of Bihar'. The theme is based on program evaluation, which refers to the use of suitable research methods to measure the effectiveness of operative programmes (Rutman, 1980:17). In another book, edited by Rutman (1977:16), he also defines evaluation research as: 'a process of applying scientific procedure to accumulate reliable and valid evidence in the manner and the extent to which specific activities produce particular effects or outcomes.' Therefore, it is necessary to adopt an appropriate method to select such reliable and valid evidences from the field. The present paper is nothing but the illustration of this new method based on the

'Composite Rank Index'. If it is relevant, this study can also be used by others for determining the sample based on the requirements of their research objectives.

Objectives of the Study

The two interlinked objectives are the following of this study:

A. to introduce a new method for Stratified Random Sampling in Social Science Research, and

B. to identify the sample size for an appraisal of Rural Development Programmes in Raghopur Block, District - Supaul of Bihar

Study Area and Theme of Present Case Study

The study area (Raghopur) is one of the eleven blocks of district - Supaul, situated in the Kosi plain of north Bihar stretching from 26° 29' 68" N to 26° 30' 34" N and 86° 83' 37" E to 86° 84' 24" E and known for its backwardness and flood vulnerability. The Block consists of eighteen Panchayats and 58 Villages with an area of 21167 hectares (211.67 Sq. Km). The population is 215643 persons (2011) of which male population shares 51.54 per cent. In 2011, the average density of population is 10 persons per hectare (Census of India, 2011).

As it is clear from the second objective of this paper, the theme of the study of sampling method is "An Appraisal of Rural Development Programmes in Raghopur Block, District - Supaul of Bihar". This study is based on both the primary and secondary sources of data. To collect primary data from the field, it is important to frame a sample design which is least biased. I have gone through several previous works and literatures for suitable sample design method for my study and came to the conclusion that Stratified Random Sampling is the most appropriate method for above mentioned theme. But, the problem arises that, 'how to identify the level of Strata and at what basis the selection of Sample will be randomly?' To overcome this problem, I have decided to calculate Composite Rank of all the sample units (Panchayats of Raghopur) for selected eight indicators. After calculating composite rank of all the units I have able to form Composite Rank Index. Further, with the help of Standard Deviation, three levels of strata have been identified which have classified all the sample units: high; moderate and low level of Strata. In this way, the Method of Composite Rank Index helps me in clear demarcation of Strata after which it becomes very easy to determine the Sample Size for my work by using stratified Random Sampling.

Methodology

The present work of classification of 'Sample Units' into different strata for Stratified Random Sampling to determine the least biased 'Sample Size' by using Composite Rank Index (CRI) is based on following Six-Steps Methodology:

Step 1: Selection of Characteristics of Population or Indictors as the basis of stratification

Step 2: Arrangement of Secondary data regarding the selected indicators for Sample Units

Step 3: Computation of CRI of all Sample Units (Table 1)

Step 4: Classification of Sample Units into three major Strata on the basis of CRI (Table 2)

Step 5: Shortlisting of Samples from each classified Strata at required proportion or Determination of Sample Size (Table 3; 4 and Fig. 1)

Step 6: Designing the Respondents or 'Respondent's Design' (Table 5)

Micro-Level Case Study (Raghopur Block)

As it is discussed earlier, that the present study is being conducted on Raghopur Block of District Supaul for the appraisal of rural development programmes. It is clear from the methodology that this study framed on the basis of Six-Steps. Therefore, it is important to discuss each steps one by one to clarify the whole process.

Step 1: Selection of Characteristics of Population or Indictors as the basis of stratification

For the calculation of CRI it is necessary to follow the first step. Although, there are several characteristics of Sample Unit which can be considered as the base of the stratification but few are the comparatively more relevant in terms of access of their secondary information to be collected from different sources and their validity for stratification. Keeping this issue in the mind, I decided to select eight indicators for the case study. These eight indicators (X1…..X8) are as follows:

X1: Population Size of the households (Persons/Households)

X2: Population of Scheduled Castes

X3: Total Literacy Rate

X4: Percent of Female Literacy

X5: Total Working Population

X6: Main-Working Population

X7: Percentage of Female in total main-working Population, and

X8: Percentage of Households below Poverty Line (BPL)

All the indicators have measured on ordinal or ranking scale, which is, one of the four widely adopted measurement scale constructed by S.S. Stevens (Baily, 1978: 52)

Step 2: Arrangement of Secondary data regarding selected indicators for Sample Units

After shortlisting of the indicators in first step, regarding data for each Sample Units (18 Panchayats of Raghopur) have been collected from the Census of India, 2011 (Patna, Bihar) and from the Office of Block Development Officer, Raghopur (BPL data, 2010). These secondary data have been further processed into Excel Sheets-2013 to arrange and obtain the relative as well as comparative figures.

Step 3: Computation of CRI of all Sample Units

After arrangement of secondary data of all the eight indicators per Sample Unit, all the eighteen Panchayats have provided their specific rank in positive order (Table 1). Average rank have been calculated for each Panchayat which helped into the formulation of Composite Rank Index (X) of all the cases of Universe (Table 1).

Step 4: Classification of Sample Units into three major Strata on the basis of CRI

After calculating the Mean ($x^- = 9$) and Standard Deviation (S.D = 4.76) of the Composite Rank all the Sample Units have been

Table 1: Composite Rank (X) of Development Variables for Panchayats of Raghopur

Sl No.	Panchayat	Rank of Indicators (In Positive order)*								Average Rank	Composite Rank (X)	$(X-X)^2$ {X=9}
		X1	X2	X3	X4	X5	X6	X7	X8			
1	Bauraha	10	9	13	15	14	2	1	12	9.50	10	1
2	Bisanpur Daulat	11	7	11	12	10	7	12	5	9.38	9	0
3	Champa Nagar	3	4	17	13	16	14	11	9	10.88	13	16
4	Devipur	5	13	10	9	6	11	14	18	10.75	12	9
5	Dharahara	4	14	6	5	7	6	7	14	7.88	5	16
6	Dumari	17	1	14	7	8	16	13	16	11.50	14	25
7	Haripur	8	3	18	14	18	12	16	8	12.13	16	49
8	Hariraha	9	12	12	6	9	5	4	3	7.50	4	25
9	Hulas	12	15	15	17	15	15	8	2	12.38	9	0
10	Karjain	1	16	1	4	3	9	9	6	6.13	2	49
11	Motipur	18	11	3	11	4	3	2	15	8.38	7	4
12	Parmanandpur	2	10	8	18	1	18	18	10	10.63	11	4
13	Phenglas	14	5	7	10	5	10	6	17	9.25	8	1
14	Piprahi	6	18	2	2	12	4	5	7	7.00	3	36
15	Raghopur	13	6	5	3	11	8	17	1	8.00	6	9
16	Ram Bishunpur	16	2	16	16	13	13	10	11	12.13	17	64
17	Simrahi	7	8	4	1	17	1	3	4	5.63	1	64
18	Baisi	15	17	9	8	2	17	15	13	12.00	15	36
	Total											408

Source: Computed by the Authors, 2015 (Based on Census Data, 2011 & Data from B.D.O office)
*X1……..X8 see the text in Step 1.
(Note: After calculation the Mean value of Composite Rank is 9 and S.D (Standard Deviation) is 4.76)

classified into three Level of Strata: High; Moderate and Low Level Strata (Table 2). If the Composite Rank of Sample Units range between -0.52 to 4.24 (1 to 4), the Units will fall in to high level of strata. Three Panchayats come under this strata i.e., Piprahi, Karjain and Simrahi. The Units range between 4.24 to 13.76 (4 to 14) belong to the moderate level of strata, while the units between the range of 13.76 to 18.52 (14 to 19) fall under the low level strata. Five Panchayats belong to this low level.

Step 5: Shortlisting of Samples from each classified Strata at required proportion or Determination of Sample Size

This step is the composition of following :

Step 5.1: Randomly selection of Panchayats from each classified level of Strata as their closer representatives at required proportion (Table 2)

Step 5.2: Randomly selection of Villages for Sampling out of total village of selected

Table 2. Classification of Sample Units (Panchayats) based on Composite Rank Method

Sl. No.	Levels of Strata	Statistical Range	Composite Rank	Name of Panchayats
1.	High	x-2S.D to x - S.D	-0.52 to 4	Piprahi, Karjain, Simrahi
2.	Moderate	x - S.D to x + S.D	4to 14	Champanagar, Devipur, Parmanandpur, Bauraha, Bisanpur Daulat, Phenglas, Motipur, Raghopur, Dharahara, Hariraha
3.	Low	x + S.D to x + 2S.D	14 to 19	Dumari, Baisi, Haripur, Ram Bishunpur, Hulas

Note: Panchayats in bold letters have been selected as Sample Panchayats.

Table 3. Selection of Sample Villages out of Selected Panchayats

Sl. No.	Selected Panchyats	Total No. of Villages	No. of Sample Villages (40% of the total)
1	Simrahi	1	1
2	Karjain	6	3
3	Champanagar	7	3
4	Bauraha	3	1
5	Phenglas	5	2
6	Raghopur	3	1
7	Dharahara	1	1
8	Baisi	3	1
9	Ram Bishunpur	3	1
10	Hulas	2	1
	Total		34 15

Source: Opted by the Authors, 2015.

Panchayats at equal proportion (Table 3)

Step 5.3: Determination of Sample Households Size for each selected Village at the same proportion (Table 4)

In the first sub-step of the fifth step, about fifty percent of the total eighteen Panchayats (10 Panchayats) have been shortlisted for next stage sampling. Since, the objective of the present sampling is to appraise the rural development programmes, much consideration has been given to the Panchayats of Moderate level strata. This is the reason that the proportion of selected Panchayats are maximum in Moderate level and minimum in high level of classified strata (Table 2). In the second sub-step (5.2) forty percent Villages (15) have Randomly selected for Sampling out of total villages of each selected Panchayats (Table 3).

In the sub-step (5.3) Sample Households Size have been determined for each selected Village at the equal proportion of three percent of total households per selected village (Table 4). In this way the total sample household size for the study is 519. The location of sample villages and the distribution of sample households, as shown in Fig.1, well illustrates the spatial location and their variations.

Step 6: Designing the Respondents or 'Respondent's Design'

The process of sampling do not get an end at household level rather it is further important to design the nature and structure of the proposed respondents for questioning.

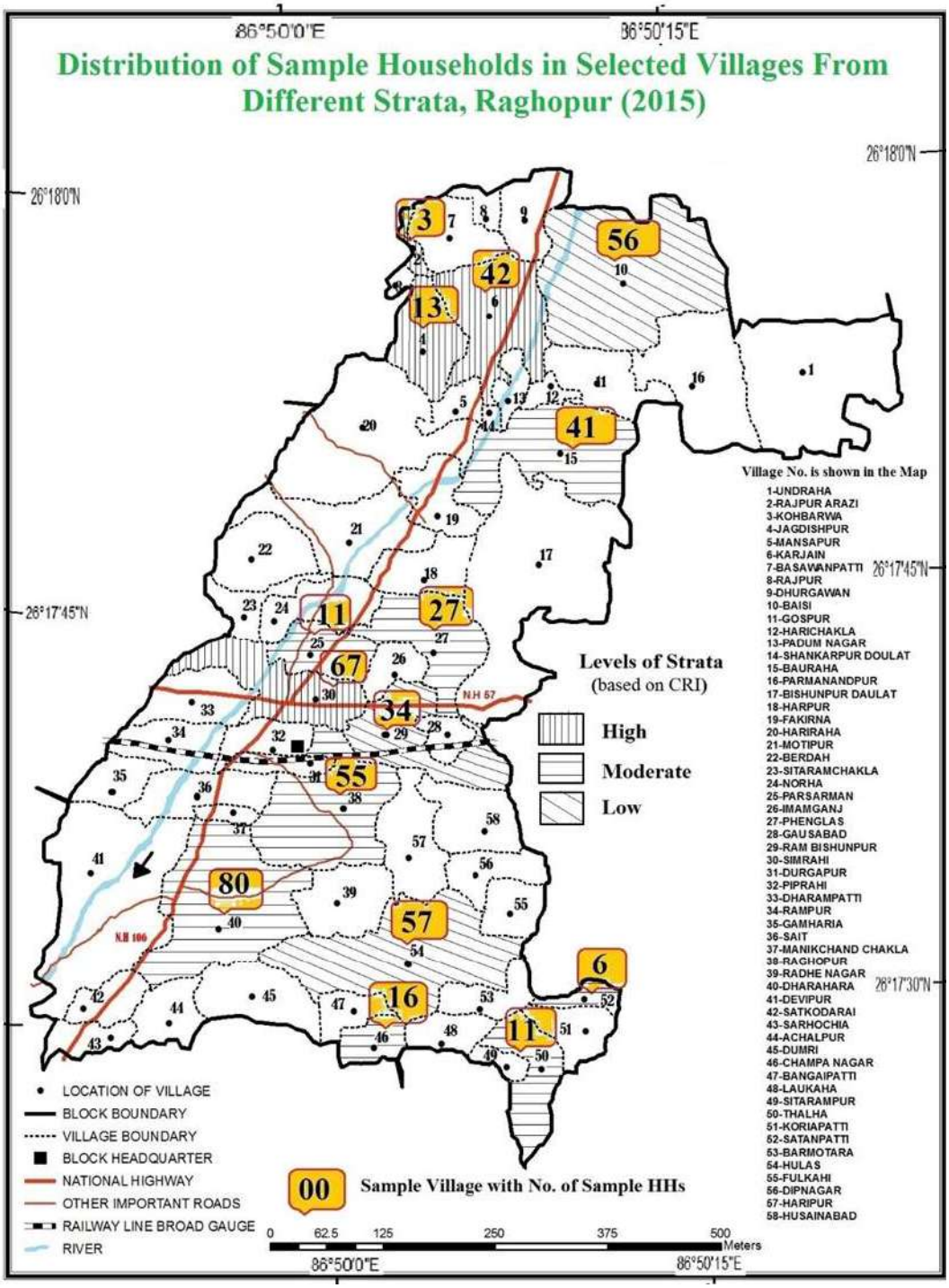
Distribution of Sample Households in Selected Villages From Different Strata, Raghopur (2015)
86°50'0"E
86°50'15"E
26°18'0"N
26°17'45"N
26°17'30"N
Levels of Strata
(based on CRI)
High
Moderate
Low
Village No. is shown in the Map
1-UNDRAHA
2-RAJPUR ARAZI
3-KOHBARWA
4-JAGDISHPUR
5-MANSAPUR
6-KARJAIN
7-BASAWANPATTI
8-RAJPUR
9-DHURGAWAN
10-BAISI
11-GOSPUR
12-HARICHAKLA
13-PADUM NAGAR
14-SHANKARPUR DOULAT
15-BAURAHA
16-PARMANANDPUR
17-BISHUNPUR DAULAT
18-HARPUR
19-FAKIRNA
20-HARIRAHA
21-MOTIPUR
22-BERDAH
23-SITARAMCHAKLA
24-NORHA
25-PARSARMAN
26-IMAMGANJ
27-PHENGLAS
28-GAUSABAD
29-RAM BISHUNPUR
30-SIMRAHI
31-DURGAPUR
32-PIPRAHI
33-DHARAMPATTI
34-RAMPUR
35-GAMHARIA
36-SAIT
37-MANIKCHAND CHAKLA
38-RAGHOPUR
39-RADHE NAGAR
40-DHARAHARA
41-DEVIPUR
42-SATKODARAI
43-SARHOCHIA
44-ACHALPUR
45-DUMRI
46-CHAMPA NAGAR
47-BANGAIPATTI
48-LAUKAHA
49-SITARAMPUR
50-THALHA
51-KORIAPATTI
52-SATANPATTI
53-BARMOTARA
54-HULAS
55-FULKAHI
56-DIPNAGAR
57-HARIPUR
58-HUSAINABAD
LOCATION OF VILLAGE
BLOCK BOUNDARY
VILLAGE BOUNDARY
BLOCK HEADQUARTER
NATIONAL HIGHWAY
OTHER IMPORTANT ROADS
RAILWAY LINE BROAD GAUGE
RIVER
00
Sample Village with No. of Sample HHs
0 62.5 125 250 375 500 Meters
N.H 67
N.H 106

Fig. 1

Table 4 : Number of Sample Households per Selected Villages

SL. No.	Sample Villages	Total HHs (2011)	Total Population (2011)	No. of Sample HHs (3% of total HHs)
1	Baisi	1850	9862	56
2	Ram Bishunpur	1137	6358	34
3	Hulas	1905	9949	57
4	Champa Nagar	534	2640	16
5	Thalha	387	1875	11
6	Satanpatti	200	948	6
7	Raghopur	1819	9534	55
8	Bauraha	1375	6967	41
9	Phenglash	913	5092	27
10	Parsarman	382	2176	11
11	Dharahara	2665	13417	80
12	Karjain	1415	7111	42
13	Jagdishpur	434	2159	13
14	Rajpur Arazi	97	402	3
15	Simrahi	2233	11415	67
	Total	17,346		519

Source: Opted by the authors, 2015.

Therefore, the final step of the present method of sampling is the 'Respondent Design'. In other words, the final step of sample selection is to finalize the proportion of respondents from those desired groups which may affect the nature of respondents in general and accuracy of information to be collected from them in particular. The accuracy of data or information in a primary survey is highly relying over the nature and structure of respondents who are mainly the source of primary information. Therefore, it is important to frame a proposed structure of respondents from each Sample Unit before the field survey. The nature and structure of respondents should be based on the research objectives and hypotheses. For an example, ifprimary objective of a research is to study the socio-economic condition of rural poor, hence, it is not necessary to make a respondents of above poverty line. It is most important to focus only on respondents belonging to the group of below poverty line (BPL). Similarly, there are several groups which act as issues in selection of respondents among the sample households. Among these issues few are more common to be considered by the researchers of Social-Sciences in determining the structure of their respondents during primary data collection:

On the basis of the issues illustrated above, the desired respondents have been designed in Table 5. In the gender issue, the priority has been given to the male respondents to avoid the complexity raised during the

Issues in Selection of Respondents among the Sample Households

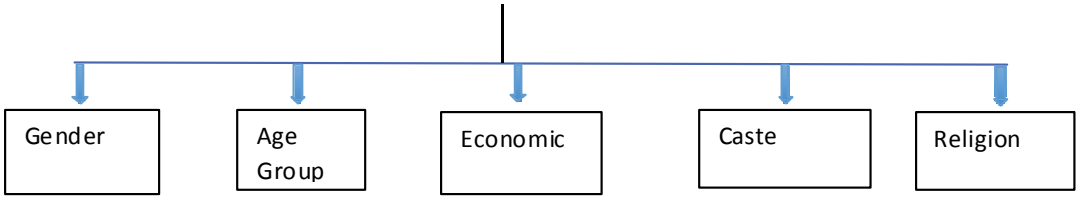

Table 5: Respondents Design for Data Collection, Raghopur Block (2015)

Total No. of Respondents	Proportion of Respondents Selected among different Groups													
	Gender		Age Group			Economic		Caste			Religion		
	Male	Fem	15-30	31-60	>60	BPL	APL	Gen.	OBC	SC/ST	Hin.	Musl.	Other
519	311	208	156	311	52	441	78	167	238	114	458	61	00
(In %)	60	40	30	60	10	85	15	32	46	22	88	12	00

Source: Calculated by authors (2015).

questioning from female body. In case of age group the more attention has been provided to the working group of adult persons because of much clear information. Though the major objective is inclined to the rural development, it is necessary to give emphasis on BPL family. Other two issues, i.e., caste and religion are taken into consideration on the basis of their relative composition.

Conclusion

This paper analyses and introduces a Six-Steps method to determine different strata of Sample Units (followed by the Sample Size and Respondent's Design) which is, more conventional in use and statistical in nature in adopting Stratified Random Sampling. The Six-Steps method clearly explains the method of Sample design by using CRI Method for identifying the strata. The whole sample units have been classified into three level of strata: High; Moderate and Low level of strata. The theme and area of the study for present paper is "An Appraisal of Rural Development Programmes in Raghopur Block, District Supaul of Bihar". The Sample Size for the study of this theme have been determined as 519 Households from fifteen randomly selected Villages after the identification of strata by CRI method. In this way the present Six-Steps method have been adopted in determining the sample size as well as the Respondents Design. If it is relevant, this study can also be used by others for determining the sample based on the requirements of their research objectives.

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Out of School/ Dropout Children In Dharwad District, Karnataka State: A Geographical Study

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Although India has made a remarkable progress in the field of literacy and education during the preceding decades (1991-2011) and it has achieved 74.04% of literacy as per 2011 census, yet the task of universalising the elementary education in the country is not complete. Since, even today 40% of the children are out of school or deprived of elementary education. In the study area of Dharwad district also number of dropouts in increasing year by year. If it continues at the same rate, at least two results of the dropout situation are threats to the society as well as to the individual concerned. One is delinquent and criminal behavior. And second concern of the society lies in the vicious circle of the same kinds of families being reproduced in the subsequent generations.

With the numbers of dropouts growing now, there is urgent need to address the problem. Thus, the present piece of work makes an effort to study present scenario of dropout children in Dharwad district of Karnataka State with the help of simple statistical methods by conducting field survey and by collecting secondary data with an aim that by studying the causes and effects the problem of dropouts in Dharwad district, we can suggest better measures for its minimization.

Keywords : OOSC, Dropout rate, Sarva Shishksan Abhiyan(SSA), Absenteeism**,** Retention.

Introduction

Discontinuation of education or dropouts as it is often called at school level is a serious problem in our country. The term dropout under normal circumstances, indicates continuous absenteeism of a child to school But the duration of absenteeism varies according to the adopted frame of time. At 1990 world conference on education for all, Indian government agreed to a broad range of education goals including that of attainment of universal primary education (UPE) by the year 2000. Sadly the millennium year had come and gone but the UPE goal is still a distant dream in India. The millennium development goal as drawn up by the UN now directs nations to ensure that all boys and girls complete a full course in primary education by the year 2015. While the government has been making concerted efforts aimed at expanding the reach of education, the phenomenon of school dropouts remains a blot on the progress of

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education in India. What is cause for particular concern is the enormity of the problem in all states of the Indian union and at all stages of school education where unacceptably high dropout rates have been reported. Another disturbing angle of dropout statistics is the fact that dropout rates have consistently remained higher for girls as compare to boys.

The problem of dropping out from the school has far reaching implications. At the individual level, a student who does not complete school education severely restricts his adult earning potential. In any social interaction-be it operating a bank account, setting up of an enterprise or taking advantage of government schemes, these people find themselves terribly disadvantaged. Simply put, they lose out in the race for self advancement being unable to leverage the opportunities available to lead a healthy and continued life. Besides dropouts cost the nation money. Dropouts are less likely to find and hold that pay enough to keep them off public assistance. Even if they find a job, dropouts earn substantially less than high school graduates.

There are many evidences which suggest that a significant proportion of our way ward citizens are in fact school dropouts. This is more so true in the case of lower level functionaries. Above all dropouts engage in crime, have poorer health and have lower rates of inter generational mobility and lower rates of political participation [Rumberger, 1983]. A member of a Board of Education of a large city reported that truants and dropouts accounted for 90 percent of the juvenile crime in that area. Such delinquent acts as are being committed on the streets are, in part, attempts to get money, to forget reality, to get status, and to get revenge. Apart from this, female dropout is a cause for greater concern in a country like India which has the problem of burgeoning population. The positive association between female education and decline in fertility, infant and child morality has been well established [Kingdom 1999; World Bank 1997]. Finally it may lead to the vicious circle of the same kinds of families being reproduced in the subsequent generation. Thus, with the numbers of dropouts growing now, there is urgent need to address the problem.

Review of Literature

Most of the studies on dropouts in India have been based upon large administrative surveys which typically provide limited information on individual dropout characteristics, their ways of life and conduct. An attempt has therefore been made in the present study to correct these lacunae.

The study makes an attempt to review the available literature on dropout children at present. As such there is dearth of literature in Geography. There are very few geographers who have thrown light on the problem of dropouts. Thus, the present study has borrowed ideas from books and journals of other social sciences such as Economics and Sociology etc. Various websites which are giving lot of details about the dropouts also have been referred here.

Objective of the study

Aim of the study was to identify the reasons of school dropout at primary and secondary level and suggest strategy to improve the situation. Within the broad framework the major objectives of the study are

1. To know the distribution and trends in growth of drop out children in the study area
2. To find out the reasons of leaving the

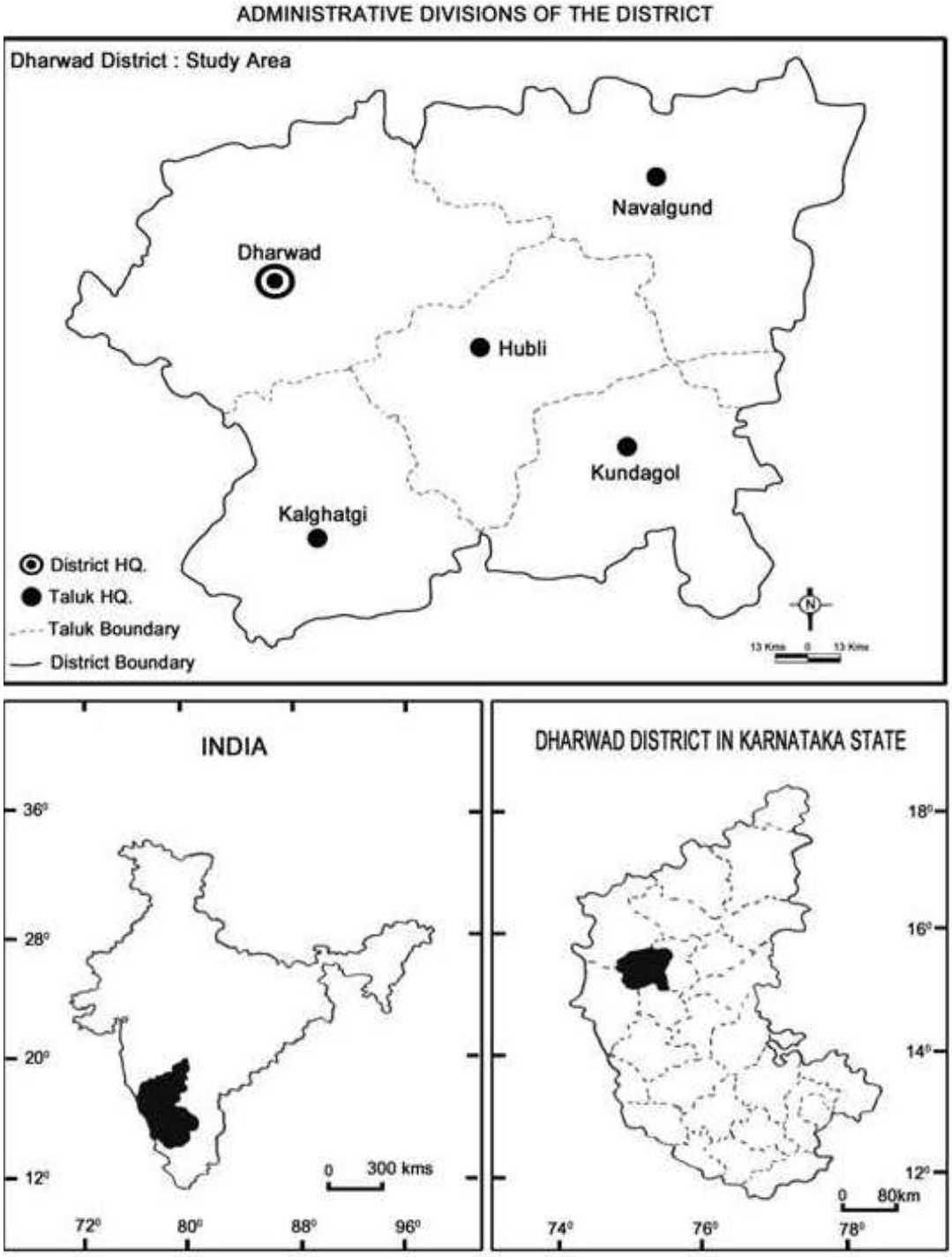
ADMINISTRATIVE DIVISIONS OF THE DISTRICT
Dharwad District : Study Area
Navalgund
Dharwad
Hubli
Kundagol
Kalghatgi
District HQ.
Taluk HQ.
Taluk Boundary
District Boundary
INDIA
36°
28°
20°
12°
0 300 kms
72°
80°
88°
96°
DHARWAD DISTRICT IN KARNATAKA STATE
18°
16°
14°
12°
0 80km
74°
76°
78°

Fig. 1

school or dropping out from the school and the present status of the OOS Children.

3. To identify the main reasons related with attitude of parents or their economic conditions.

4. To identify the main reasons related with behavior of children and to suggest measures to improve the condition of the drop out children.

Study Area

Dharwad district lies between 15° 152 to 15° 352 North latitude and 75° 02 to 75° 202 East longitude. It covers an area of 4263 Sq Kms., which is 2.22% of the states geographical area. The district is divided into 5 taluks and is under administrative control of Belgaum division (Fig.1). Total population of the district is 18.46 lakh according to 2011 census, out of which 8.23 lakh are males and 7.8 lakh are females. Dharwd ranks 16th in population size and 25th in areal in the state. Dharwad district has very high annual average percentage of dropouts i.e 8.07% in the state.

Data base and methodology

The study was conducted in a holistic manner, in order to comprehend various inter-related issues pertaining to school drop-out rate at primary school level. To understand the drop-out rate and its causes, primary and secondary data were collected on various dimensions of drop-out of school children at primary level of school. The study is based on empirical investigation conducted in selected rural and urban locations of the identified district.

The methods of research/investigations of Primary Data included:

(i) Household level survey;

(ii) In-depth Discussion with Government officials and school dropouts.

Collection of Primary Data had to be kept within limits of permissible time and cost of the study. Secondary data pertinent to the study were also collected, reviewed and analyzed to achieve the objectives of the study Supplementary secondary information was collected from the records of educational offices of district.

Indian Scenario

India has the second largest educational system in the world after China wherein more than 1 million primary and secondary schools cater to the educational needs of the Indian children. Children constitute over one-third of India's population of 1.21 billion people, which means India is home to 400 million children. Net Enrollment Ratio (NER) at the Upper Primary Elementary Level in government schools in India is only 58.3%

The incidence of dropouts among adults is very high. Only 17 per cent of adult (aged 15 and above) in rural India complete middle school (Shariff, 1999). The corresponding figure for completing matriculation was 12 per cent by boys and 5 per cent for girls (aged 17 and above). The problem of dropouts in India's countryside is very serious. This incidence of dropouts is obviously higher among girls than that among boys. Only 52 girls every 100 boys in rural India are able to complete middle school level of education. The National Sample Survey 61st round (2006) highlighted predominant reasons for those who left education before completion. The reasons so stated in the survey report are: need for supplementing household income for males, and household chores for females, in addition to the fact that education is not considered necessary by many.

Sarva Shiksha Abhiyan

Sarva Shiksha Abhiyan is an effort of the government to universalize elementary education by community-ownership of the school system. This scheme was implemented to provide useful and relevant elementary education for all children in the 6 to 14 age group by 2010. The Sarva Shiksha Abihyan (SSA) which recently held a survey on the Gender Disparity and Dropout rates in India has revealed the record which explains that in a typical Indian family, the son almost always gets special interest and care. According to the status of education in India it also highlights that parents prefer to send their sons to Private schools where as the girl is sent to Government schools.

Ground realities

Even though India has achieved almost 100 percent access to school for its children at the primary level, it has a high 40 percent dropout rate at the elementary level. The country has failed to meet the target set in the 11th five year plan that is reduction in dropout rates from 50 percent to 20 percent at the elementary level. The study by non-governmental organization chief rights and you (CRY) said. Besides, the quality of education continues to remain a matter of concern, both in terms of infrastructure as well as teaching and learning out comes.

It is not only a problem of the high dropout rate but the high rate of non-enrolment which is the reason for the educational deprivation of children. Wastage and stagnation have been other major problem in the field of primary and middle school education. Premature withdrawal of a student from school before completion of the last class/grade leads to wastage, while stagnation implies retention of a student in a class for more than the required period of stay due to unsatisfactory progress.

Although, our government is spending crores of rupees on education, still there is gap in India's educational expenditure. Educational statistics point out that even today every village does not have primary school. India's education system expanded exponentially over the past five decades. However, its current achievements are grossly inadequate for the nation to realize its potential greatness. India's enrolment rate - cutting across gender, region, class, caste, states, rural-urban divides - has witnessed remarkable improvement in the last decades of 20th century. However, gap remains in retention rate/checking of dropout rates In addition to gender inequality in all educational issues, there are great inter region, interstate even inter district variations in Rate, Enrolment Rate, Drop-out Rate etc.

Constitutional responsibility and efforts

Article 45 of the constitution and the 83rdConstitutional Amendment bill, 1997 seeks to provide free education for all children up to the age of 14 years as a Fundamental Right. National Policy on Education (NPE) 1992 redefined the educational priorities and made an attempt to address the issue of access, quality and equity in educational processes. Program of Action (POA) 1992 has emphasized that enrollment by itself is of no importance if child does not continue education. Hence, retention of a child in the school till elementary education is completed assumes importance. Continuous absenteeism and the dropout rate are certain pertinent issues to be addressed before providing quality education. Thus, dropout of children is a matter of concern.

Major hurdles of Elementary Education

Learning Environment i.e. Physical infrastructures of the schools, including classroom facilities, drinking water, and toilets etc., distance from home, the available funds for education for teachers, their capacity building as well as the cost of continuing teacher's education - though distance learning etc. are not available. Social Attitude towards education especially of girls education, are some of the major constraints in continuation of schooling by the students.

NSSO data from the 52nd round also provides information on the reasons for dropping out. Child not interested in studies accounts for the highest proportion of dropouts in rural (37percent) and urban (37percent) area and for both male and female children. "Parents not interested in studies" affect the female child more in rural (17percent) and urban (11percent) areas .Inability to cope with the demands of schooling has a somewhat equal effect on boys and girl in rural (11percent) and urban (13percent) areas and is one of the important reasons for dropping out. A larger proportion of female children in urban areas (5.6percent) dropout because of the need to work for wages/salaries to supplement the family income

Current Status of Primary Education in Karnataka State

Karnataka has achieved 75.60% of literacy as per 2011 census which is higher than the national average. 82.85% of males and 68.13% of females are literates in our state. Primary education is not free even in government run schools of Karnataka, as the parents have to spend on stationery, transport, uniforms etc. With all state government's efforts to universalize primary education by providing mid day meals, free books and uniforms and learning materials, many districts are still lagging behind in the race. According to a survey suggested by High court of Karnataka state-2015, there are 1.70 lakh dropout children in the state. Among them 35% of the children are belonging to ST/SC community while 28.3% are from minority group. Number of dropout children is very high in Hyderabad Karnataka region. Districts such as Bidar, Kalaburgi, Yadgiri, Bellary and Raichur are having large number dropout children.

Dropouts in Dharwad District

It is very interesting to know that Dharwad district has recorded 80.30% of literacy where male literacy rate is 86.83% and female literacy is 73.57% as [er 2011 census. It one among the seven districts which have achieved literacy more than 80% and it ranks seventh in literacy rate in our Karnataka state. Above all district head quarter Dharwad city is known as'Vidhya Kashi" as it great centre of learning in northern part of Karnataka State. Contrast to this annual average dropout rate of school children is very high in Dharwad district.

According to the report published by District Education Department, number of dropout children in Dharwad district is dwindling in the year 2011, there were 17,132 dropout. 55.17% of the children left the school at 14 years of age and 34.48% of the children left the school at six years of age. It means that these children could not spend even one year in the school in the year 2012 number of dropout decreased suddenly to 4560 thanks to state government effort to bring back the dropout to school. However, their number again increased in 2013 to 5240. Increasing trend continued in 2014 has witnessed a double

Table 1 : Dharwad District: Trends in growth of OOSC 2011-2015

Age	2011		2012		2013		2014		2015	
	Total	%	Total	%	Total	%	Total	%	Total	%
6	5908	34.48	0	0	1999	38.14	287	2.85	10287	48.39
7	368	2.14	190	4.16	56	1.06	212	2.11	40	0.18
8	136	0.79	147	3.22	50	0.95	184	1.83	11	0.05
9	94	0.54	107	2.34	41	0.78	184	1.83	16	0.07
10	93	0.54	161	3.53	40	0.76	222	2.21	22	0.10
11	186	1.08	195	4.27	84	1.60	304	3.02	30	0.14
12	320	1.86	273	5.98	75	1.43	551	5.48	34	0.15
13	575	3.35	447	9.80	68	1.29	1500	14.93	75	0.35
14	9452	55.17	3040	66.66	2827	53.95	6601	65.71	10743	50.53
Total	17132	100	4560	100	5240	100	10045	100	21258	100

Source: District Education Department report-2015

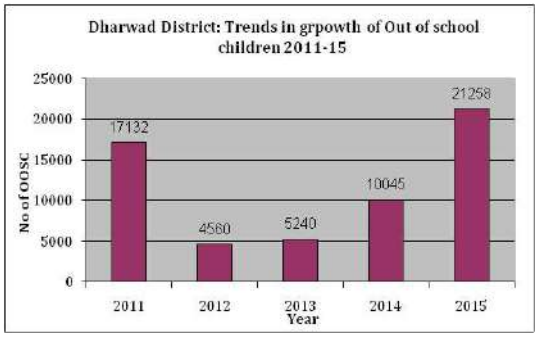

Fig. 2

number of dropouts. Thus the present table makes it clear that inspite of all schemes, especially Sarva Shiksan Abhiyana district administration failed to universalize elementary education as 50.53% of the children left the school at 14 years age while 48.39% children could not complete at least one year schooling(Table 1).

Talukwise distribution of dropout children shows that Hubli taluk has the highest number of dropout i.e 57.52% of the district. Thire number is more in Hubli rural area (29.41%) compared to Hubli urban (28.11%). Dharwad taluk ranks second in this respect with 39.96% of dropouts of the district. Here also number of dropouts is very high in rural Dharwad (27.61%) compered to urban area where it is only 12.35%.

Kalaghatagi taluk is in third place with 23.01% of the dropouts of the district and it is followed by Kundgol and Navalgund where the percentage of dropouts is 10.46% and 8.99% respectively. Thus, Navalgund taluk has the lowest number of dropouts in the district. It is very interesting to know the age at which children are living the school. In all taluks 50% of the dropouts are discontinuing education at 14 years of age while 45 to 49% of the dropouts are leving school without completing one year schooling. Thus, we can understand that 50% of the enrolled children do not continue their education after seventh standered and approximately 45 to 50% of the enrolled children leave the school within a year of enrollment. (Table 2 and Fig.3)

Table 2 : Dharwad District: Talukwise distribution of Dropout children-2015

AGE	Dharwadrural		Dharwadcity		Hublirural		Hublicity		Kalaghatagi		Kundagol		Navalgund	
	OOSC	%	OOSC	%	OOSC	%	OOSC	%	OOSC	%	OOSC	%	OOSC	%
6	2070	49.35	923	49.20	2181	48.82	2006	46.97	1734	49.61	720	45.28	653	47.80
7	10	0.23	1	0.05	2	0.044	12	0.28	0	00	6	0.37	9	0.65
8	0	00	1	0.05	1	0.022	7	0.16	0	00	2	0.12	0	00
9	0	00	1	0.05	3	0.067	8	0.18	0	00	4	0.25	0	00
10	1	0.023	0	00	3	0.067	10	0.23	0	00	8	0.50	0	00
11	0	00	2	0.10	3	0.067	18	0.42	1	0.02	6	0.37	0	00
12	0	00	2	0.10	6	0.13	16	0.37	2	0.057	8	0.50	0	00
13	7	0.16	3	0.15	17	0.38	15	0.35	6	0.17	16	1.00	11	0.80
14	2106	50.21	943	50.26	2251	50.39	2178	51.05	1752	50.12	820	51.57	693	50.73
Total	4194	27.61	1876	12.35	4467	29.41	4270	28.11	3495	23.01	1590	10.46	1366	8.99

Source: District Education Department Report- 2015

Age of the parents of OOSC

When we observed the age of the parents of dropout children, 57.94% of them are 40 years or younger than this age. It shows that although parents are belonging to present generation and have great exposure to information, they are not bothering to send their children to school. They still have not realized the importance of education for their children. [Table 3.1 and Fig. 4].

Occupation of OOSC's parents

We made an effort to find out occupation of the parents 47.72% of them are still engaged agricultural laborers, While 18.18% of the parents are working in factories. Remaining 34% of the parents are doing petty services like construction workers, house hold workers, drivers etc. It indicates that most of the parents of OOSCs are living below poverty level [Table 3.2 and Fig 5].

Level of Education of the Parents

Higher schooling is expected to increase cognitive development and also contribute to economic modernization [Colclough, 1982]. Our survey about the level of education of the parents of the OOSC makes it clear, most of them are either illiterate or having very low level of education. 73.86% of the parents have schooling less than five years. Only 20.45% of them have 5 to 10 years schooling and very few people i.e 5.69% of them have completed 10 years schooling. Thus, illiteracy of the parents has direct influence on children education. Parents are forcing their children to earn bread by doing some petty jobs as they themselves had done like that. [Table 3.3 and Fig. 6]

Income of the OOSC's parents

As for as income of the parents is concerned none of them have monthly income 6000 rupees or above it. 98.86% of the parents are earning less than 3000 rupees per month. Hardly 1.14% of the parents earn 3000 to 6000 per month. It clearly indicates that the parents are very poor and hence providing education to their children seems very expensive to them. [Table 3.4 and Fig. 7]

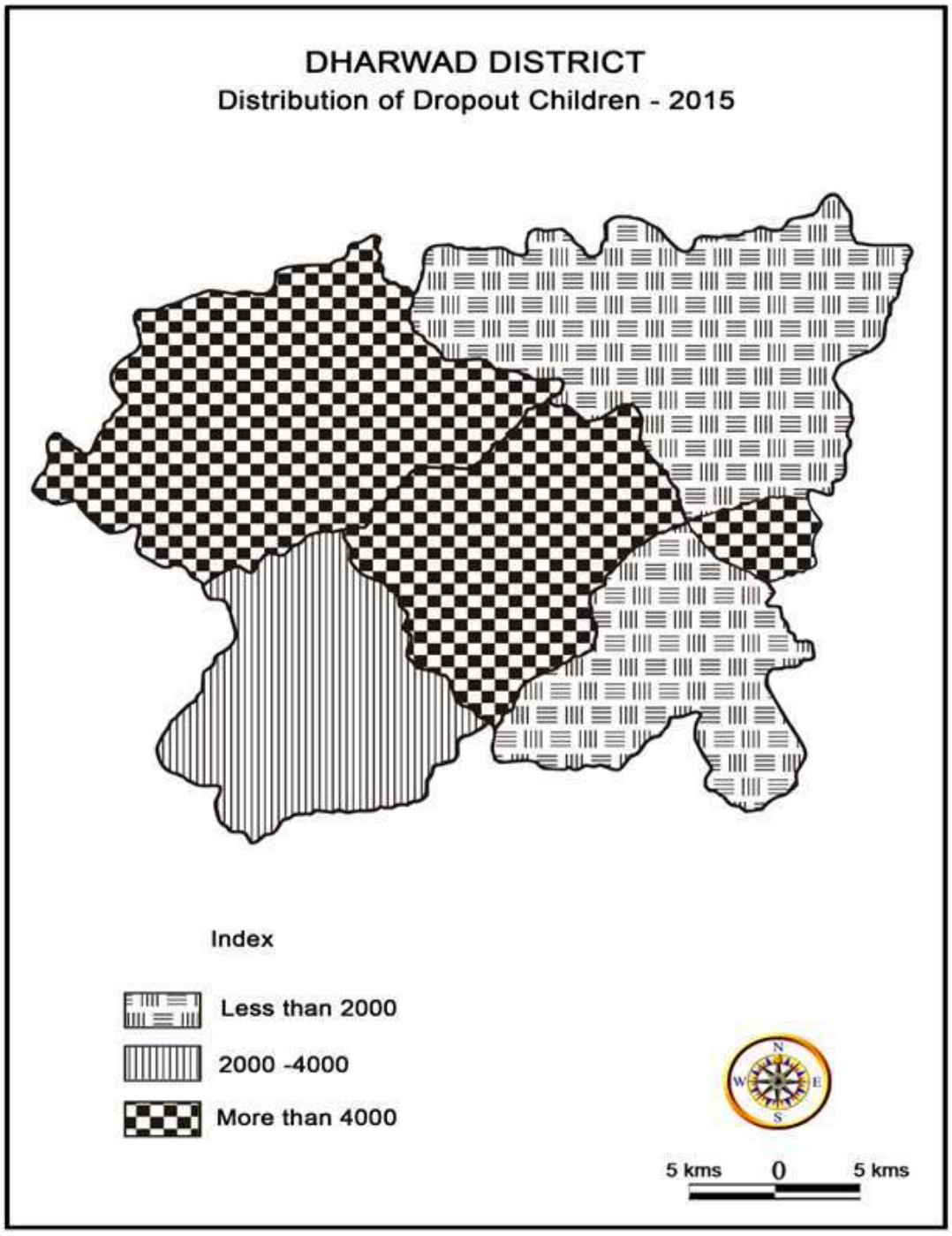
DHARWAD DISTRICT
Distribution of Dropout Children - 2015
Index
Less than 2000
2000 -4000
More than 4000
N
W
E
S
5 kms
0
5 kms

Fig.3

OOSC: Size of the family

It is interesting to know that family size of the parents is neither too big nor too small. 50.65% of the parents of OOSC have 2 to 4 children while 28.57% of the parents have more than 4 children. Parents having two or less than two children account for about 20.78%. Thus half of the families of dropout children have two to four children approximately which shows that they are still unaware or not interested in family planning. In the same families, 57.14% of children have left the school, while 42.86 % of them are going to school [Table 3.5 and Fig. 8]

There are 308 children from 176 respondents' families. Among them 42.86% of the children are going to school while 57.14% of the children dropouts. Thus, on an average each family is having one or two dropouts in the respondents' family. [Table 3.,6 and Fig.9]

OOSC: Age at which left the school

We have made an effort to find out that at what age the children left the school. 52.28% of the dropout children left the school between 8 to 12 years of age and 35.22% of the children left the school after 12 years. It is very disheartening situation to know that 12.5% of the children left the school when they were eight years old. They could not go to the school at least for two years. Majority of the students left the school before completing four years of schooling. It is at this age only parents stop sending children to schools since they want their children to earn by doing some work or to take care of their young siblings [Table 3.7 and Fig.10]

Reasons for leaving the school

We have tried to know the reason for leaving the school. Most of the respondents have common problems. Either child's disinterest or parents' disinterest was the major reason for dropping the school. Above all inability to pay school fees or poverty of the parents is the main obstacle for the children which force them to leave the school. However, the collected data shows that 52.27% of the children left the school as they themselves are not interested in learning. While 39.78% of the respondents blamed their poverty due to which they can't bear the expenditure of education. 7.95% of the parents agreed that they are not interested in education. Thus they are not worrying about it. [Table 3.8 and Fig. 11]

Present Status of dropouts

We have made an effort to find out the present condition of dropout children. It is very disappointing to know that 63.63% of the children are doing small jobs to support their family and 26.13% of the children are staying at home. It does not mean that they have no work. They are taking of their younger siblings at home so that their parents could go to work to earn livelihood. (Table 3.9 and Fig. 12)

OOSC's interest to return the school

Among the dropouts hardly 13.63% are interested to return to school. Remaining children have no plan to return to school as many of them felt it is very difficult to learn and some other children had feared about the punishment given by teachers. As such their parents were also not insisting them to go to school (Table 3.10 and Fig. 13)

Out of total dropouts from respondents families 86.36% of the children are not at all interested in returning to the school. Hardly 13.63% children showed interest in going back to the school (Table 3.11 and Fig. 14)

Parent's awareness about Government Schemes

Even in the days of information revolution, 44.31% of the parents of these dropouts are not having idea about government's schemes to provide education to all by providing free books, mid day meals etc. (Table 3.12 and Fig. 15)

Table 3.1 : Age of the OOSC's parents

	30-35	35-40	> 40	Total
No of Respondents	62	40	74	176
P Percentage	35.22	22.72	42.06	100

Table 3.2 Occupation of the OOSC parents

	Agricultural labour	Industrial labour	Service men	Total
No of Respondents	84	32	60	176
P Percentage	47.72	18.18	34.1	100

Table 3.3 Level of education of the OOSC parents:

	< 5th	5th-10th	10th	Total
No of Respondents	130	36	10	176
P Percentage	73.86	20.45	5.69	100

Table 3.4 Income of the OOSC's parents

	< 3000	3000-6000	6000	Total
No of Respondents	174	2	00	176
P Percentage	98.86	1.14	00	100

Table 3.5 Total no of children to the parents

	< 2	2-4	>4	Total
No of Respondents	64	156	88	308
P Percentage	20.78	50.65	28.57	100

Table 3.6 School going children and OOSCs in the family

	School going children	OOSC	Total
No of Respondents	132	176	308
P Percentage	42.86	57.14	100

Table 3.7 OOSC: Age when children left the school

	Below 8	8-12th age	Above 12	Total
No of Respondents	22	92	62	176
P Percentage	12.5	52.28	35.22	100

Table 3.8 Reason for leaving the school

	Poverty	Child's disinterest	Parent's Disinterest	Total
No of Respondents	70	92	14	176
P Percentage	39.78	52.27	7.95	100

Table 3.9 Present status of OOSC

	Staying at home	Doing petty work	None	Total
No of Respondents	46	112	18	176
P Percentage	26.13	63.63	10.22	100

Table 3.10 Child's interest to return the school

	Yes	No	Total
No of Respondents	24	152	176
P Percentage	13.63	86.36	100

Table 3.11 Reason for OOSC's disinterest

	No interest	To earn bread	Parent's	Total disinterest
No of Respondents	104	43	05	152
P Percentage	68.42	28.28	3.28	100

Table 3.12 Parent's awareness about the government schemes

	Yes	No	Total
No of Respondents	98	76	176
P Percentage	P 55.68	44.31	100

Source: Field survey and personal computation

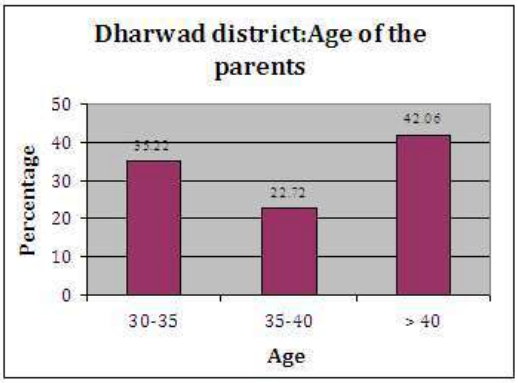

Fig. 4

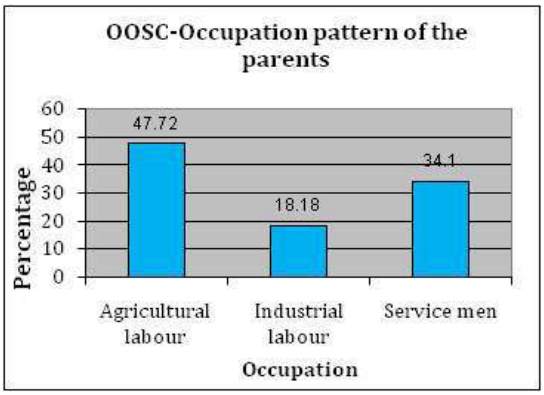

Fig. 5

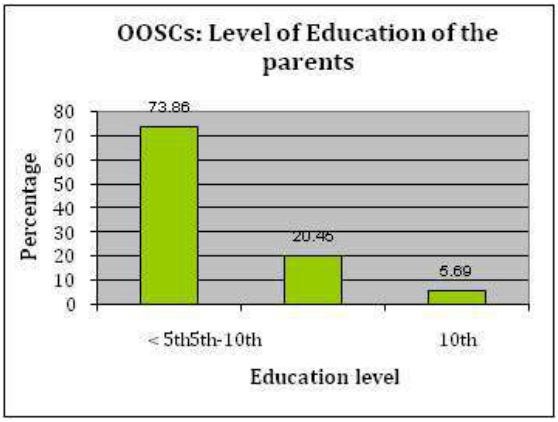

Fig. 6

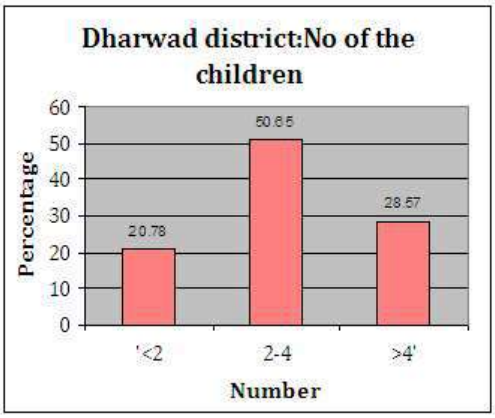

Fig. 7

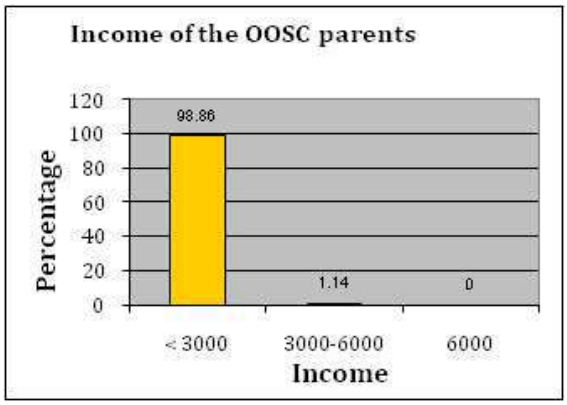

Fig. 8

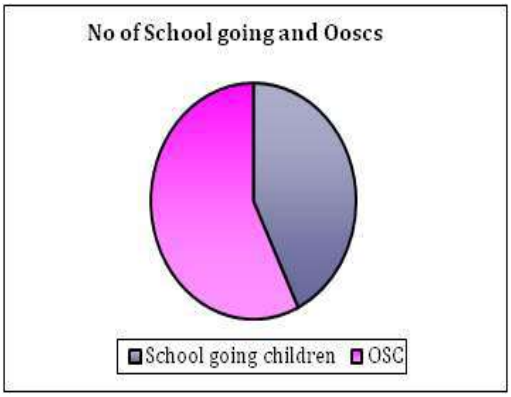

Fig. 9

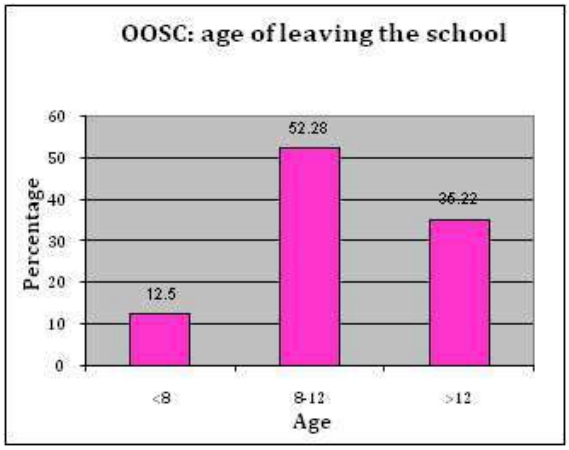

Fig. 10

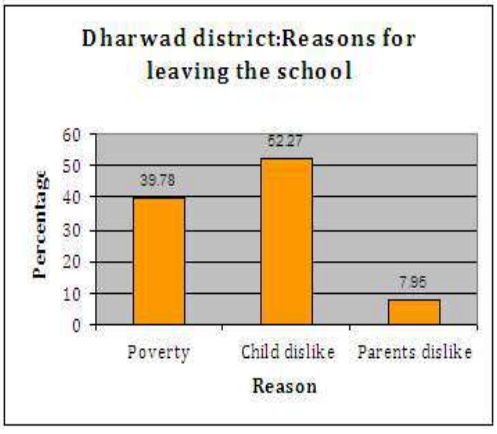

Fig. 11

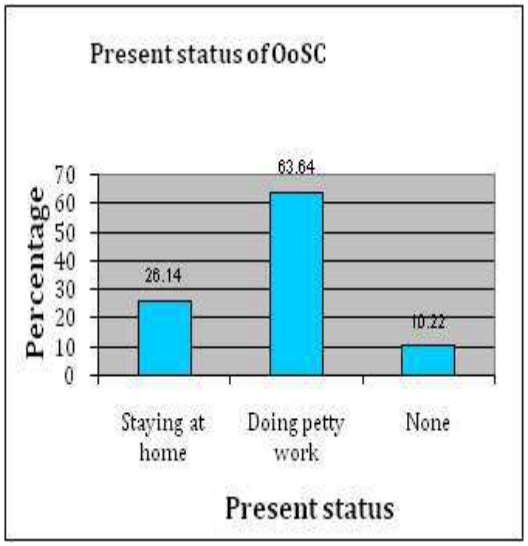

Fig. 12

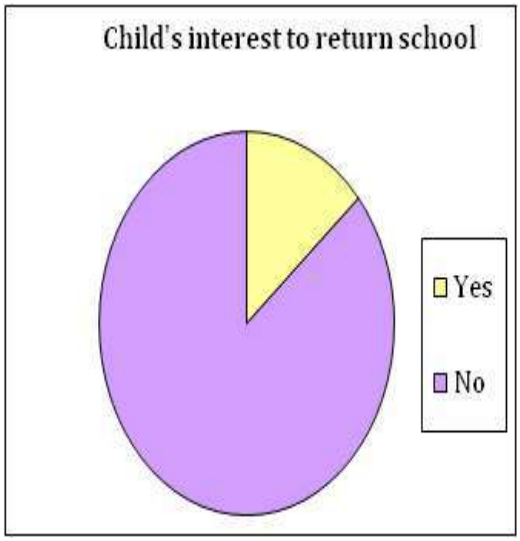

Fig. 13

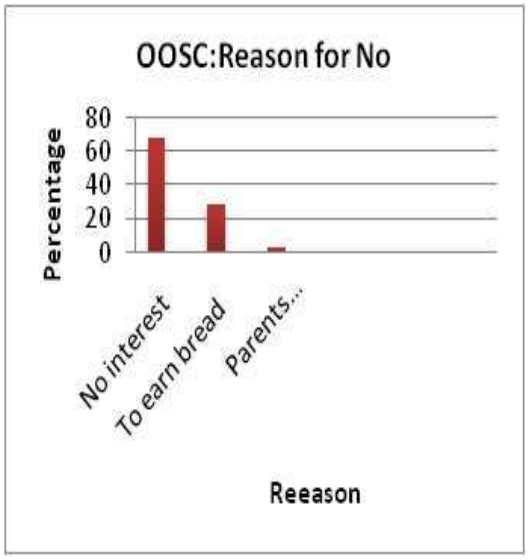

Fig. 14

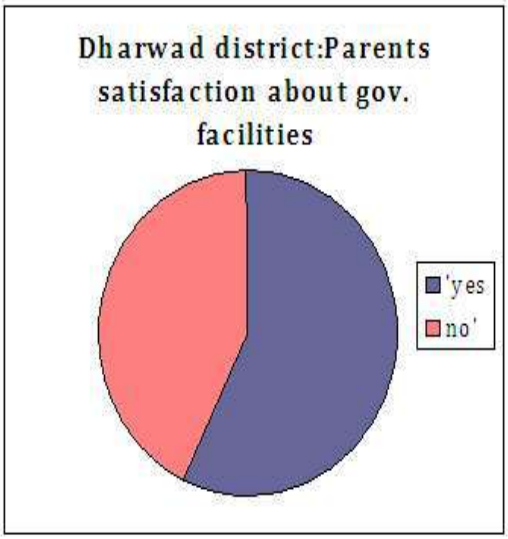

Fig. 15

Conclusion and Suggestions

An elaborate attempt was made to study the problem of school dropouts and the situation prevailing in Dharwad district. Though the sample was small and confined to the district, the study can be considered as an indicator for the whole country. The reasons for the dropping out of school were mainly due to economic and

financial problems. The educational background of the parents of the children interviewed reveals that they have not studied middles school. The mindset of a child is mostly influenced by its parents' educational background and it is unfortunate that most of the parents of the underprivileged children are not well-educated.

Parents of the samples have given importance to job in the case of male children and household duties in the case of female children, without realizing the importance of education. After leaving the school children are engaged in some petty jobs and they are not interested in returning to school. This point needs urgent concern as these dropouts are generally sent to some unskilled work by their parents in order to improve their livelihood and their future is bleak. After analyzing the problem of dropouts in the district, following suggestions are made to improve the retention of dropouts to schools and for improving their condition.

1. As is known fact that poverty is the main reason for dropping out the school, the government should strengthen the schemes of alleviating people from poverty.

2. It is suggested that the educators should think in terms of providing some opportunities for earning while learning. They also stress upon the need for vocational education and link the bridge between education and occupation.

3. Teaching community can play a major role in creating awareness about the importance of education by monitoring, counseling and guiding the students

4. Capital punishment must be strictly in Government schools as it also discouraging the children from going to school.

5. To make education system more job-oriented, teachers are to be trained or expert trainers are to be appointed. So that students can be trained in various skill- based jobs.

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Intra-Regional Variation in Industrial Development in Mau District, Uttar Pradesh

Mumtaj Ahmad and Mahtab Alam

Industrialization plays a crucial role in the economic development of a region but many regions face the regional disparity in the development of industry mainly due to natural as well as historical process of development. In the present paper, an attempt has made to analyze the intra-regional disparity in Mau district. Mau district has suffered from intra-regional disparity and inequality. Some blocks of this district are very advanced in the development of textile industry and some blocks are very backward in textile industries due to inefficiency of different facilities like infrastructure, government policies and their planning. The present work is entirely based on secondary sources of data which is collected from Sankhyaki Patrika (Govt. of Uttar Pradesh). This paper tries to point out the causes of intra-regional disparity of the regions and also explain the consequences of intra-regional variations in industrial development. In the present work simple percentage method has been used for the analysis of data to demarcate the regional disparity. Policy measures have also been suggested to reduce the intra-regional disparity and to achieve the overall growth and development of industries in the regions.

Keywords : Regional analysis, block wise variations, industrial development, employment and investment.

Introduction

Industrialization is the process of social and economic change that transforms a society from an agrarian society into an industrial one. It is a part of a wider modernization process, where social change and economic development are closely related to each other. Industry refers to an economic activity that is concerned with production of goods with the manufacturing process that means transformation of raw materials to the highest value added products by processing, assembling and repairing. On the basis of raw materials, ownership, size and manufacturing, there are different types of industries such as Metallurgical, Mechanical, Textile, Food Processing, Electricity generation, Electronics, Communication and Agro- based industries. These industries play a crucial role in economic development of a region. In fact, economic development is generally not possible unless the region has wide and strong industrial base. The regional disparity in the development of industries arises due to natural factor as well

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as historical process of development. Some regions are abundantly engage in primary economic[1] activities due to fertile land. The industry in endowment of natural resource is one of the causes for regional disparity in industrial development. The purpose of the present paper is to examine the analysis of regional variation in industrial development.

Review of literature

In India district wise intra-regional variation of industrial development has been undertaken by several authors: Sadhak (1986) examined the issue of industrial growth taluka wise in the district Aurangabad. He found that most of the industrial development took place mainly in Aurangabad and Jalana taluka. He also found that financial incentives have not induced the dispersal of industries to the other talukas. Papola (2005) India has been growing from the status of an underdeveloped to developing nation, acquiring higher capabilities in terms of food security, social overhead capital, technology, human development and overall growth. However, the benefits of growth were cornered by a small influential section of society having patron- age from the polity and the challenge of disseminating the benefits of growth with distributive justice continued growing amidst widening horizontal and vertical disparities. The experiences of advanced nations of the world suggest that they could transform and shift their labour force from the primary sector to the secondary and tertiary sectors along with increasing contributions in gross domestic product (GDP). But this did not happen in developing nations like India, which perpetuated structural and inter-sectoral imbalances. Gurubasappa (2008), where the territorial development and industrialization in Bidar and Dharwad district of Karnataka were examined talukawise. He found that industrial units, especially small scale Industrial units are not evenly distributed in these districts. In fact, 50 percent of small scale Industrial units are concentrated in Bidar taluka of the Bidar district and Hubli taluka of the Dharwad district. He found that incentives have been encouraged the growth of small scale Industrial units in both the districts but this growth has been uneven. The Uttar Pradesh has suffered from regional disparities and inequality since six decades after independence some of the regions of this state are very backward and existed the largest proportion of poor in the country. The challenges raised by intra-regional disparities and their compounding implications on living conditions and governance are enormous (Diwakar D.M. 2009). This study identifies the dimensions of intra-regional disparities, inequality and deprivation in poor households of the state. Its basic objective is to examine whether micro-level disparities and deprivations are much wider and more alarming than at the aggregate level and whether region-specific, district-level planning needs to address these issues on a priority basis. Umakant Tripathi (2011) focuses on inter district variation related to different indicators of agricultural, industrial, infrastructural and human resource development of the districts in the State of Orissa. There is a comparison between two points of time 1980-81 and 2000-01. On the basis of the indices computed by author, classified the different districts of Orissa into very backward, backward, developing and developed categories. SUDARSAN IYANGAR method has been used to measure the overall development of a district along with its development at sectoral level. The main

objective of his study to reduction of disparities within a reasonable span of time. Dinkar Narsinh Nayak and Shankar Jha (2014) studies about the regional variation in the development of industries which occurs mainly due to natural as well as historical process of development. The government policies or lack of it also cause a concentration of industries in some regions. They pointed out the real picture of intra-regional variation in industrial development in Vadodara district in the state of Gujarat and used the location quotient statistical technique. Vadodara is a well developed district but some talukas which are not industrially developed.

Objectives of the study

The present study is intended to achieve the following set of objectives:

1. To analyses the industrial setup of Mau district.

2. To find out the block – wise percentage changes in growth of workforce involved in house hold industry.

3. To find out the investment and employment pattern in industry.

4. To find out the different aspects of intra-regional variations in the development of textile industry.

Data base and Research Methodology

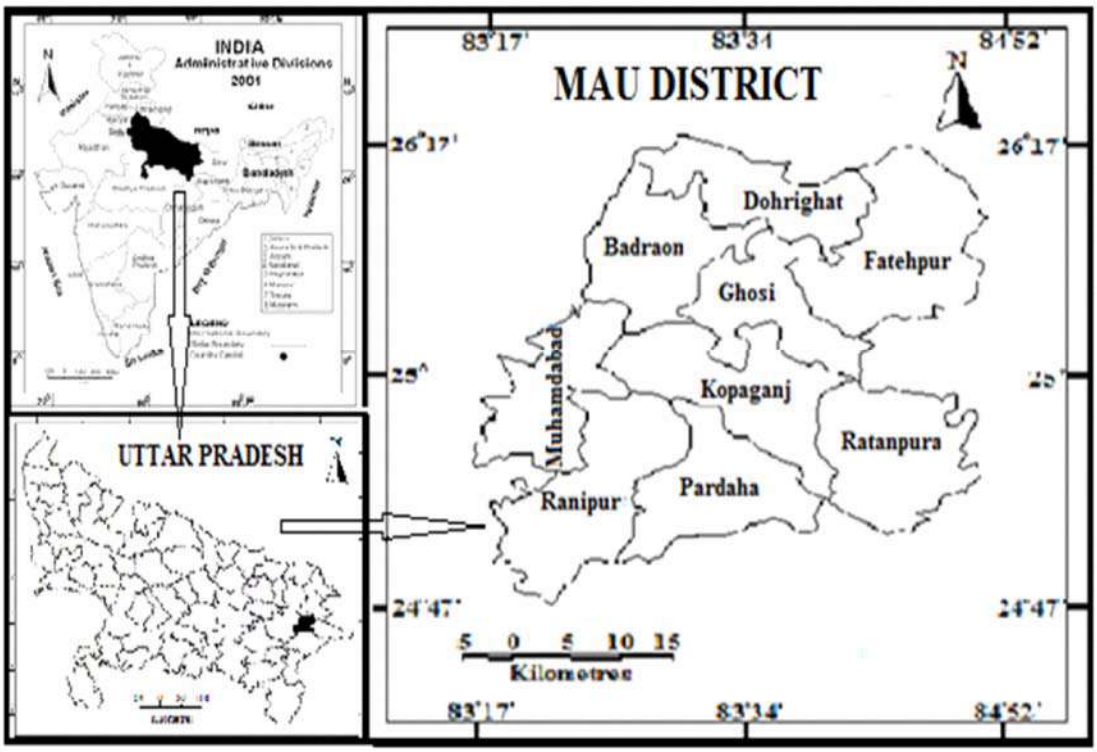
The present study is based on secondary data which have been collected from the different sources like Sankhyaki patrika, District Industrial Corporation, District Gazetteer, the census data, municipal records, published and unpublished work, base maps and statistical abstracts etc. In the present paper an attempt has made to find out the causes and consequences of intra-regional variation of industrial development in Mau districts of Uttar Pradesh. The simple percentage method has been used for the analysis of data to demarcate the regional development of the district. Policy measures have also been suggested to overcome the intra-regional variations of different types of industries in the district.

Study Area

Mau district is located in the south-eastern part of Uttar Pradesh. It lies between 83° 17' to 84° 52' east longitude and 24° 47' to 26°17' north latitude. The total geographical area of the district is about 1,714 Sq. Km. The district is surrounded by Ghazipur district on the south, Ballia district in the east and Azamgarh district in the west and by Gorakhpur on north. Mau was an important township of Azamgarh district before its creation on 19th November, 1988. Mau district is one of the industrially developed districts of Uttar Pradesh. According to the census 2011, the total population of the district is 2,205,170 in which total rural and urban population are 17, 05,386 and 4, 99,784, respectively. The average density of the Mau district is 1,287 persons per sq. km. Average literacy rate of Mau during 2011 is 75.16 per cent and the sex ratio in the district is recorded as 978 females per thousand males.

Industrial Profile of Mau District

The district of Mau is industrially developed district in the state of Uttar Pradesh. The industrialization of the district is not a recent phenomenon but the trend is continuously change from historical process of development. During the Mughal period various developmental works were undertaken by "Sher Shah Suri" during his reign for economic development of the Mau region. During the construction of Military Base and Shahi Mosque, a large number of labourers, artisans and weavers came with Mughal Army. These



Source: District official website. **Fig.1**

Table: 1 Industry at a Glance

S.No.	Head	Particulars
1	Total Registered Industrial Unit	6570
2	Total Industrial Unit	6570
3	Registered Medium and Large Industrial Unit	Nil
4	Average No. of Daily Worker Employed in Small Scale Industries	21795
5	Employment in Large and Medium Scale Industries	Nil
6	No. of Industrial Area/Estate	i/ii
7	Turnover of Small Scale Industries	26280.1
8	Turnover of Medium & Large Scale Industries	Nil

Source: District Sankhyaki Patrika (2011)

workforces originally belong to Iran, Afghanistan and Turki. They settled here permanently. These workers were started their works from handloom or traditional industry to power loom or highly modern industries. Due to the residence of skilled workers, the textile industry and related clusters are highly developed. The textile industry is mostly based

Table: 2 Different Types of industries and their Number of Units, Investment and Employment in Mau district

S. No	Industrial Groups	No. of Units	Investment (In lakh Rs.)	Employment (No. of Persons)	Percentage of Employment
1	Agrobased	302	905	878	4.02
2	Soda Water	10	350	45	0.2
3	Textile Industry	1640	3497.2	5700	26.12
4	Readymade garments & Embroidery	185	523.5	740	3.39
5	Wood/Wooden Based Industry	240	600	740	3.39
6	Paper and paper products	14	42.4	42	0.19
7	Chemical/ Chemical based	5	30	21	0.09
8	Engineering Units	121	485	367	1.68
9	Repairing & Servicing	2606	2871.2	5228	23.96
10	Others	1447	6248.9	8054	36.91

Source: District Industrial Corporation Mau (2011)

on Sari, Lungi, Dhoti etc.

The table 1 shows that the total small scale industrial unit and total registered small scale industrial unit in the district are 6570 units. These industries are employed average number of daily workers of 21795 persons. The turnover of Small Scale Industries is Rs. 26280.01 lakh annually. The large and medium industrial units are completely absent in the study area.

Mau district is one of the oldest regions in the development of different types of industrial groups. These groups are agro-based, soda water, textile, readymade garments and embroidery, wood/wooden based industry, paper and paper products, chemical/chemical based, engineering units, repairing and servicing and others (Table 2).The textile industry acquired a dominant position in terms of number of industrial units, investment and level of employment in Mau district.

In terms of number of units of industrial groups, the highest numbers of industrial units are found in Repairing & servicing (2606 units) followed by textile industry (1640 units), agro-based (302 units), wood/wooden based industry (240 units) and others.

In terms of investment in these industries, the highest one is textile industry with Rs 3497.2 lakh followed by repairing and services (Rs 2871.2 lakh), agro-based (Rs 905 lakh) wood/ wooden based industry (Rs. 600 lakh), readymade garments (Rs. 523.5 lakh) etc. Hence, the textile industry plays a dominant role in the development of the socio- economic conditions of people in the study region than the other industries.

The highest percentage of employment is generated by textile industry provides 26.12

Table 3 : Block wise Percentage of Employed persons in Small Scale industry in Mau District in 2010-11

Small Scale Industry in 2010-11

Name of the Blocks	Number of Employed Persons	Percentage of Employed persons
Dohrighat	797	6.29
Fatehpur Madaon	864	6.82
Ghosi	1019	8.05
Badraon	808	6.38
Kopaganj	1168	9.23
Pardaha	1320	10.43
Ratanpura	774	6.11
Muhamdabad Gohna	970	7.66
Ranipur	840	6.63
Total Rural	8660	68.45
Total Urban	4091	32.33
Total District	12651	100

Source: District Industrial office, Mau 2010-11.

percent of the total employment in the region followed by repairing and services providing (23.96 percent), agro-based industry providing (4.02 percent). Hence, the textile industry is dominating over the other industries because due to the historical process of development and the availability of cheap & skilled workers in the district. The total number of employed persons in small scale industries is 12651.

The highest percentages of employed persons in small scale industries are mainly found in to the urban and semi-urban regions of Mau district, in which Pardaha has the highest per cent of employed persons (10.43percent), followed by Kopaganj (9.23percent), Ghosi (8.05percent), and Mohamdabad (7.66percent) and the remaining blocks of Ratanpura, Dohrighat, Badraon, Ranipur, and Fatehpur Madaon have low percentage of employed person i.e. 6 percent. (Table 3). The highest number of employed persons and percentage of employed workers are found in these blocks because the peoples were historically engaged in this work and labours are easily available,

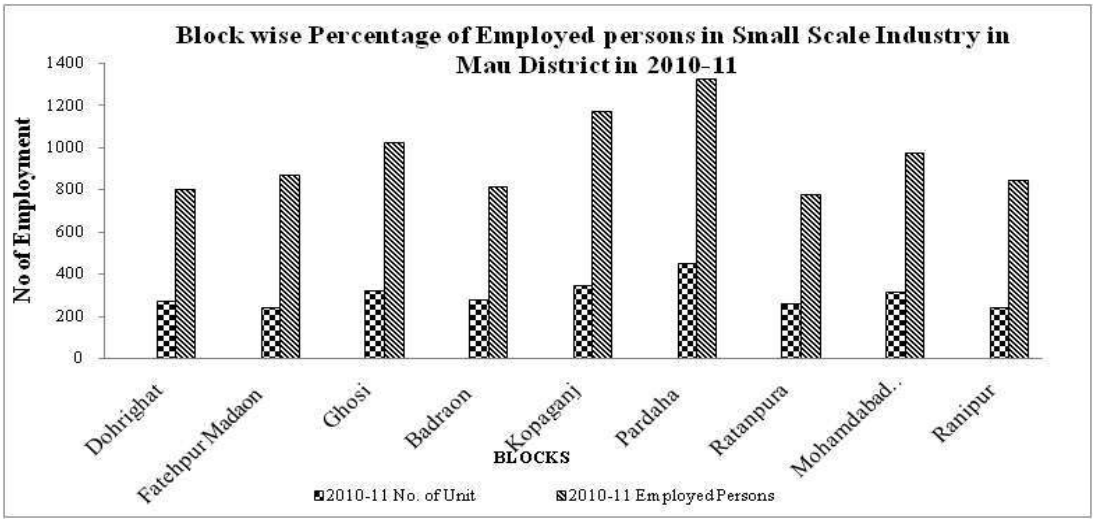


Fig. 2

Table 4 : Block wise Number of Small Scale Industrial Units in Mau district 2010-11

Name of the Blocks	Number of Small Scale Industrial Units
Dohrighat	265
Fatehpur Madaon	236
Ghosi	320
Badraon	274
Kopaganj	340
Pardaha	449
Ratanpura	254
Muhamdabad Gohna	312
Ranipur	235

Source: District Industrial office, Mau 2010-11.

and have well developed markets (Fig.2).

The table 4 shows the block-wise distribution of small scale industrial units in Mau district. The total number of small scale industrial units during 2010-11 is 3962, which are mainly concentrated in urban areas .On the basis of the number of Small Scale Industrial units the blocks of the Mau district are divided into three categories of high, medium and low. Pardaha and Kopaganj block has the highest number of 449 and 340 Small Scale Industrial units respectively. The blocks like Ghosi (320), Muhamdabad Gohna (312), Badraon (274), and Dohrighat (265) comes under medium category and the remaining blocks namely, Ratanpura (254), Fatehpur Madaon (236) and Ranipur (235) have low number of small scale industrial units. The Headquarter of Mau district is 'Mau Nath Bhanjan' is located in the Pardaha block and this is the main center of textile industry. The analysis shows that the concentration of population, the number of small scale industrial units and percentage of employment are decreasing from the core region to periphery region in the district (Fig.3).

The table 5 and figure 4 shows the percentage of change in workforce involves in house hold industry in different blocks of Mau district from 2000-01 to 2010-11. The highest percentage of work force involve in small scale industry in 2000-2001 was found in Muhamdabad Gohna (12.7 percent) and lowest in Fatehpur Madaon (1.9 percent). But during 2010-11 this trend has changed. The highest percentage of workforce is found in Pardaha block (18.7 percent) and lowest in Fatehpur Madaon block (4.3 percent). The percentage of change of workforce involves in small scale industry range from 7.9 percent (Pardaha block) to 1.2 percent (Ratanpura block) during the period from 2000-01 and 2010-11.

The percentage of change is highly varied due to the high and low level of workforce involves especially in textile industry in different blocks of Mau district. Textile industry provided fulltime job opportunity as compared to seasonal agricultural activity so the inclinations of working population were increase towards the industrial activities. The study shows that the inclination of workers increases from 2000-01 to 2010-11 towards the small scale industries or house hold industries in all blocks of Mau district (Fig.4).

Conclusion

The most important factor to increasing the economic growth of India is essential to have rapid industrial growth. The industrial activities in the district have largely concentrated in Pardaha block and the other blocks which are located around the Mau Nath

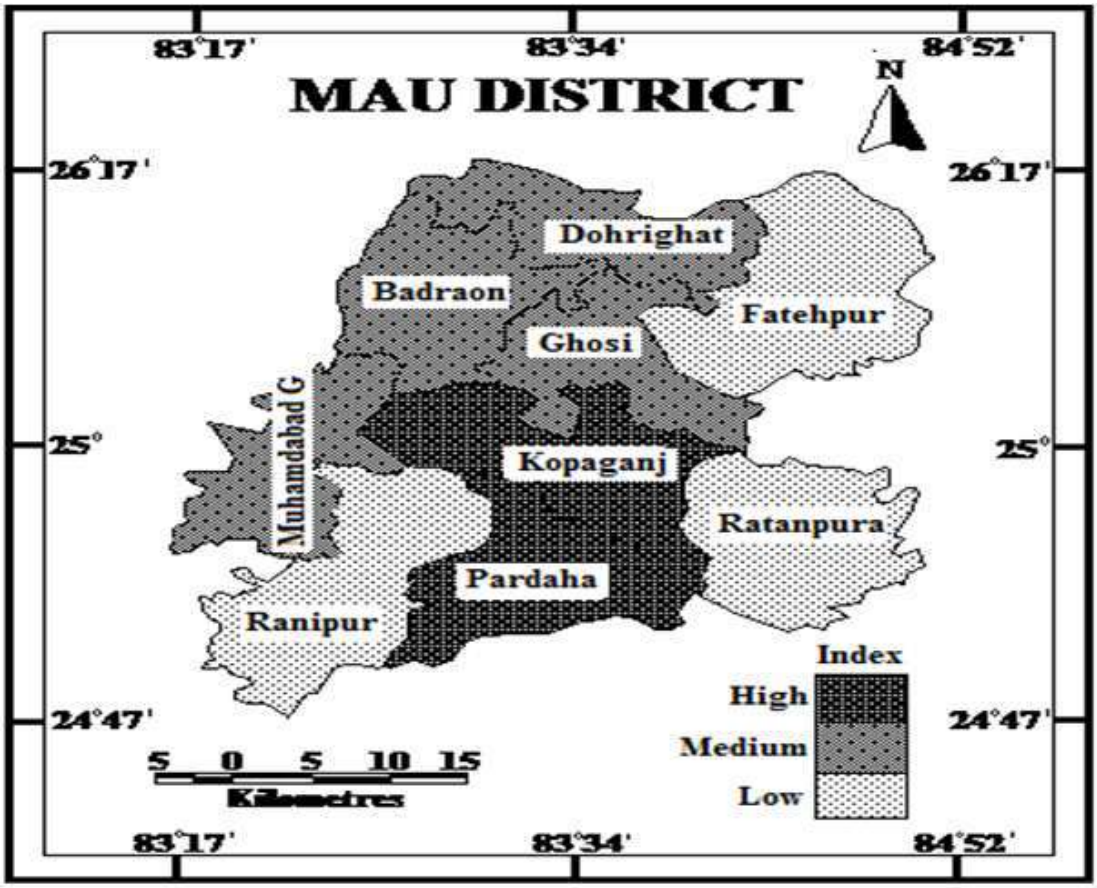


Fig. 3

Table: 5. Percentage of changes in workforce involve in House hold industry in Mau District during 2000-01 to 2010-11

Name of the Blocks	2000-2001	2010-2011	Percentage of Change
Badraon	2.3	6.9	4.6
Ratanpura	3.3	4.5	1.2
Fatehpur Madaon	1.9	4.3	2.4
Ghosi	3	6.7	3.7
Dohrighat	4.1	8.5	4.4
Ranipur	5	8.1	3.1
Kopaganj	9.3	15.1	5.8
Pardaha	10.8	18.7	7.9
Muhamdabad Gohna	12.7	16.4	3.7

Source: District Sankhyaki Patrika, 2000-01 and 2010-11.

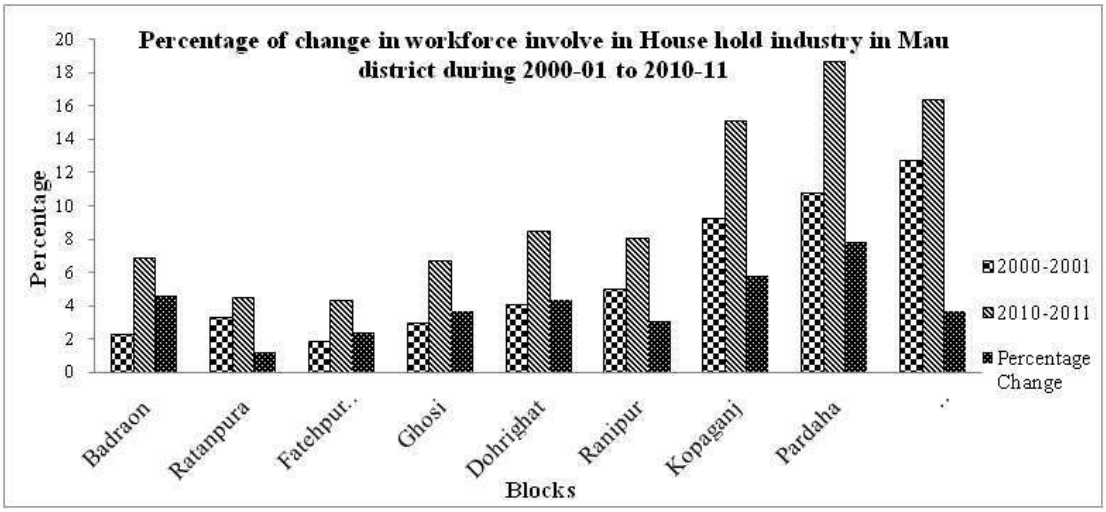


Fig. 4

Bhanjan city. It shows that the location of industry in Mau district is not spatially balanced.

The high levels of industrial development is found in Pardaha and Kopaganj blocks.The medium levels of industrial development is shown in Badraon, Ghosi Dohrighat and Mohammadabad Gohna blocks and the remaining blocks namely, Ranipur, Ratanpura, and Fatehpur Madaon are industrially backward blocks. Because these blocks have not well developed basic infrastructural facilities like, electricity, transportation and communication, and market. The growth of workforce and development of small scale industry are continuously increases because it provided fulltime job opportunities as compared to seasonal agriculture activities. So, these are the main causes to create the intra-regional variation in the industrial development of Mau district.

In the light of the present study certain suggestions are made to overcome the intra-regional variations in industrial development in Mau district.

1. Introduction of modern technologies and proper supply of electricity are must to balance the intra-regional disparity of the district.

2. Government must provide different types of subsidies to industrialists and welfare schemes for workers.

3. To develop the infrastructural facilities for removing the intra-regional variations in industrial development of the district.

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Women's Social Network and use of Family Planning Methods in Rural Uttar Pradesh, India

Praveen Kumar Pathak

Although fertility has declined across several Indian states of late, with varying historical points of onset and pace of decline, women in Uttar Pradesh on average, still bear around four children in their reproductive lifetime due to the interplay of a complex set of socio-economic, demographic and cultural factors. However, little attempt has been made in the past to examine the role of diffusion, aside from the standard set of socioeconomic factors in influencing fertility change in the Indian context. Using a unique ego-centric social network data, present study examine the informal interpersonal social network effect on the adoption of contraceptive and method choice among 567 currently married women in reproductive age groups in rural India. Bivariate and multivariate techniques were employed for data analysis. Findings suggest that social interaction appears to be a significant predictor of contraceptive method use among women after adjusting for pertinent socio-economic and demographic covariates.

Keywords : Social interactions, family planning methods, ego-centric networks.

Introduction

Growing body of demographic research has established central role of *social interactions* (i.e. informal interpersonal communication between individuals within social networks) towards determining childbearing decisions and fertility regulation across diverse socio-cultural context (Bernardi and Klarner, 2014; Balbo and Barban, 2014; Lois and Becker, 2014). The different meanings and connotations attached to reproduction and fertility regulation have been considered to be dependent on local 'social contexts'. The role of social context towards mediating shared systems of meanings and connotations permeates through social diffusion mechanisms (Kaler, 2000). It probably so happens as the individuals are generally considered as member of different social groups and they often informally encounter various viewpoints, perceptions, attitudes and behaviors of other persons. These set of information held by other persons, the decisions and choices made by them and the consequences that emanate from such actions may trigger a strong impression upon the individual calculus related to advantages and disadvantages attached to regulating fertility.

Such ideational-diffusion will be more powerful in case on innovative decisions such

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as use of contraception wherein associated costs/ risks or benefits have not been properly comprehended in the social context. Thus, the individual predisposition towards adopting contraception (innovative decision) will be reshaped by local context, social influence and information about the availability of contraceptives. Studies have also noted that even if women have learnt about the different contraceptive methods through official family planning program/health center/health worker, the evaluation of its health implications, usage convenience and effectiveness are debated/ discussed/determined through the personal experiences of relatives/neighbors/friends/ colleagues (Kohler, 1997; Rutenberg and Watkins, 1997; Bouley and Valente, 1999; Kincaid, 2000; Montgomery *et. al.,* 2001; Behrman, Kohler and Watkins, 2002; Musalia, 2005; Aglobitse and Casterline, 2007).

These studies have also demonstrated increasing dependence of women on informal networks for information on measures of fertility control. For instance, a study in rural Kenya noted that women who have been sufficiently informed about contraceptive methods still depends on information from friends, relatives and/or other women similar to them before making any decision on use of family planning method (Rutenberg and Watkins, 1997). Another study from rural Thailand noted that family planning has become a part of the daily discussions among women in several settings (Entwisle et. al, 1996). Further, study from rural Nepal reported regular discussions and evaluations of modern methods of contraception as part of routine day activity. Several groups of women and men discussed about appropriate family size and family planning among themselves during routine normal activities (Stash, 1999).

The way in which information on family planning influences an individual's prospect for contraceptive adoption depends, among other things, on the *content of the information*. While the expectation is that discussions will highlight the positive aspects of contraception, it must not be presumed that information will always be positive. In order to facilitate a meaningful analysis of the impact of diffusion on contraceptive change, particularly for program efforts, some researchers have noted the need to document the content of conversations among conversational members (Cleland, 2001; Marsden, 1998; Valente, 1998). Discussions about the negative health consequences of family planning methods may predominate in some societies with the result that contraceptive innovation is frustrated. Studies in Senegal (Ngom, 1995), Ghana (Adibo, 1992; Adongo et. al, 1997), Egypt (De Clerque et. al, 1986) and the Dominican Republic (Porter, 1984) have shown that rumours and misconceptions about contraception can frustrate innovation.

In addition, studies have also indicated that misconception (or misinformation) about contraception is one of the major reasons for non-adoption. Expectedly, however, information on family planning or particular contraceptive methods is not always negative. There have been reports of discussions that not only put more emphasis on the advantages of contraception but also encourage adoption. Women who receive positive information have often been reported to have greater prospects of adopting contraception (Valente, 1995). Contraceptive adoption can also be facilitated or frustrated by elements of social influence: the disposition of discussion partners to family

planning and the experiences of discussion partners who have adopted contraception. Individuals with conversational partners who approve or encourage contraceptive use are more likely to adopt contraception than individuals whose discussion partners neither approve nor encourage contraceptive use. Thus, in addition to acquiring information, individuals take decisions on the basis of the weight of the support they receive either through encouragement or the experience of other people.

2. Indian Context

India provides a unique setting owing to her extended family system in order to investigate the association between social networks and fertility behaviour, since the patrilineal familial system entails a woman to move into her in-laws family post nuptial union, particularly in the northern regions. Owing to practice of early arranged marriages, *gotra* system, village exogamy, and restrictions on movement of women, the bargaining position of women is often subjugated (Dyson and Moore, 1983; Karve, 1990; Chakraborty and Kim, 2010). Furthermore, arrival into the in-laws household/family oblige that the newlywed bride will be conditioned as per the prevailing norms, customs and expectations under the stewardship of mother-in-law and other senior women in the households. This suggests that young bride is often expected to behave/ function as per the expectations and norms set by other women in the households. Thus, *significance others* who probably influence fertility decision may include mother-in-law and other relatives from in-laws family.

Furthermore, as large proportion of women in rural Uttar Pradesh still continue to bear, on average, four children in their reproductive span (IIPS, 2010). Use of family planning methods remained to be relatively low (38 percent) with one out of every third currently married women (15-49 years) reported unmet need for family planning in Uttar Pradesh (IIPS, 2010). Women reportedly do not use contraception due to fear of side effects or disapproval of their close relatives/friends (Sedgh *et al*., 2007). This perhaps suggests that significant others may have important influence upon rural women fertility behaviour. However, to what extent the attitudes, behaviour and opinions of close relatives, neighbours and friends matters on decisions of fertility regulation might determine the use of family planning methods. There hardly exits any micro level study that explicitly used ego-centric social network data to establish the linkages between social network and contraceptive choice among women in Indian context.

3. Data and Methods

Data

The unique data for the present study comes from a field based work conducted during February-May, 2010 in a rural village-*Chandwak*– in Jaunpur district, Uttar Pradesh, India[1]. All currently married women aged between 18-35y (N=700) were targeted for interview. With the response rate of 81 percent, finally detailed ego-centric social network data were collected from 567 women. Direct information on social networks was obtained using *name generators* (network members with whom respondent discuss matter of child bearing) following by *name interpreters* (socioeconomic and demographic attributes of each social network with whom the respondent discusses about fertility matter). In addition,

information about the individual and household socioeconomic characteristics, complete birth history and family planning practices of the respondents was also collected. Furthermore, in-depth interviews and focus group discussions were also conducted to support the quantitative data and advance appropriate narrative.

Outcome variable

The main outcome variables were i) *current use of any family planning method (yes=1; no=0)* and ii) *contraceptive method choice (no method=0; limiting method=1; spacing method=2)* among currently married women (18-35y). Limiting method refers to sterilization while spacing method included contraceptive pills, condoms, IUDs/Copper-T, withdrawal, rhythm method etc.

Exposure variable

The main explanatory variables include i) *main alter approves use of family planning method* (yes=1, no=0); ii) other alters *approves use of family planning method* (yes=1, no=0); iii) *main alter method use* (no method=0, limiting method=1, spacing method=2, no alter=3); *other alters method use* (no method=0, limiting method=1, spacing method=2, no alter=3). Note that the information related to the approval about use of family planning and contraceptive method choice within social networks was actually reported by the egos/respondents themselves.

Control variable

We controlled for various pertinent factors in the analysis drawing upon the relevant demographic literature. This includes ego's characteristics (age, year of schooling, number and gender composition of children, experience of child loss, social class, wealth status), husband's characteristics (education, migration status, spousal education gap) and formal exposure to family planning methods (saw/read/heard about family planning through official channels like poster/banner, radio/television, health centre, health worker).

4. Analytical strategy

Identification of main alter and other alters

The egos/respondents can name up to four persons as their network members with whom they discuss about child bearing/family planning related matter. In order to identify the key person within the social network who might have the most influence on family planning outcome of the respondents, we employed factor analysis to generate a composite index of main alter. The index is created based on five items: duration of contact, frequency of contact, degree of closeness, spatial proximity and provision of urgent material support, if needed. Using the factor loading we identified the 'main alter' i.e. a network member with the highest index score whereby the remaining network members are grouped into 'other alters' category.

We used cross tabulations to examine the current use of any family planning method across approval for contraception by main and other alters, followed by egos and husbands characteristics and formal exposure to family planning methods. Chi square tests were used to check the strength of statistical difference of the outcome variable across explanatory factors. In order to assess the influence of women social interactions on contraceptive choice of ego, we employed two strategies. Firstly, we investigated the effect of approval for family planning methods by main alter and

Table 1: Descriptive statistics on current use of any family planning method by selected ego's and husband's demographic, socioeconomic, network and formal family planning characteristics among currently married women 18-35y, Jaunpur, Uttar Pradesh, 2010

Ego's and husband's characteristics	Used Any FP	P-value	Sample
All women	49.2		567 (100.0)
Ego's and husband's characteristics			
Age		0.000	
18-24 years	37.3		177(31.22)
25-28 years	37.5		120(21.16)
29-32 years	55.3		141(24.87)
33-35 years	69.8		129(22.75)
Education		0.000	
No/low education	40.2		246(43.39)
Secondary & above	56.1		321(56.61)
Wealth status		0.000	
Poor	33.3		189(33.33)
Middle	55.6		189(33.33)
Rich	58.7		189(33.33)
Social group		0.000	
Scheduled Caste	34.4		270(47.62)
Other Backward Class	61.8		165(29.10)
Forward Caste	65.4		78(13.76)
Muslim	61.1		54(9.52)
Sex composition of children		0.098	
no. sons = no. daughters	46.4		168(29.63)
no sons > no. daughters	54.2		249(43.92)
no. sons < no. daughters	44.0		150(26.46)
Experienced child loss		0.610	
No	48.8		480(84.66)
Yes	51.7		87(15.34)
Duration of marriage		0.000	
d┐ 10 years	39.1		261(46.03)
>10 years	57.8		306(53.97)
Husband present in household		0.000	
No	29.6		132(23.28)
Yes	55.2		435(76.72)
Husband's education		0.001	
No/low education	40.8		147(25.93)
Secondary	45.1		213(37.57)

Table 1 continues…

Ego's and husband's characteristics	Used Any FP	P-value	Sample
Higher secondary & above	59.4		207(36.51)
Spousal educational gap		0.027	
Both illiterate	33.3		72(12.72)
Husband more educated than ego	50.5		327(57.67)
Both equally educated	56.5		69(12.17)
Ego more educated than husband	51.5		99(17.46)
Healthcare decision		0.000	
Herself	60.9		138(24.34)
Spouse	46.5		129(22.75)
Jointly	47.8		276(48.68)
Others	12.5		24(4.23)
Alter's characteristics			
Main alter approves use of family planning		0.000	
No	37.5		120(21.16)
Yes	60.5		342(60.32)
No alter/other	25.7		105(18.52)
Other alters approves use of family planning			0.000
No	42.3		78(14.13)
Yes	57.7		333(60.33)
Can't say	43.8		48(8.70)
No alter/other	25.8		93(16.85)
Formal exposure to family planning methods			
Saw/read FP message on poster/banner		0.004	
No	41.2		204(35.98)
Yes	53.7		363(64.02)
Heard/watched program on modern FP@radio/television			0.002
No	39.3		168(29.63)
Yes	53.4		399(70.37)
Heard talk on modern FP@clinic/health center			0.000
No	25.7		105(18.52)
Yes	54.6		462(81.48)
Visited by health staff at home to advice on FP			0.000
No	34.5		174(30.69)
Yes	55.7		393(69.31)

Note: Chi-square tests were used to examine statistical differences between current use of any family planning methods by selected demographic and socioeconomic characteristics of ego's, husband's, alters and official family planning program.

other alters (*social influence mechanism*) on the likelihood of any contraceptive use among egos through nested logistic regression models. Secondly, we further examined the influence of type of contraceptive use by main and other alters (*social learning mechanism*) towards predicting contraceptive method choice of ego themselves through nested multinomial regression models.

5. Results

5.1 Bivariate analysis

We examined the level and differentials in the current use of any family planning method among currently married women (18-35y) by selected socioeconomic, demographic, network properties and formal exposure to family planning methods. Overall, 49 percent of respondent reported currently using any family panning method (Table 1). Large proportion of women used modern contraception- dominated by female sterilization followed by condoms, contraceptive pills and IUD/Copper-T. On the other hand, use of traditional family planning method remained relatively small as only six percent practiced withdrawal and two percent followed rhythm/periodic abstinence (Figure 1).

However, we observed substantial variations in the prevalence of current use of any family planning methods. For instance, the current use of any contraceptive method was significantly higher among women from older cohorts, with secondary plus education, economically better-off household, non-scheduled caste groups, more sons than daughter, married for more than equal to 10 years, husband usually stayed at home, husband were secondary plus educated, equally educated couples, and women who independently took own health care decisions.

We also examined the variations in the current use of any family planning by alters approval for contraceptive use. It was observed that large proportion of women reported currently using any contraception if the main alter approved family planning than otherwise. However, use of contraception remained the least in case if ego didn't have any alter. Likewise, similar pattern was also observed, wherein, approval for family planning from other alters considerably increased current use of any family planning method among egos than their counterparts. In addition, we also examined variations in current contraceptive use by formal exposure to family planning methods. Women who saw/read family planning related posters, heard/watched programs about family planning on radio/television, counseled about benefits of family planning at health centre, or counseled about family at home by the health worker reported higher proportion of any contraceptive use than their counterparts.

Data presented in Table 2 depicted substantial variations in the contraceptive method mix among study participants. Overall, large proportions of egos were reportedly currently using limiting method (28 percent) as compared to spacing method (21 percent) in the study area. The pattern of contraceptive method mix markedly varied by the age group of egos as large proportion of young egos were opting for spacing methods while relatively older egos were using limiting method after completing their desired family size. The educational status, wealth status, social groups, sex composition of children and husband education was significantly associated with the current contraceptive method mix among egos in the study area. It may be interesting to note

Table 2: Descriptive statistics on contraceptive method choice by selected ego's and husband's demographic, socioeconomic, network and formal family planning characteristics among currently married women 18-35y, Jaunpur, Uttar Pradesh, 2010

	No method	Limiting	Spacing	Sample	P-value
Ego's and husband's characteristics					
Age					0.000
18-24 years	62.7	8.5	28.8	177(31.22)	
25-28 years	62.5	25.0	12.5	120(21.16)	
29-32 years	44.7	31.9	23.4	141(24.87)	
33-35 years	30.2	54.5	16.3	129(22.75)	
Education					0.000
No/low education	59.8	26.8	13.4	246(43.39)	
Secondary & above	43.9	29.0	27.1	321(56.61)	
Wealth status					0.000
Poor	66.7	20.6	12.7	189(33.33)	
Middle	44.4	33.3	22.2	189(33.33)	
Rich	41.3	30.2	28.6	189(33.33)	
Social group					0.000
Scheduled Caste	65.6	21.1	13.3	270(47.62)	
Other Backward Class	38.2	32.7	29.1	165(29.10)	
Forward Caste	34.6	34.6	30.8	78(13.76)	
Muslim	38.9	38.9	22.2	54(9.52)	
Sex composition of children					0.025
no. sons = no. daughters	53.6	32.1	14.3	168(29.63)	
no sons > no. daughters	45.8	28.9	25.3	249(43.92)	
no. sons < no. daughters	56.0	22.0	22.0	150(26.46)	
Duration of marriage					0.000
d┐ 10 years	60.9	11.5	27.6	261(46.03)	
>10 years	42.2	42.2	15.7	306(53.97)	
Husband present in household					0.000
No	70.5	20.5	9.1	132(23.28)	
Yes	44.8	30.3	24.8	435(76.72)	
Husband's education					0.003
No/low education	59.2	22.5	18.4	147(25.93)	
Secondary	54.9	28.2	16.9	213(37.57)	
Higher secondary & above	40.6	31.9	27.5	207(36.51)	
Spousal educational gap					0.039
Both illiterate	66.7	12.5	20.8	72(12.72)	
Husband more educated than ego	49.5	29.4	21.1	327(57.67)	

Table 2 continues…

	No method	Limiting	Spacing	Sample	P-value
Both equally educated	43.5	30.4	26.1	69(12.17)	
Ego more educated than husband	48.5	33.3	18.2	99(17.46)	
Healthcare decision					0.000
Herself	39.1	23.9	37.0	138(24.34)	
Spouse	53.5	34.9	11.6	129(22.75)	
Jointly	52.2	29.4	18.5	276(48.68)	
Others	87.5	0.0	12.5	24(4.23)	
Alter's characteristics					
Main alter's method use					0.000
Limiting method	35.2	44.4	20.4	162(28.57)	
Spacing method	39.0	24.4	36.6	123(21.69)	
No method	60.3	25.4	14.3	189(33.33)	
No alter	74.2	9.7	16.1	93(16.40)	
Other alters method use					0.000
Limiting method	45.0	45.0	10.0	120(21.16)	
Spacing method	46.8	19.2	34.0	141(24.87)	
No method	46.5	32.4	21.1	213(37.57)	
No alter	74.2	9.7	16.1	93(16.40)	
Formal exposure to family planning methods					
Saw/read FP message on poster/banner					0.000
No	58.8	14.7	26.5	204(35.98)	
Yes	46.3	35.5	18.2	363(64.02)	
Heard/watched program on modern FP@radio/television					0.000
No	60.7	16.1	23.2	168(29.63)	
Yes	46.6	33.1	20.3	399(70.37)	
Heard talk on modern FP@clinic/health center					0.000
No	74.3	11.4	14.3	105(18.52)	
Yes	45.5	31.8	22.7	462(81.48)	
Visited by health staff at home to advice on FP					0.000
No	65.5	15.5	19.0	174(30.69)	
Yes	44.3	33.6	22.1	393(69.31)	
All women	**50.8**	**28.0**	**21.2**	**567 (100.0)**	

Note: Chi-square tests were used to examine statistical differences between contraceptive method mix by selected demographic and socioeconomic characteristics of ego's, husband's, alters and official family planning program.

here that if egos herself take decisions on health care then proportion of spacing method use remained higher (37 percent spacing method use by ego), while, if spouse/other were taking call about egos health care, then use of limiting method predominated (35 percent limiting method use by ego). Data also indicate correspondingly significant and positive association between the method of main and other alters with the method use of egos.

Egos with no alter had substantially low contraceptive use. It may be worth mentioning here that any exposure to official modes of family planning resulted significantly higher use of limiting method among egos than their counterparts. For instance, it may be observed that the prevalence of limiting method among egos was relatively higher if they were either counseled about family planning methods at the health centre (32 percent limiting vs. 23 percent spacing method used by egos) or visited by any health worker at home for counseling about family planning methods (34 percent limiting vs. 22 percent spacing method used by egos) than their counterparts who were either not counseled at the health centre (11 percent limiting vs. 14 percent spacing method used by egos) or not visited by any health worker (16 percent limiting vs. 19 percent spacing method used by egos).

The findings from qualitative data further brings out several complexities involved while making decisions about use of family planning methods among egos in the study area. Many study participants reported that they either first heard about family planning methods from some relative/neighbour/friend, informed by husband, saw/read family planning poster, watched/heard programs about family planning on radio/ television or informed about contraception at health centre or health worker who visited her at home. After watching/hearing/reading about contraception through formal sources of family planning, women used to jointly evaluate the costs and benefits associated with contraception with personal social networks in local context. One of the respondent during in-depth interview about using family planning narrated- *'When I first heard about family planning on radio, I asked my friend who informed me about benefits and convenience of using oral pills and condoms that she practiced herself too…afterwards I also started taking oral pills'*. Several women were ambivalent about using family planning methods due to various (mis)information pertaining to side effects/ health risks/failure risks associated with family planning. Another respondent narrated health risk associated with use of IUD/Copper-T- '*I believe that traditional methods of family planning are generally better…one of my aunt used Copper-T that was not properly inserted which led her to excessive bleeding…she became pregnant and later went for tubectomy after her last child…and unfortunately died due to lack of blood*'. However, there were also some women who secretly used contraception without informing husband/other family member. But it generally emerged from gathered qualitative data that positive experience of contraception within social networks enhanced acceptance of family planning methods among egos, while, news of any side effects/health risk/risk of method failure associated with family planning sometimes also deterred egos from using them.

Multivariate analysis

We fit nested logistic regression models to predict current contraceptive use based on

Table 3 : Adjusted odds ratios from logistic regression model predicting likelihood of any contraceptive use, Jaunpur, Uttar Pradesh, 2010

Characteristics	Model-1	Model-2	Model-3
Alter's characteristics			
Main alter approve use of family planning			
No (Ref)			
Yes	2.443**(0.722)	3.411**(1.225)	3.255**(1.193)
No alter/other	0.513(0.372)	2.033(0.680)	1.827(1.512)
Other alters approve use of family planning			
No (Ref)			
Yes	0.983(0.339)	0.722(0.303)	0.699(0.301)
Can't say	0.594(0.252)	0.556(0.272)	0.596(0.295)
No alter/other	1.026(0.807)	0.344(0.311)	0.460(0.417)
Ego's and husband's characteristics			
Age	x		
18-24 years (Ref)			
25-28 years		0.645(0.234)	0.644(0.239)
29-32 years		1.203(0.473)	1.239(0.500)
33-35 years		1.904(0.858)	1.912(0.881)
Education	x		
No/low education (Ref)			
Secondary & above		1.289(0.396)	1.216(0.370)
Wealth status	x		
Poor (Ref)			
Middle		1.164(0.326)	1.310(0.382)
Rich		0.668(0.227)	0.690(0.246)
Social group	x		
Scheduled Caste (Ref)			
Other Backward Class		1.298(0.370)	1.434(0.417)
Forward Caste		2.526*(0.950)	2.335*(0.897)
Muslim		2.103(0.842)	2.189(0.908)
Sex composition of children	x		
no. sons = no. daughters (Ref)			
no sons > no. daughters		1.242(0.308)	1.407(0.361)
no. sons < no. daughters		0.812(0.238)	0.736(0.220)
Experienced child loss	x		
No (Ref)			
Yes		1.338(0.393)	1.574(0.477)
Duration of marriage	x		
d"10 years (Ref)			
>10 years		1.595(0.527)	1.429(0.484)
Husband present in household	x		
No (Ref)			

Table 3 continues…

Characteristics	Model-1	Model-2	Model-3
Yes		4.035***(1.075)	3.767***(1.028)
Husband's education	x		
No/low education (Ref)			
Secondary		1.359(0.498)	1.421(0.531)
Higher secondary & above		1.581(0.694)	1.481(0.665)
Spousal educational gap	x		
Both illiterate (Ref)			
Husband more educated than ego		1.918(0.845)	1.218(0.575)
Both equally educated		3.079*(1.655)	2.117(1.206)
Ego more educated than husband		2.721*(1.306)	1.693(0.883)
Healthcare decision	x		
Herself (Ref)			
Spouse		0.693(0.217)	0.641(0.214)
Jointly		0.500*(0.143)	0.450*(0.143)
Others		0.143**(0.101)	0.155*(0.113)
Formal exposure to family planning methods			
Saw/read FP message on poster/banner	x	x	
No (Ref)			
Yes			1.058(0.361)
Heard/watched program on modern FP@radio/television			x x
No (Ref)			
Yes			1.237(0.432)
Heard talk on modern FP@clinic/health center		x	x
No (Ref)			
Yes			2.049*(0.713)
Visited by health staff at home to advice on FP		x	x
No (Ref)			
Yes			1.307(0.356)
Log likelihood	-358.579	-304.609	-299.222
Constant	0.660(0.154)	0.060*** (0.032)	0.037*** (0.021)
Pseudo R^2	0.063	0.204	0.218
Total sample	567	567	567

*Note: Model-1 adjusts for network characteristics; Model-2 adjusts for ego's and husband's characteristics (ego's age, education, wealth status, social group, sex composition of children, experienced child loss, duration of marriage, health care decision for self, husband usually present at home, husband's education, spousal education gap); Model-3 adjusts for formal exposure to family planning (saw/read FP message on poster/banner, heard/watched program about FP on radio/television, counseled about FP at health center, counseled about FP at home by health worker); ***p<0.001 **p<0.01 *p<0.05.*

approval for family planning by main and other alters after controlling for demographic, socioeconomic and formal exposure to family planning methods among egos (Table 3). In the first model, we examined the influence of approval for contraception by main and other alters on likelihood of ego's current use of any family planning method. It may be noted here that if the main alter approved family planning method, egos were significantly two times more likely to currently use any contraception than their counterparts. However, approval for family planning by other alters was not statistically associated with ego's current use of contraception. Even after adjusting for the ego's and husband's demographic and socioeconomics characteristics and the formal exposure to family planning methods in the second and third model respectively, approval for the current use of family planning by main alter appeared had statistically significant and positive association with the current use of any contraception among egos. This suggests that social influence mechanism is positively exercising its influence on the current use of any family planning methods among egos in the study area. We also observed statistically significant association of any contraceptive use with egos from forward social groups, whose husband usually stayed at home, herself took decision regarding own health care, and was counseled about family planning methods at the health center.

We further examined the influence of family planning methods used by main and other alters on the contraceptive method choice of egos. Given the polychotomous nature of dependent variable (contraceptive method use: 0=no method; 1=limiting method; 2=spacing method), we fitted multinomial logistic regression models to assess the effect of family planning methods used by main and other alter on egos' contraceptive choice after adjusting for selected demographic, socioeconomic and network characteristics of egos (Table 4). As multinomial logistic regression estimates *k-1* model, where k is the number of levels of the dependent variable, we setup the no method use as our reference group. Consequently, we estimated models for limiting method relative to no method use of ego and spacing method relative to no method use of ego.

It was observed that, keeping all factors constant, a unit increase in spacing method by main alter was significantly associated with 0.385 times decreased relative risk ratio of limiting method use relative to no method use by egos. Similarly, unit increase in no method use by main alter was significantly associated with 0.242 times depressed relative risk ratio of limiting method use relative to no method use among egos, keeping all other factor constant. Furthermore, unit increase in no alter was also significantly associated with 0.089 times decreased relative risk ratio of limiting method use relative to no method use by the egos. However, we do not found any significant association between contraceptive methods used by other alters with egos risk of using limiting relative to no method. We further observed that, keeping all other factors constant, unit increase in no method used by main alter was significantly associated with 0.163 times decreased relative risk ratio of spacing method use relative to no method use by egos. Interestingly, it was found that, keeping all other factors constant, unit increase in spacing method by other alters was significantly associated with 7.966 times increased relative risk ratio of spacing method use relative to no

Table 4: Relative risk ratios from multinomial logistic regression model predicting the likelihood of contraceptive method choice adjusted for selected ego's and husband's demographic, socioeconomic, network and formal family planning characteristics, Jaunpur, Uttar Pradesh, 2010

	No method vs. Limiting	No method vs. Spacing
Ego's and husband's characteristics		
Age		
18-24 years (Ref)		
25-28 years	1.424(0.696)	0.379*(0.179)
29-32 years	2.710(1.494)	1.709(0.194)
33-35 years	5.162**(3.130)	0.737(0.462)
Education		
No/low education (Ref)		
Secondary & above	0.631(0.240)	2.528*(1.132)
Wealth status		
Poor (Ref)		
Middle	1.662(0.638)	1.648(0.670)
Rich	1.158(0.506)	1.342(0.654)
Social group		
Scheduled Caste (Ref)		
Other Backward Class	1.003(0.374)	1.703(0.675)
Forward Caste	1.602(0.775)	4.223**(2.094)
Muslim	2.532(1.245)	1.352(0.741)
Sex composition of children		
no. sons = no. daughters (Ref)		
no sons > no. daughters	0.674(0.222)	3.600***(1.321)
no. sons < no. daughters	0.358**(0.136)	2.267(0.952)
Duration of marriage		
d"10 years (Ref)		
>10 years	3.128**(1.377)	0.591(0.269)
Husband present in household		
No (Ref)		
Yes	2.008*(0.692)	5.511***(2.298)
Husband's education		
No/low education (Ref)		
Secondary	2.180(1.034)	0.586(0.325)
Higher secondary & above	2.737(1.542)	1.100(0.698)
Spousal educational gap		
Both illiterate (Ref)		
Husband more educated than ego	0.960(0.608)	0.890(0.546)
Both equally educated	2.448(1.822)	0.749(0.537)

Table 4 continues…

	No method vs. Limiting	No method vs. Spacing
Ego more educated than husband	3.586(2.545)	0.792(0.548)
Healthcare decision		
Herself (Ref)		
Spouse	1.241(0.522)	0.364*(0.164)
Jointly	1.018(0.442)	0.387*(0.155)
Others	na	0.261(0.214)
Alter's characteristics		
Main alter's method use		
Limiting method (Ref)		
Spacing method	0.385*(0.162)	0.556(0.244)
No method	0.242***(0.088)	0.163***(0.070)
No alter	0.089***(0.053)	1.206(0.648)
Other alters method use		
Limiting method (Ref)		
Spacing method	0.473(0.209)	7.966***(4.133)
No method	1.045(0.378)	5.811(2.781)
No alter	na	na
Formal exposure to family planning methods		
Saw/read FP message on poster/banner		
No (Ref)		
Yes	2.475*(1.155)	0.306*(0.148)
Heard/watched program on modern FP@radio/television		
No (Ref)		
Yes	0.626(0.283)	0.766(0.371)
Heard talk on modern FP@clinic/health center		
No (Ref)		
Yes	1.563(0.708)	2.743*(1.266)
Visited by health staff at home to advice on FP		
No (Ref)		
Yes	2.504**(0.881)	1.196(0.467)
Log likelihood		-395.947
Constant	0.027***(0.202)	0.025***(0.020)
Pseudo R^2		0.322
N		567

*Note: ***p<0.001 **p<0.01 *p<0.05***(Footnotes)

The data was collected as part of the doctoral dissertation with partial funding from the University Grants Commission, New Delhi and the London School of Hygiene and Tropical Me dicine (LSHTM), London.

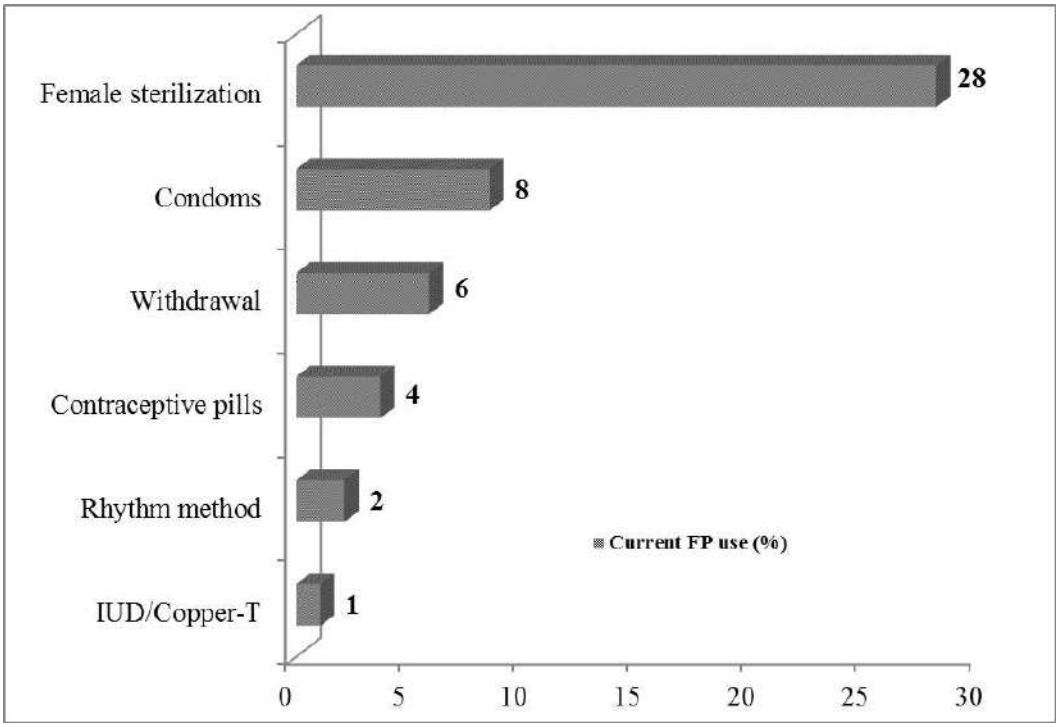

Figure 1: Current use of family planning methods among egos, Jaunpur, Uttar Pradesh, 2010

method use by the egos. These findings indicate that main alter do play an important when it comes to take a final call about the use of limiting method by egos. Probably the main alter shared positive experiences to convince egos about benefits of terminating family size after achieving a desired level by adopting female sterilization. Further, main alter may have also discouraged the use of reversible methods contingent with associated health risks/side effects/failure risks. On the other hand, it appears that other alters seems to play crucial role with regard to use of spacing method among egos. Here, wider discussions / consultations and shared experiences/ evaluations about the benefits related to spacing of children, and wider choice of reversible methods may have helped to convince egos decision to opt for spacing methods.

6. Discussion and Conclusion

This micro level study using ego-centric social network data, perhaps for the first time, investigated the association between family planning related attitude and its practice within women's social networks and the use of family planning methods by women themselves in rural Uttar Pradesh, India. It broadly examined the influence of social interactions on contraceptive method choice of egos through two mechanisms: approval for contraceptive use by main and other alter (social influence); and actual contraceptive method use by main and other alters (social learning).

It was found that after adjusting for ego's and husband's demographic and socioeconomic characteristics and formal exposure to family planning methods, approval for family planning by main alter had significant and positive association with current contraceptive use among egos. However, other alters approval did not matter. Furthermore, effects of the actual method used by main alter and other alters on egos likelihood of choosing a contraceptive method was investigated. It was observed that main alters use of spacing method, no method use and no alters respectively had significant and negative association with relative risk ratio of limiting method use relative to no method use by the ego. On the other hand, use of spacing method by other alters had significant and positive association with use of spacing method relative to no method among egos, keeping all factors constant. In addition, no method use by main alter had a significant and negative influence of relative risk ratio of spacing method use relative to no method use among egos, after holding other factors constant. These results suggest that main alter make vital influence on use of limiting methods of egos while other alters shape the adoption of spacing methods by egos in the study area. However, most notable fact remains that no methods use of alter or having no alter seems to have strong negative bearing on contraceptive use among egos. These findings confirm results from other studies as well wherein approval, experience and advice from social network partner emerged as critical factor in women's decision regarding choice of family planning methods (Rutenberg and Watkins, 1997; Valente *et. al*., 1997; Musalia, 2005).

Given the cross sectional nature of the data, the present study only examined the associations between women personal social networks and its influence on their fertility behaviour. Therefore, it was difficult to establish any cause and effect relationship between the above two. Furthermore, the social network that was considered in the study was ego-centric i.e. person considered as relevant from the stand point of egos. Therefore, alters characteristics and fertility related behaviour are reported by the egos. However, even then, what matters is the perception that ego carries from alter with regard to fertility that helped/ constrained her to make some informed decisions on family size and contraceptive method use. Information was not directly collected from husband or mother-in-laws and cross verified with the egos. Perhaps, some of these may be addressed in future research.

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Green Spaces in the Urban Environment: A case study of Varanasi City

Kaushalendra Prakash Goswami and Niraj Kumari

The green belts in urban area are considered to be an integral part of the urban landscape lending beauty to the concrete of which the city is made. It gives fresh environment and release of mental stress caused by the hectic life. Varanasi city is the centre of Indian tradition religion, culture practices and rituals, rich in heritage and colours of India. So as to be described as mini India representing all the colours of Indian diversity, a city having a sense of its own, breathing and living in daily homage paid to the god and goddesses. The city as old as the culture of the country itself, built centuries ago is now wanting more space to breath and grow to come out of the old maze like narrow streets which has become its identity, with crumbling buildings which still hold the mark of its beauty, buried under dust of lack of maintenance it is asking for attention. Varanasi is a city in mess, with uneven development, and unplanned expansion of unapproved colonies. The city which is very significant as a religious and tourist centre, at present is in need of urban forestry which is only about less than 5 % and which actually should be 20% for urban areas. The question that arises is that in spite of its significant as one of the important cities in the north why have the care or initiative not been taken by the State or central government. The paper highlights the work done by the forest division to create green belts and plant them by social forestry schemes to make the city ecologically balanced.

Keywords: Urban forestry, Biodiversity, Green belts, Ecological function, Development Pressure, Tourism and Pilgrimage, Air pollution, Noise pollution.

Introduction

Urban green space can be broadly defined as any land predominantly covered with vegetation or water that is situated within an urban area. This space can include parks, gardens, playing fields, children's play areas and also derelict and vacant land. Green space is often considered to be an essential type of urban land use that can benefit urban dwellers through making their everyday life more pleasant, liveable and healthy but in some countries and cities one which is diminishing too frequently in extent. Many areas of green space within or adjacent to cities are experiencing pressures and threats resulting from the processes of urban growth and redevelopment that are occurring in cities in all parts of the world. There is thus a widespread concern that the rapid expansion and internal restructuring of urban areas in many countries

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can isolate urban dwellers from direct contact with nature (Wilson, 1984; Miller, 2005; Fuller et al., 2007). These concerns appear to be particularly strong in developing countries, where there is evidence that urban green spaces are often being lost or degraded at alarming rates (Kuchelmeister and Braatz, 1993;Yamamoto, 2009).

The definition of urban greening incorporates human beings as an integral part of the urban forestations, ecosystem association defines urban forest as those areas in and around populated regions that has the potential for tree growth .therefore people should consider trees and associated vegetation and animals when designing and developing their communities.

The tendency however has been to built cities to accommodate motor vehicles, sidewalks and huge concrete buildings. A 1991 survey by the American forestry association reveals that of the twenty cities more trees are dying and being removed than are being planted. In downtown areas, trees may be relegated to the status of outdoor furniture in concrete planters to be replaced at two to five years interval. This is largely due to the lack of effective urban forest management.

Ideally urban greens entails association sufficient soil area for root to spread selecting appropriate tree species for soil types location planting in areas that will not obstruct human activities ,and implementing a comprehensive maintenance programme which includes regular watering pruning and removal of dying trees, as well human beings must be discouraged from causing undue harm to the trees, lime from concrete ,cleaning solvent, oil and even dog urination can all contribute to the early demise of the root system(Chaudhry et al, 2010) .Also walking on the soil the tree or using heavy mechanism in construction results in compacted soil ,which destroys the soil, which denies the root adequate oxygen.

Care should be taken of even the little amount of plantation that is in the city because it is the lifeline of the city, giving life to the stony lifeless structures and bringing colour to the busy lives of the people lost in the piles of daily toil and fast paced life.

Why the urban green frame should be encouraged

Properly planned and managed urban green areas can provide and maintain a wide range of basic ecological, social and economic functions and values upon which human well-being depends.

Ecological Function

Ecologically, green spaces are significant for nature conservation as they provide habitats for a wide range of flora and fauna. The very presence of plants in a city improves the visual appearance of the urban environment, contributes towards climate change prevention, creates lower densities of development and reduces levels of activity in an area.(Barker, 1968). This contributes to a more peaceful and relaxed ambience, a benefit equally important in commercial and residential areas. Plants can improve the atmosphere by absorbing atmospheric carbon and releasing oxygen to improve the quality of air. Vegetation can also act as a buffer by absorbing and reducing noise. Like air conditioners, plants transpire water that, in turn, reduces the temperature. Well drained green areas can enable water to infiltratethe soil and reach the water table without causing toomuch run-off. This, in turn, can reduce urban flooding andthe accumulation of stagnant

water. Flooding can causesewer systems to overflow, thereby bringing bacteria-richwaste to the surface, while stagnant water may providebreeding grounds for malaria and dengue fever-carryingmosquitoes. Bamboo, water reeds or willow can helpprevent soil erosion along river banks.

Social Functions

Socially, benefits from urban greenery can accrue to urban communities through access to urban green spaces, healthy living and education. Many public green areas provide the local community and visitors with opportunities for physical recreation and relaxation, as well as for social interaction. For this purpose, green spaces do not have to be necessarily large to be enjoyed (Thomas, 2013).However, one concern that is sometimes raised about public open spaces is their potential to attract criminal activities such as drug dealers and other undesirable elements from outside the immediate community. This is because the public green spaces are often deserted at night, thus providing secluded and convenient venues for crime. However, if the community has been involved in the planning and implementation of a green area, its presence could be increased as it takes over management and ownership of the green areas in their locality.

Economic Function

Economically, urban greens, once mature, can be a source of raw materials for local handicrafts and small scale commercial activities. Similarly, in poor urban areas, where food purchasing makes up a large part of a house-hold's income, the produce from urban agriculture or gardens can be used for home consumption and as an effective way of supplementing income, thus contributing towards poverty reduction.

High quality parks and green spaces often add an economic value to a city by improving the quality of the townscape. This can assist in urban regeneration and renewal; improve the attractiveness of locations for business investments; create community enterprises; and generate new employment opportunities (Thomas, 2013). Green space areas can also provide shaded cool areas for vendors and customers seeking to escape from the heat.

Objective of the study:

The present study has following objectives:

- To assess the need of green belts in the city.
- To study the condition of green belts in the city.
- To assess the adverse effect due to the lack of urban forestry.
- To assess the work done by Forest Division in this direction.

Methodology

The data is collected from secondary source. The data of the plantation work and proposed plantation work is of secondary nature. It is collected from the office of forest division Varanasi, land use data collected from the office of Town and Country planning, the data of pollution from Dept. of Environmental Science (B.H.U.), the evaluation of the result is done with the help of Statistical Cartographic method and using MapInfo (8.5) and Arc GIS (9.1) for map making.

Study Area

The city of Varanasi is located in the middle Ganga valley of North India, in the Eastern part of the state of Uttar Pradesh, along

the left crescent-shaped bank of the GangaRiver. The Varanasi City is the district headquarters of the Varanasi District and the major part of the urban area, delimited by the Census as 'Varanasi Urban Agglomeration' (VUA; 82º 56'E - 83º 03'E and 25º 14'N - 25º 23.5'N, covering an area of 112.26 sq. km) and consisting of 7 urban sub-units (fig.1). These urban units are: (a) Varanasi), (b) Ramanagar MB, (c) Maruadih Railway Settlement), (d) Varanasi Cantt, (e) Banaras Hindu University NA, (f) Phulwaria CT, and (g) Sheodaspur CT. The average height of the city from mean sea level is 77m., i.e.: around 72m in the south along the Assi stream, and 83m at the high ground near the confluence of the Varana to the Ganga River in the north (known as Rajghat plateau). The nature and the character of the banks of the Ganga River has made the position of Varanasi so stable and enviable that it is among the few cities of the world which show little shifting in its site. The city proper is built on a high ridge of kankar (lime concretion) that forms the left bank of the Ganga for a distance of 5km, being quite above normal flood level. The maximum temperature of summer season is 45 and the minimum temperature is 32; while the maximum temperature in winter season is and the minimum temperature is, and the average rainfall is 600–1,000 mm. Due to floods caused every year the Quaternary Sedimentary layer is covered with two layers of soil, the new Alluvium and the Old Alluvium. Old Alluvium is formed as the mixture of Khad and Sand and is still found in the riverbeds of Ganga River and its tributaries.

Why the study area is Varanasi?

The area selected for the study of urban forestry is Varanasi city, the centre of Indian tradition religion, culture practices and rituals, rich in heritage and colours of India. So as to be described as mini India representing all the colours of Indian diversity, a city having a sense of its own, breathing and living in daily homage paid to the god and goddesses. The city as old as the culture of the country itself, built centuries ago is now wanting more space to breath and grow to come out of the old maze like narrow streets which has become its identity, with crumbling buildings which still hold the mark of its beauty, buried under dust of lack of maintenance it is asking for attention.

The condition of Varanasi is at present is degrading with a rapid pace ,with the increasing population, and the pressure on the city to provide urban amenities to the growing population and also the additional pressure of floating population of tourists who visit the city in large numbers. The city is not able to take in any more , its deteriorating environmental condition is calling for attention, The city is not able to keep pace with the time which is demanding more and more from the city,

The city needs fresh and clean Air to breath, quite and calm surroundings, the sky free of dust to see clearly the rising sun and shade to cool off in summer and more pouring water to drench itself. To put it in word the city needs lungs to breath, for this it needs urban green belts which are very much lacking.

Urban green belts are considered the lungs of the cities as they act as a sink for some of the harmful gases released by vehicles and industries operating in the city area, they check the flow of dust and bring down noise pollution level. Whether sprawling over a large area or a small belt, these green belts are found in all cities and play a very important role. Plants provide innumerable environmental benefits

LOCATION OF VARANASI CITY

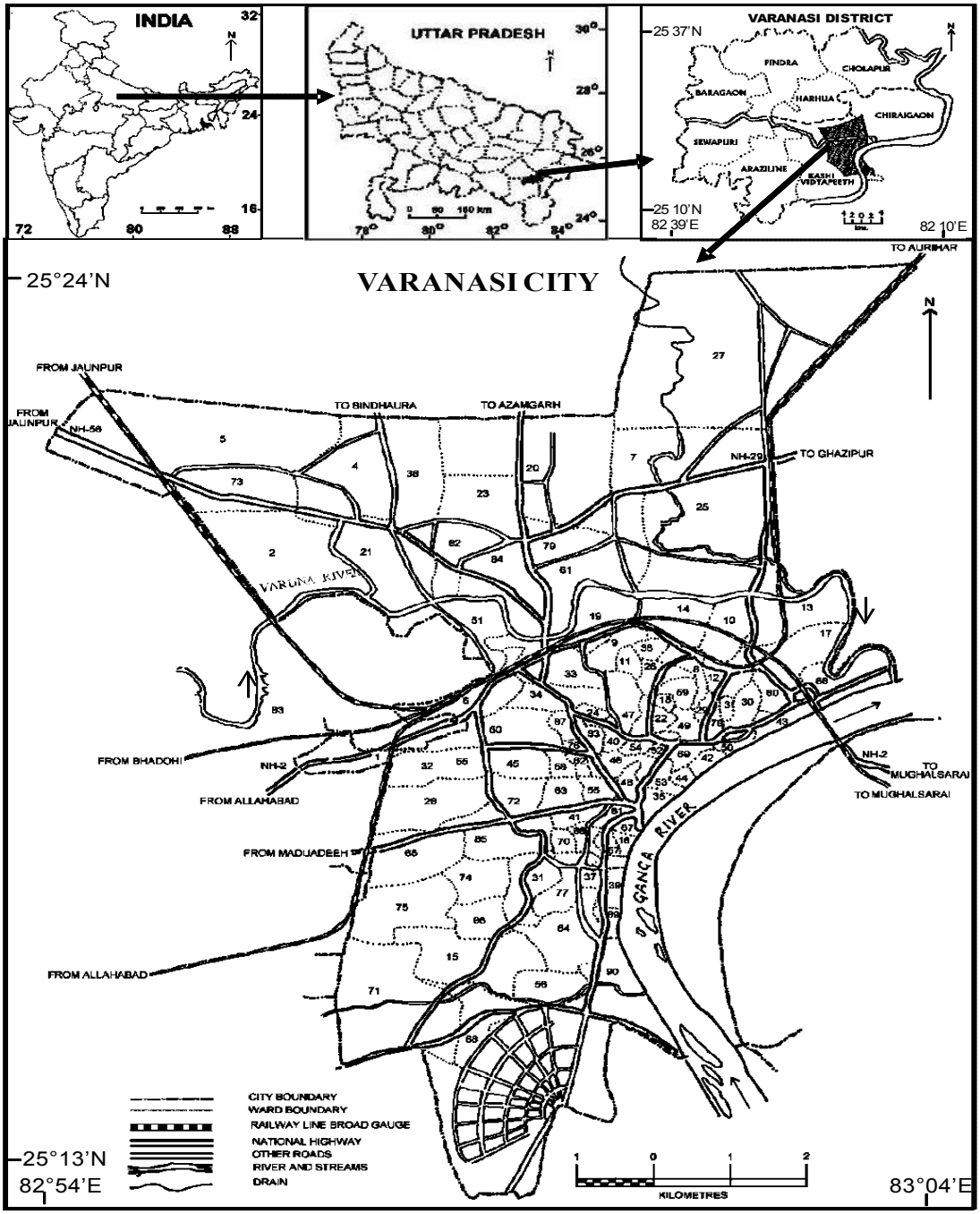


Fig: 1

and considering the steady increase in air pollution, it has become imperative to increase the green belts in and around the cities. And the case is similar to Varanasi, there the increase in the number of trees and urban green belt is the need of time which if not paid attention to, would cause disintegration of the city.

Need of Urban Forestry in Varanasi

(i) Development Pressure : Increasing Population, According to the Census of 2011, the population of the city was around 1.43 million. It is projected that by 2021 the population of the city will cross 2.5 millions! There is, moreover, an estimated 30,000 daily floating population in the city. The riverfront and old city is densely populated (above 500 persons/ per ha), and it is here that development pressures are altering irreversibly the socio-cultural fabric of the city. Shrinking spaces,with population growth, is increasing the demand for utilising every inch of free space, including gardens. This is creating pressures for substituting existing spacious architectural forms with optimal space utilisation plans. Parks are becomingsmaller and giving way to concrete residential or commercial structures Modifying urban spaces. The modification of urban spaces in the old city centre of Varanasi could also negatively alter the religious and cultural life increasing traffic. Increasing population is leading to traffic congestion, not only at peak hours but at most hours of the day. This leads to noise pollution and smog.

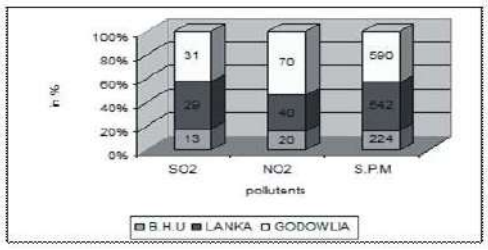
(ii) Tourism and Pilgrimage Pressure : Every year around a million pilgrims come to this city, and all of them bathe in the Ganga River, followed by worshipping in various temple. Tourism and related activities are major source of city's economy. However, it is more important to maintain a sustainable tourism development that is in harmony with the existing cultural and religious atmosphere of the city

(iv) Environmental Pressure : The rich abundance of clay has kept the eco-system of the river still intact but increasing urban and industrial pressure and pollutant agricultural run-offs have started stretching the sustainable limits of the river system to the maximum. The river eco-system is facing pressures in the river front zone and also from other parts of the city whose sewage flows directly into the river. It is also facing pressure from the pollutant agricultural run-offs from villages around the city. However, approximately 80% of the pollution in the River Ganga in Varanasi is urban waste, and of its 60% is concentrated in the Riverfront.

(v) Air Pollution : The air pollution in the city is increasing with the increase in the number of vehicles running on diesel and Petrol. The numbers of factories are increasing which are located in the city or in areas very close to the city. These include not only large factories but also small scale and cottage industries , specially the traditional sari industry and handicraft industry, although their contribution is less but they do form an important contributor .domestic sources which has increased its contribution due to increase in the population and number of houses. The data acquired from the Department of environmental Science, BHU. Shows the comparison of Air pollution Recorded in three places in Varanasi city At BHU, Lanka and Godowlia, showing contrasting difference between these three places in the amount of So2, No2 and S.P.M. (suspended particulate matter).

Concentration of Air Pollution at Various Stations in Varanasi

Monitoring Station	SO2	NO2	S.P.M
B.H.U	13	20	224
Lanka	29	40	542
Godowlia	31	70	590



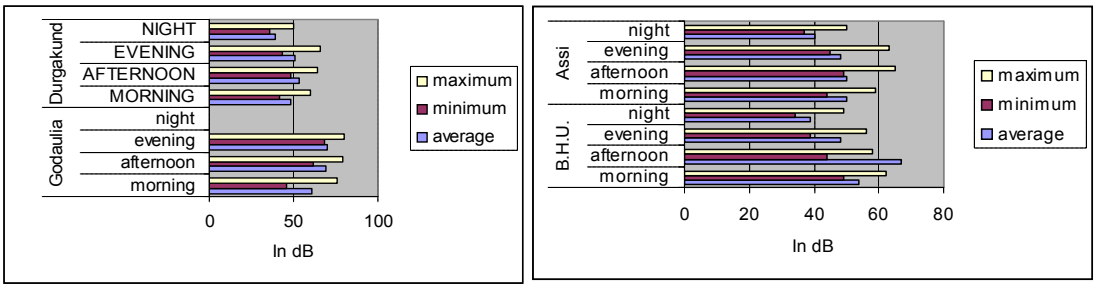
BHU considered to be the most green area located on the Southernmost tip with abundant trees has So2 concentration of 13 micro gram / meter^3 , 20 micro gram / meter^3 and S.P.M. of 224, the pollution level recorded at Lanka just outside BHU So2 concentration of 29 micro gram / meter^3 , 40 micro gram / meter^3 and S.P.M. of 542 and the level of pollution in Godowlia the busiest place in the city is So2 concentration of 31 micro gram / meter^3 , 70 micro gram / meter^3 and S.P.M. of 590.

(vi) Noise Pollution : The level of noise pollution in the city although has not crossed

Table 1 : Noise Level Recorded at Various Stations in Varanasi (in db)

Monitoring Station	Time	Averagenoise Level	Minimum	Maximum
Durgakund	Morning	48	42	60
	Afternoon	53	48	64
	Evening	51	43	66
	Night	39	36	50
Assi	Morning	50	44	59
	Afternoon	50	49	65
	Evening	48	45	63
	Night	40	37	50
Cantt Railway Station	Morning	62	55	75
	Afternoon	71	59	82
	Evening	68	53	78
	Night	58	49	67
Godaulia	Morning	61	46	76
	Afternoon	69	62	79
	Evening	70	68	80
	Night	-	-	-
B.h.u.	Morning	54	49	62
	Afternoon	67	44	58
	Evening	48	39	56
	Night	39	34	49

Level of Noise Pollusion in Varanasi City



Source: Department of Environmental Science, B.H.U

the danger line but still it is significantly high than the nominal level, the level of noise pollution recorded at Gowdulia (Commercial area) by the department of Environment Science shows the recordings at 69 dB during the day and 58 dB at night while the Standard given by the Gov. stands at 65 dB during the day and 55 dB at night for commercial area

Open and Green Spaces in Varanasi City

National forest policy recommended that there should be 33 percent forest cover of the total geographical area of the country in all, 60 percent land in the hilly region 20 percent in the plain.The study area has only 5.49 percent green cover of its total geographical area. There

Table 2 : Land use Category of Varanasi City (1991-2011)

Sl No.	Land use category	Area 1988,ha	I:MP as in 1991		I:MP as in 2011		Change
1	Residential	2615.64	5,457.24	37.65	9,254.61	51.62	+69.58
2	Commercial	176.08	475.10	3.28	618.23	3.45	+30.13
3	Industrial	195.31	981.37	6.77	656.19	3.66	-33.13
4	Public and Community facility	261.05	450.42	3.11	1,309.07	7.30	+190.63
5	Recreational (Parks/Open grounds)	53.04	2705.76	18.67	984.47	5.49	-64.95
6	Services and utilities	-	-	-	103.97	0.58	-
7	Government and Semi government	56.69	292.18	2.01	1433.15	7.99	+390.50
8	Tourism	-	-	-	423.73	2.37	-
9	Transport and communication	914.30	1300.27	8.97	1460.35	8.15	+12.31
10	Others (Agriculture and Open space)	1393.79	28,32.06	19.54	1,683.45	9.39	-40.56
	Total	**5,665.90**	**14,494.40**	**100.00**	**17,127.22**	**100.00**	**+23.68**

Source-Varanasi Development Authority

Possible Places Where Tree Plantation Can Be Done.

Fig.2a

Fig.2b

Source: Forest Division, Varanasi

is a negative change of -64.95% in green cover of the city during 1991 to 2011. In 1991 2,705.75 hectare land has green covers but in 2011 it shrieked very much and now only 948.47 hectare land has greenery in the city, which shows its poor condition in city sustainability (Fig. 2b).

Decadal Study of Plantation Work (2002-2013)

Settled amidst the eighty ghats from the Varuna River to the Assi River is the city of Varanasi the centre of culture religion and tradition. This holy city of Gods is changing into the most polluted city as a result of increasing population, pollutants from the factories, and smoke from the vehicles running on petrol / diesel.

In the past 20-25 years 20-25% increase in the number of vehicles, the increasing number of houses to accommodate the growing population .the liberation of pollutants from the increased number of factories, the growth of transportation network, all these have caused the destruction of green covers in the city. To improve this condition the only alternative is to plant trees on a large scale (Fig. 2a) .

The area of the Varanasi city is 6992 hectare in order to maintain the environmental

Table 3 : Yearly Plantation of Tree Done Under the Varanasi Forest Division

S. no.	Year	Area where plantation has been done					Total	No of trees planted
		Road (In hectare)	Canal (In hectare)	Railway line (In hectare)	Gram Samajh (In hectare)	Others (In hectare)		
1	2002-03	41.00	4.00	32.10	15.50	37.50	130.10	166580
2	2003-04	46.50	5.00	67.50	23.50	22.00	164.50	201921
3	2004-05	5.00	5.00	12.00	15.00	3.00	40.00	53729
4	2005-06	88.50	26.00	30.00	109.00	19.50	273.00	418525
5	2006-07	15.00	2.00	31.00	64.00	16.00	128.00	216680
6	2007-08	8.00	1.00	5.00	23.00	18.00	55.00	96900
7	2008-09	3.00	8.50	12.00	46.50	23.00	123.00	133800
8	2009-10	6.00	-	29.00	90.50	23.50	158.00	282700
9	2010-11	-	-	-	-	-	-	-
10	2011-12	5.00	2.00	15.00	50.00	40.00	112.40	84891
11	2012-13	-	13.00	1.00	18.50	9.50	42.00	63570
	Total	**218**	**66.5**	**234.6**	**455.5**	**212.5**	**1157.5**	**1861297**

Source: Forest Division, Varanasi.

equilibrium at least 33% of the land area should have green cover .In the bygone years the work of planting trees have been carried out but the lack of funds, and the work being carried out on a very small scale, the desired result has not been got.

Roadways: Due to immense pressure of vehicles and lack of space on either side of the roadways, there are difficulties for plantation along road side. But few plantations may be done along NH 56 from jaunpur and NH 2 from Allahabad to mugalserai, passing through the city.

Railways: There is possibility of tree plantation along railway line from cant station-Kashistation; in the same manner Varanasi-Allahabad railway line passing through the town has possibility for plantation.

Ponds: Tree plantation can be done along the important ponds like the chakka, Ganeshpur, Sarnath, Son etc. and also along other smaller ponds.

Parks: There are many parks in the city but the possibility of tree plantation is only possible in very few parks.

Educational Institutions: Plantation can be done in the campus of University, Colleges, and schools through various urban social forestry programs.

Government & Non- Government Institutions: Plantation can be done in the campus of these institutions

Residential Colonies: Plantation can be done in various residential colonies, or on lands available along the roadway through community forestry. In order to protect the planted trees, and keeping in mind the availability of land, protection could be done by

Table 4 : Details of the Places Proposed for Plantation of Trees in Varanasi Range

Name of the range	Sl No `	Name of The Place Residential Colonies	No of Plants
Varanasi	1	Ganeshdham Colony	150
	2	Chandrikanagar Colony	100
	3	Patelnagar Colony	80
	4	Nagar Colony	100
	5	Sanjay Gandhi Nagar Colony	100
	6	Bharat Milap Colony	150
	7	SauravVihar Colony	100
	8	Ashokpuram Colony	200
	9	Vivekanand Nagar Colony	80
	10	Gokulpura Colony	100
	11	Balaji Nagar Colony	150
		Total	1310
	ALONG THE ROADS		
	1	Lahartara-Manduari crossing	350
	2	Lanka-Seer Road	125
	3	Cant-Rajghat	500
		Total	975
	EDUCATIONAL INSTITUTIONS		
	1	Jainarayan Inter College	200
	2	Adarsh Inter College	70
	3	D.A.V. Inter College	100
		Total	370
	PARKS		
	1	GulabPark	50
	2	NatiImliPark	30
	3	SaketnagarPark	100
	4	BrahmanandPark	20
	5	In various other parks	1000
		Total	1200
	OTHERS		
	1	Cantonment area	700
	2	AssiNala	500
	3	Padao-Baba Anil Ashram	200
	4	Dairy-BhagwanAvdhutram Samadhi Colony	200
	5	Gautam Nagar Chitaipur	250
		Total	1850
		TOTAL	**5855**

Source: Forest Division, Varanasi.

Table 5 : Details of The Places Proposed for Plantation of Trees Kashi Range

Name of the range	Sl. No.	Name of The Place	No of Plants
		Residential Colonies	
Kashi	1	Omnagar Colony	250
	2	Ashok Vihar Colony Phase-II	250
	3	Ashok Nagar Colony	100
	4	GautamVihar Colony	100
	5	Rajeshvari Nagar Colony	50
	6	Anmol Nagar Colony	100
	7	Kashi Enclave Colony	250
	8	Gautam Nagar Colony	300
	9	Chitragupt Nagar Colony	25
	10	TulsiVihar Colony	250
	11	Shivnathpuri Colony	75
	12	Shivpur Colony East and West	150
	13	Bhaktinagar Colony	200
	ALONG THE ROADS		
	1	Lakshmi mandir – Pandeypur	50
	2	Pahadiya – Bela Road	150
	OTHERS		
	1	UdayPratap College-Panchkosh RoadPandeypur	25
	2	Traffic Police line	50
	3	JeevanBimaHospital	150

fencing, Brick guard, Tree guard or Iron guard.

Difficulty Problems and Solution of Urban Forestry by The Forest Division Varanasi

Difficulties

I. The area where tree plantation is possible in the city is under the municipal corporation, educational institutions or government offices. Generally cooperation for the work of foresting is not got from these institutions.

II. Adequate monetary help in not provided by the government for undertaking the work of plantation, therefore the forest department has to depend on other organizations, who not well informed about the technique of plantation therefore, the work of urban foresting is not always successful.

III. Since the needs of forested plants are different therefore the plantation done under the prevalent techniques are not successful, they are not even useful in the beautification of the city.

IV. The plants suitable for plantation in the urban areas are not grown in the nurseries of the forest department, because it's very

difficult to grow them and to look after them and this also becomes very costly and surpasses the budget.

V. The trees planted in the urban areas need a lot of care, because these trees are badly affected by the pollution and population pressure, but due to lack of funds proper care can't be given.

VI. Apart from the forest department the work of plantation done by other government and non government organizations are not given proper attention or care.

Problems

I. There is no provision of providing funds to the damage caused by the falling of trees etc to the houses. Therefore people do not show interest in growing tall trees near their houses.

II. There is no law to punish people who cause damage to the forested area, therefore care is not taken.

Solution

Varanasi city has only 5.49% vegetation cover of the total geographical area. To maintain the standard level (33%) of vegetation cover, the people of the city as well as the city dwellers will have to save and increase the green cover by the following ways:

I. Create new places as per new master plan.

II. Social forestry programmes should be launched at priority basis in the densely populated areas.

III. Roof top floriculture may be preferred.

IV. Convert community lands and unused private lands into green zones.

V. Increase the level of awareness among the people of the city.

VI. Start some award schemes for plantation more trees on own private lands.

VII. In order to protect the plants that have been planted adequate measure of its protection has to be taken.

Conclusion

Urban forests are fundamentally a human dominated ecosystem i.e. the role played by human beings in the urbanforestry environment is critical. The educational level andenvironmental awareness of urban residents play a crucialrole in determining species composition, management andoverall demand for urban forests. Urban greenerydevelopment relies not only on investment and technology, but largely on the attitude and involvement of urbanresidents. The need of the hour in India is to educate people and policy makers about the utility of urban green spaces, because public knowledge of the connection between human well being and ecosystem services is limited. Urban greenery plays a significant role in developing countries towards development of tourism sector, thereby contributing in city's economy.

Urban green belts are very important for the city take the present environmental state of the study area. The city has very few pockets, at present only 948.47 hectare land covers green belts due to irregular financial support, plantation work is not regularly done likewise in 2010-2011 no plantation work has been done in the city because fund was not provided by the government.

1. The public of this city to some extent are aware of the problems but no one is ready to take any kind of personal initiation.

2. Lack of environmental monitoring within the various government bodies.

3. Poor public interest regarding the idea, 'clean city green city'.

4. Lack of public place for creating new spaces due to concrete forest.

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