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Introspection of Indian Agriculture with Respect to Food Security and Agricultural Sustainability

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Abstract

Alarmingly high population pressure in the country has led to fast decline in availability of arable land from 0.69 ha in 1991 to merely 0.15 ha in 2011. In order to feed huge population of 1211 million (2011) of the country, food demand would need to be increased to 345 million tons by 2030. However, net cultivated area is stagnating since last 30 years. Besides, response to fertilizer application in food grain production is declining steadily. Per capita calorie intake is decreasing in both rural and urban areas. Thus time has come to introspect agricultural scenario of the country for achieving food and nutritional security and agricultural sustainability.

Introduction

High population growth continuing in any country over a long period of time retards the overall development and poses a challenge to agriculture for producing enough food. India is passing from this stage where population growth above 20 per cent per decade since 1951 has been alarming. The unprecedented increase in population in the country from 360 million in 1951 to 1211 million in 2011 in general and rural population from 298 million to 834 million in particular has mounted enormous pressure on land resources. As a consequence, the per capita agricultural land in the country has reduced from 0.63 ha in 1951 to merely 0.15 ha in 2011. Owing to above pressure on land, the food security is also at the stake. In order to feed vast population the demand for food grains in the country would need to be increased from 192 millions tons in 2000 to 345 million tons in 2030. Hence in the next 30 years, production of food grains requires to be increased at the rate of over 5.0 million tons

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annually without degrading environment further. This problem seems to be more serious after knowing the fact that net cultivated area in the country is stagnating since last 30 years. India is feeding about 17 per cent of the world's population on merely 2.3 per cent land resource and 4.2 per cent water resource indicating more population pressure on agriculture than world's comparison.

In view of the above gloomy conditions prevailing in the country, this research paper aims to analyze the agricultural scenario over past 60 years on the one hand; and its prospects in relation to food and nutritional security and ecological sustenance on the other. Moreover, an introspection of performance of agriculture also seems pertinent because it is the backbone of Indian economy constituting the largest share of national income, employing more than half of workforce and influencing growth of other sectors of economy.

Objectives

To have a wide range of discussions for portraying comprehensive scenario of Indian agriculture in coping the increasing need of the country's population and maintaining its ecological health, following objectives have been undertaken.

(i) to analyze various kinds of agricultural land uses and cropping patterns

(ii) to describe inputs scenario and agricultural production and productivity

(iii) to assess the food and nutritional security and present an account of agricultural sustainability

Data base

For fulfilling the above noted objectives, the different informations have been collected for over sixty years period from various sources. Data for three points of times especially for 1950-51, 1980-81 and 2010-2011 are collected from secondary sources. To compute per head availability of many aspects population data of particular census year such as of 1951, 1981 and 2011 are employed in this analysis.

Study area

Present study consists of entire India which is the seventh largest country of the world. Administratively the country is divided into 36 states and union territories. It covers an area of 32,87,782 sq. km consisting of 1211 million population (second largest after China) in 2011. The country is of diverse nature incorporating mountains, flat plateaus, fertile plains, deserts, coasts and islands, several rivers, variety of soils, and tropical monsoony climate exhibiting remarkable variations in temperature and rainfall conditions. These aspects are translated into variegating agro-climatic regions which reveal large scale variations in agricultural system.

The country is endowed with much diversified agricultural structure that is characterized by the millions of peasant households, a bulk of which possess tiny land holdings. In the country there is heavy dependence of production on vagaries of nature i.e. rainfall because more than half of area under cultivation is unirrigated. In spite of slow agricultural growth in general, some pockets in the country exhibit good growth creating regional disparities as a cause of concern.

(A) Analysis of agricultural scenario

Agricultural scenario of the country has been analyzed with regards to land use, crop-

ping pattern, irrigation, fertilization, use of HYV seeds, operational holdings and consolidation, production and productivity, and growth of agriculture.

1. Land use

The land use system and its distribution in the country includes forests, land not available for cultivation, permanent pasture and grazing land, culturable waste land, land under miscellaneous trees and crops, fallow land, arable land and cultivable land. Land utilization statistics are available for 93.05 per cent or 305.90 million hectares of the total geographical area of 328.73 million ha of the country. The changes occurred in land use due to increasing demands for food, lifestyle, government's policies, pressure on land for other activities, infrastructural development, high value of crops,

irrigation, etc. have been analyzed for over 60 years period (1950-51 to 2010-2011). The salient feature of land use categories of the country are as follows:

(i) Forests

Forest considered as green gold, is a vital for entire biotic and abiotic life. It provides fuel, fodder, fruits, timber, herbs, oils and other raw materials needed in every walk of life. Table 1 reveals that the area under forests has increased from 40.48 m ha in 1950-51 to 67.47 m ha in 1980-81 but declined to 60.50 m ha in 2010-11. This happened because of unscientific developmental activities without giving due consideration on ecological perspective. Presently it accounts for 19.77 per cent of the total reporting area which is much below the national norm of 33 per cent.

Table 1: Land utilization in India (million hectares)

Land use category	1950-51	1980-81	2010-2011
Reporting area	284.32	304.15	305.90
Forest	40.48	67.47	60.50
Land not available for cultivation	47.52	39.62	43.56
Permanent pasture and grazing	6.68	11.97	10.30
Culturable waste	22.94	16.74	12.65
Land under miscellaneous trees and crops	19.83	3.60	3.20
Current fallow	10.68	14.83	14.26
Old fallow	17.44	9.92	10.31
Net area sown	118.75	140.00	141.58
Area sown more than once	13.14	32.63	57.39
Gross cropped area	131.89	172.63	198.97
Crop intensity	11.07	123.05	137.26
Net irrigated area	20.85	38.72	63.60
Gross irrigated area	22.56	49.78	86.42

Source: Directorate of Economics, Ministry of Agriculture, Govt. of India.

A perusal of status of Indian states in regards to forest cover, presents more gloomy picture as out of 36 states/union territories, only 15 states/union territories possess forest cover above the national norm. These states are Arunachal Pradesh, Chhattisgarh, Jammu and Kashmir, Goa, Odisha, Sikkim, Tripura, Uttarakhand, Manipur, Meghalaya, Mizoram, Nagaland, A and N islands, D and N Haveli, There are 11 states/ union territories namely Bihar, Gujarat, Haryana, Punjab, Rajasthan, Uttar Pradesh, Delhi, Lakshadweep, Puducherry, Daman and Diu and Chandigarh which have forest cover below 10 per cent of their reporting area.

Most remarkable aspect of the analysis is steady depletion of area under this precious resource. Its availability was 0.157 ha per capita in 1960-61 which declined to 0.137 ha in 1970-71, 0.108 ha in 1980-81, 0.091 ha in 1990-91, 0.062 ha in 2000-2001 and 0.049 ha in 2010-11. The current per capita availability of the forest resource (0.049 ha in 2010-11) is much lower than the global figure of 1.08 ha and much behind from Brazil (8.6 ha), Australia (5.1 ha), Sweden (3.2 ha), and U.S.A (1.8 ha).

(ii) Arable land

The most significant feature of land use in India is the large proportion of area suitable for agriculture that has already been brought under cultivation due to high population growth. Arable land comprising net area sown, fallow land (current and old) and culturable waste land constituted 169.81 m ha in 1950-51 (59.72 %) of the reporting area. Area under this category rose to 181.49 m ha (59.67 %) in 1980-81 and reduced slightly to 178.8 m ha (58.60 %) in 2010-2011. Thus the arable land in-

creased by 13.73 m ha in 1980-81 but it declined by 2.69 m ha in 2010-11 which is no way a healthy sign for the country.

Net area sown is the main component of arable land. The net area sown was 118.75 m ha in 1950-51 which enhanced to 140.0 m ha in 1980-81 and 141.58 m ha in 2010-11. This figure clearly reveals that during the last 30 years (1980-81 to 2010-11) net cultivated area has become stagnant at around 140 m ha.

On an average country possesses about 46 per cent net sown area of the total reporting area for land utilization. There are only 13 states/ union territories which own area under net sown category more than the national average. These states are Bihar, Gujarat, Haryana, Karnataka, Rajasthan, Punjab, Uttar Pradesh, Kerala, Tripura, Madhya Pradesh, Maharashtra, West Bengal, Daman and Diu, and Lakshadweep. Twelve states/ territories are endowed by less than 20 per cent net sown area in which 3 states own less than 10 per cent of its area under this category. These states are Arunachal Pradesh, Mizoram and Andaman and Nicobar islands.

(iii) Waste land

The area under waste land category was 47.52 m ha in 1950-51 which reduced to 39.62 m ha in 1980-81 due to pressure to increase cultivated land for feeding the growing population but this area again increased to 43.56 m ha (2010-11) during last 30 years may be because of mismanagement of agricultural land. Presently this category constitutes about 14 per cent of the country's reporting area.

(iv) Area under miscellaneous trees and crops

A considerable amount of land under mis-

cellaneous trees and crops is essential for economic wellbeing of the region. Tea, coffee, rubber, spices and fruits are chief crops of this category. Land under miscellaneous trees and crops was 19.83 m ha in 1950-51 which reduced drastically to 3.60 m ha in 1980-81 and to 3.20 m ha (1.04 %) in 2010-11 due to conversion of these lands into non agricultural uses. This preposition is not conducive for maintaining ecological sustenance.

(v) Grazing land

Grazing land consists of the shrubs and grasslands inclusive of permanent pastures and grazing lands. In the year 1950-51 area under this category was 6.68 m ha which increased considerably to 11.97 m ha in 1980-81 but it declined slightly to 10.30 m ha (3.36 %) in 2010-11. Presently the states having area under this category more than the national average are Madhya Pradesh (4.31 %), Rajasthan (4.94 %), Maharashtra (4.03 %), Karnataka (4.78 %), Himachal Pradesh (33.03 %), Gujarat (4.46%), Chhattisgarh (6.20%), and Uttarakhand (3.50 %).

Grazing in the forests has been reported from all parts of the country. A forest survey report evinces that in Rajasthan all forest lands are subject to grazing. In Uttar Pradesh grazing in forest has been found over 83 %, in West Bengal over 70 %, in Sikkim over 75 %, and in Nagaland over 53 %. Unregulated and extensive grazing in forest land is one of the prime causes of forest depletion in the country.

As per government notification, 1924 the grazing land amounting to 3.1 ha per cattle is safe. But in regards to this norm, the picture is very disturbing because it is declining continuously. For instance, in 1960-61 per cattle only 0.041 ha grazing land was available which further reduced to 0.028 ha in 1982-83 and to 0.023 ha in 1993-94.

2. Cropping pattern

In the country seasons of cultivation are kharif, rabi and zaid/ summer. Kharif crops (rice, jowar, bajra, maize, ragi, cotton) are sown in June-July and harvested in autumn. Rabi crops (wheat, gram, barley, peas, pulses, oilseeds) are grown in October-December and harvested in April-May. While maize, groundnut and few varieties of rice are cultivated in summer season. Cereals, pulses, oilseeds and fibrous crops are chief categories of the crops that are grown in India. In 1950-51 four cereals (rice-39.38%, jowar-19.90%, wheat-12.46%, and bajra-11.53%), together constituted 83.27 per cent area leaving only approximately 17 % area for growing other cereal crops. The share of these four crops enhanced to 86.21 % in 1980-81 and to 88.68 % in 2010-11 leaving only 11 per cent area for other cereals. Moreover at present there remains only two crops namely rice (42.73%) and wheat (28.92%) which share 71.65 % of the total area under cereals (Table 2). This analysis indicates continuous shrinking of the area under other cereals especially of small millets (0.7%), barley (0.69%), ragi (1.28%), etc. This has happened as result of more focus on increasing the production of rice, wheat and maize without giving due consideration on cereals which are more nutritive and soil fertility friendly.

Table 2: Area under principal crops (million hectares)

Crops	1950-51	1980-81	2010-11
Rice	30.81	40.15	42.86
Jowar	15.57	15.83	7.38
Bajra	9.02	11.68	9,61
Maize	3.15	6.01	8.55
Ragi	2.19	2.52	1.29
Small millets	4.60	3.98	0.79
Wheat	9.75	22.08	29.01
Barley	3.11	1.81	0.70
Total cereals	78.22	103.88	100.29
Gram	7.57	6.58	9.18
Tur (arhar)	2.18	2.84	4.36
Others	9.34	13.03	12.85
Total pulses	19.09	22.46	26.41
Total food grains	97.31	126.34	126.77
Ground nut	4.49	6.79	5.85
Rapeseed and mustard	2.07	4.11	6.90
Soya bean (1970-71)	0.03	0.47	9.60
Sunflower(1970-71)	0.12	0.11	0.93
Others	4.16	6.09	3.32
Total oilseeds	10.72	17.59	16.08
Cotton	5.88	7.82	11.20
Jute	5.71	0.94	0.77
Mesta	-	0.358	0.098
Sugarcane	0.036	2.67	4.88

Source: Directorate of Economics and Statistics, Ministry of Agriculture

Maximum area under pulses in 1950-51 was under gram (39.65%), followed by tur/arhar (11.42%) and other pulses (48.93%). Although the area under total pulses is increasing (from 19.09 in 1950-51 to 26.41 m ha in 2010-11) but at slower rate which is unable to cope the country's demand for pulses. Similar is the story of oilseeds.

3. Agricultural inputs

Agricultural inputs include irrigation, fertilization, HYV seeds and operational holdings and consolidation which are described below.

Irrigation

In the country main sources of irrigation are tanks, canals, wells and tube wells. In 1950-51 the contribution of canal was 44.10 per cent followed by wells including tube wells (31.70%), tanks (19.10%) and other sources (5.20%). But 1980-81 period marked the decline in the share of irrigated area by canal (39.37%) and increase in the contribution of wells irrigated area (45.78%). In recent time the proportion of wells irrigation went up tremendously to 61.42 % in 2010-11 in which tube well irrigation alone contributes 44.88 %. The tank irrigation was the main source of irrigation of poor farmers and it was ecologically most sustainable but unfortunately due to government's negligence the contribution of tank irrigation gone down from 19.10 % to 3 % in 2010-11 (Table 3).

Table 3: Percentage share of sources of irrigation

Sources	1950-51	1980-81	2010-11
Canals	44.10	39.36	24.63
Wells including tube wells	31.70	45.78	61.42
Tanks	19.10	8.22	3.13
Other sources	5.20	6.64	10.81

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India.

The gross irrigated area comprises 44.96 per cent of the total gross cropped area in 2010-11 which was only 17.20 in 1950-51 and 28.84 per cent in 1980-81. This means about 55 per cent cropped area of the country (105.78 m ha) still depends on rainfall, most of which is occurred in few months of the year. It is only because of uncertainty of rainfall and lack of sufficient irrigation, the growth of production and productivity of important rain fed crops has been much lower.

Table 4: Cropped area and irrigated area (million hectares)

Period	Net area sown	Gross cropped area	Net irrigated area	Gross irrigated area	Gross irrigated area as % of total cropped area
1950-51	118.75	131.89	20.85	22.56	17.20
1960-61	133.20	152.77	24.66	27.98	18.31
1970-71	140.27	165.79	31.10	38.20	23.04
1980-81	140.00	172.63	38.72	49.78	28.84
1990-91	142.25	185.91	48.02	63.20	33.99
2000-01	141.23	189.74	55.20	76.19	40.15
2010-11	140.23	192.20	63.60	86.42	44.96

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India.

Wheat (92%) and rice (58%) among food grains and sugarcane (93.5%) among non-food grains enjoy the maximum irrigation coverage in all the states. Even in the states with lesser irrigation coverage, such as in Karnataka, Madhya Pradesh, Kerala, etc., the irrigation coverage for rice and wheat is much higher in comparison to other crops (Table 4). Thus, in India irrigated area generally tends to be used for growing rice and wheat, while the other crops are grown mostly in rainfed conditions.

Fertilization

India occupies the second largest place in consumption of chemical fertilizer in the world after China. In 1950-51 about 0.65 million tons of total NPK was used which increased to 5.52 million tons in 1980-81 and the amount rose drastically to 28.12 m tons in 2010-11 (Table 5). Importance of chemical fertilizer in yield improvement for achieving enhanced agricultural production further increases because there is little scope for bringing more area under cultivation as well as majority of Indian soils are deficient in many macro and micro nutrients (Jaga and Patel, 2012).

Table 5: All India consumption of chemical fertilizer in million tons

Period	Nitrogen (N)	Phosphorus(P)	Potash (K)	Total
1950-51	0.587	0.069	-	0.657
1980-81	3.678	1.213	0.624	5.515
2010-11	16.55	8.049	3.514	28.122

Source: Department of Agriculture and Cooperation, Government of India

On an average in the country chemical fertilizer use accounts for 146.32 kg/ha in 2010-11 which was 32 kg/ha in 1980-81 and merely 5 kg/ha in 1950-51. Although per ha use of chemical fertilizer in India is much lower than many countries such as Netherlands (610 Kg), Belgium (520 kg), New Zealand (503 kg), China (445 kg), Japan (353 kg) and Egypt (312 kg). The average per hectare consumption of pesticides in India rose from 15.4 g/ha in 1960-61 to 450 g/ha in 1989-90 and marked decline to 295 g/ha in 2010-11.

HYV seeds

The high yielding varieties programme launched in 1966 and it has brought remarkable improvement in agricultural production. Between 1970-71 and 2010-11 the area under HYV has witnessed 5 times increase. The success of the program remained more confined to wheat and rice. It is clear from the above table that in the country presently about 82.3 % of cereal's area is under HYV seeds (Table 6).

Table 6: Area under HYV Seeds (million ha)

Crops	1970-71		1980-81		1990-91		2010-11
	Area	%	Area	%	Area	%	Area in percent
Paddy	5.6	14.9	18.2	45.4	27.4	64.2	87.0

Wheat	6.5	35.7	16.1	72.2	21.0	86.8	87.0
Maize	0.5	8.6	1.6	26.2	2.6	44.1	62.0
Jowar	0.8	4.6	3.5	22.2	7.1	49.3	-
Bajra	2.0	15.5	3.7	31.6	5.7	54.3	-
Ragi					1.2	55.2	-
Total	15.4	15.1	43.1	41.4	65.0	63	82.3

Source: Indian Economic Survey, 1999-2000 and 2010-11.

4. Agricultural production and productivity

In 1950-51 the total production of food grains was 50.82 million tons which rose to 129.59 m tons in 1980-81 and 259.32 m tons in 2010-11 marking almost 5 times increase. By contrast, the production of total pulses grew almost only two times i.e. from 8.41 m tons to 10.63 m tons in 1980-81 and 18.24 m tons in 2010-11. The production of total oil seeds enhanced around six times from 5.16 million tons in 1950-51 to 29.79 m tons in 2010-11. Among the cereals wheat marked 15 times growth (from 6.46 million tons to 94.88 m tons) in its production during 1950-51 to 2010-11. Whereas over this period rice witnessed only 5 times increase in production from 20.58 m tons to 105.31 m tons.

Analysis of yield in kg/ha is good for in-dicating the progress made by any country during any specified period. The yield of food grain was 522 kg/ha in 1950-51 which enhanced to 1023 kg/ha during next thirty years period (1980-81) and 1930 kg/ha in 2010-11. In comparison to food grains yield, pulses yield marked only slight growth from 441 kg/ha in 1950-51 to 473 kg/ha in 1980-81 and 697 kg/ha in 2010-11 (Table 7). The yield of oil-seeds marked only two and half times increase from 481 kg/ha to 1193 kg/ha in 2010-11. Productivity of rice grew from 668 kg/ha in 1950-51 to 2239 kg/ha while the yield of wheat increased from 663 kg/ha to 2989 kg/ha in 2010-11. Against these two cereal crops the yield of sugarcane enhanced only two times over 60 years period from 33422 kg/ha in 1950-51 to 70091 kg/ha in 2010-11.

Table 7: Yield of major crops (kg/hectare)

Year	Rice	Wheat	Pulses	Foodgrains	Oilseeds	Sugarcane
1950-51	668	663	441	522	481	33422
1080-81	1336	1630	473	1023	532	57844
2010-11	2239	2989	697	1930	1193	70091

Source: Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India

5. Growth of agriculture

Agriculture growth is pre-requisite for its own growth and for overall growth of the economy. The main goal of National Agricul-ture Policy 2000 is to achieve growth rate more than 4 per cent which seems to be a tough task. It is clear from table 8 that over fifty years period after Independence (1950-51 to 2005-

06) the growth of agriculture has been below 3 per cent per annum (Teble 8). The decadal growth also confirms the same trend excepting the decade 1990-91 to 1999-2000 where it has been found slightly higher than 3 per cent due to diversification of agriculture towards horticultural crops which recorded high growth rate of around 6 percent. In comparison to agricultural crops, horticultural crops, livestock and fisheries have shown the potential to grow at the rate of 4-5 percent for a long time. Thus it is suggested that 1 percent shift in area from agricultural crops to horticultural crops would raise the output of crop by 4 percent.

Table 8: Growth rate in GDP (per cent)

Period	Agriculture and allied	Agriculture	Fishing
1950-51to 1959-60	2.71	2.93	5.79
1960-61 to 1969-70	1.51	1.27	4.00
1970-71 to 1979-80	1.74	1.94	2.90
1980-81 to 1989-90	2.95	3.13	5.82
1990-91 to 1999-2000	3.23	3.28	5.46
1950-51 to 2005-06	2.54	2.66	4.31

Source: National Accounts Statistics, various issues

(B) Food security

Before 1970 availability of adequate food grains at the national level was considered as a measure of food security. But 1974 World Food Conference added that apart from the overall availability, stability of food supplies within and over the years is an important aspect of food security. Later on after the writings of Amartya Sen the accessibility and entitlement became the part of food security definition. As per new agreed definition of food security, all households should be able to avail at all times of adequate food for a healthy living. In this way nutritional security becomes an integral part of the food security.

According to UN World Food Program report, despite reporting GDP growth of over 6 per cent even during the global economic down turn, over 42 % of India's 1.17 billion people live on less than $ 1.25 per day. Nutritional indicators are extremely low and India is home to over 20 per cent of the world's under nourished population. India is home to about 25 per cent of the world's hungry poor. In spite of the enough food for its people in the country, pockets of hunger remain. According to governments figure, around 43 per cent of children under the age of 5 years are malnourished and more than half of all pregnant women aged between 15 and 49 years suffer from anemia (Singh, 2014).

Undoubtedly the country has made an impressive achievement in the production of food grains at macro level but due to rapid increase in population, per capita availability of food grain could not mark noticeable increase (144 kg/ha in 1951 to 169 kg/ha in 2011). Despite the increase in domestic production, 171 million metric tons of food grains had been imported every year during 1970-75 and pres-

ently this import has increased to 210 m million tons (Mohammad and Hanafi, 2013). In import of food grains higher share goes to pulses. This was 0.172 million tons in 1980-81, 1.273 million tons in 1990-91 and 2.591 million tons in 2010-11 costing an exchequer of around Rs. 69800 million. The per capita daily availability of food grains declined from 458.6 grams in 1960-65 to 450.6 grams during 1970-75 and today it is 454 grams per head per day in spite of the fact that the per capita income had registered an increase of 0.98 per cent per annum during this period.

Agrarian structure in the country is dominated by small farms (*i.e.* holdings of less than one hectare) which account for 59.47 per cent of farmers in total landholdings. In addition to the marginal and small farmers, there are a large number of landless households accounting for 31.12 per cent of all rural households. These two categories (marginal and small farmers and landless labourers) having 90.99 per cent and a large number of traditional craftsmen constitute the bulk of food unsecured households in the rural areas.

Another important aspect of food availability is a change in diet composition showing a rise in the share of non cereal (fruits, vegetables) and animal product consumption due to change in life style, tastes and preferences. This suggests an increase in the availability of calories at a faster rate than the availability of food grains particularly cereals. However, per capita availability of low - cost nutritious food especially pulses has declined from 22 kg/year per capita in 1951 to 14 kg/year in 2011. This raises the concern for providing nutritional food security to the poor masses. One group of scientists does not consider change in dietary composition (*i.e.* from cereals to non cereals and animal products) positive but they regard it not by choice or under distress due to unexpected price rise.

Stability is an important consideration in making people especially poor masses food secured. The severe situation arises at the time of occurrence of cyclones, droughts and floods that results shortfall in agricultural production. For instance, drought occurred in 2002 caused 14 per cent decline (30 million tons) in food grain production. Apart from these, seasonal fluctuations in food grain supplies due to sharp price rise also produce adverse condition for food security and the country is facing this problem since a couple of years. This can be managed in better way by monitoring available food stocks, integrating domestic food markets and judicious use of buffer stocks and formulating rational price/inflation mechanism. The country is often threatened by cyclones, floods and droughts. These natural calamities are posing severe challenged for food and nutritional security of the country because the huge sum of resources has to devote to cope with frequent natural disasters.

Akin to stability, accessibility is also necessary to make food accessible to households. On account of some progress made in this direction population living below poverty line has declined considerably from 65 per cent in 1960 to 27.5 per cent in 2005. This preposition becomes more heartening when a look is given on absolute number of people living below poverty line because this number is continuously on rise from 177 million in 1960 to 260 million in 2001 and 450 million in 2011. Apart from this, higher concentration of poverty in Uttar Pradesh, Bihar, Madhya Pradesh,

Maharashtra, West Bengal, Odisha, Jharkhand and Chhattisgarh calls for priority attention.

(C) Nutritional security

Nutritional security is another important parameter of food security. From this point of view, the country is unable to control widespread mal nutrition. The real problem of the country is not the under nutrition but it is malnutrition. It produces enough food grains to get over the problem of under nutrition. If people are not fed enough, it is not because of shortage of food but because of accessibility.

Titumir and Basak (2010) has calculated the shortage of rice and wheat for 2100 in India which would be 80.72 million tons and 41.90 million tons respectively and consequently 740 million (19.58 %) people in the country could face the problem of food shortage (Table 9). This has been computed by taking 72.56 kg and 67 kg per person per year consumption rate of rice and wheat. As per their projection shortage of rice and wheat would start from the year 2070 and 2060, respectively.

Table 9: Demand and production of rice and wheat (million ton) in India

Year	Rice		Wheat	
	Demand	Production	Demand	Production
2020	149.60	167.00	97.52	98.10
2030	170.23	190.10	111.00	112.80
2040	193.70	213.50	126.30	130.20
2050	220.40	232.40	143.70	145.10
2060	250.79	253.20	163.50	159.60
2070	285.37	274.50	186.00	175.90
2080	324.71	295.80	211.70	191.00
2090	369.48	319.80	240.90	206.20
2100	420.42	339.70	274.10	232.20

Source: R.A.M.Titumir and J.K.Basak, 2010

The per capita intake of calories in rural India has sharply and steadily declined from 2266 calories in 1972-73 to 2221 in 1983, 2153 in 1993-94 and 2114 calories in 1999-2000. According to the estimate for the year 1999-2000, more than 26 per cent farm population and more than 45 per cent of rural labourer is suffering from energy and protein deficiency. Cereals are the main and cheapest source of calorie, protein and energy for rural poor. Because of low level of per capita income these people cannot compensate nutrition decline by enhancing consumption of fruits, vegetables, milk, meat, etc. Thus control of price rise of cereals may be best option of increasing nutritional decline.

Agricultural production appears to have reached a plateau as far as food grains, oil seeds and fibers are concerned (Misra, 2009). This situation asks for crop diversification in-

cluding the development of dairy, fisheries, poultry farming, piggeries, vegetable farming, floriculture, horticulture, medicinal crops and introduction of crops that need less water. In this strategy priority incentives need be given to marginal and small farmers for growing high value added crops of the above groups. Diversification of agriculture is also essential to remove the mal-nutrition.

In the country some pockets like Punjab, Haryana, Western Uttar Pradesh and many districts of South India are recording a very high level input i.e. 60 per cent input and 40 percent output. Now the farmers of these pockets are facing the frustration as further increase in input is not possible. Agricultural land of these pockets is facing the problem of land degradation because of use of high level of chemical fertilizer and irrigation (Mohammad and Hanafi, 2013).

(D) Agricultural sustainability

In order to maintain an ecological health of the country at least total 99.61 m ha area should be under forest that means 39.11 m ha additional area need to be put under forest category. For this purpose, there is a need to initiate a massive afforestation programme priority wise for example- (i) dense plantation where cattle pressure is high, fragile and weak rock structure, high soil erosion, along riversides and in hilly and upland areas, (ii) moderate plantation where vegetation is sparse, interplant distance is higher, cattle pressure is less and moderate soil erosion, (iii) less plantation where forest exists by removing (a) old trees, (b) diseased trees and (c) environmentally unsuitable trees

Out of 305.90 million hectares reporting area, 262.34 m ha can be considered for some

sort of biotic production. Out of this, 141.58 million ha is under cultivation. The big threat to this area is to maintain its fertility and protect it from degradation due to soil erosion, chemicalisation, water logging, salinization and alkalization. Almost 47.52 million ha area is as waste land and as per National Agricultural Policy these lands must be brought under agriculture and forest cover. Some innovative mechanism like leasing such lands to local households, needs to be evolved to make productive use of waste lands (Chandra, 2015). The marginal and small farmers possess 36.84 percent and 44.25 per cent holdings unirrigated. Thus sustainability of agriculture cannot be ensured without providing assured irrigation to marginal and small farmers because they constitute above 85 per cent of the total land holdings.

According to Department of Land Resources, Ministry of Agriculture, Govt. of India, about 175 m ha area of the country is suffering from degradation and out of this 95.5 m ha area must be the part of the cultivated land (141.58 m ha). This indicates that about two-third of our agricultural lands are degraded or sick up to some extent and only one third are in good health. Indiscriminate and non judicious use of chemical fertilizer is held responsible for degradation of agriculture land.

The cultivation of rice, wheat and sugarcane in many parts of the country such as in Punjab, Haryana, Rajasthan and Western Uttar Pradesh is going on rigorously without taking cognizance of their sustainability in terms of their water need. Moreover, these crops are cent percent irrigated in above states and some pockets in the country. As a result water table in these areas is falling rapidly. For instance, in

over 80 per cent of blocks of Punjab, ground water is depleting at a rate between 50 and 100 cm a year. Of 138 hydrological blocks, over 100 are listed as dark or grey zones due to over exploitation (Dheer, 2013).

Irrationally increasing use of chemical fertilizers (426 times during 1950-51 to 2010-11) and pesticides (96 times during 1954 to 2009-10) ultimately finds its way into the soil and makes the cultivated land sick by damaging soil micro flora and fauna. Even the residue of insecticides and pesticides (DDT and HCH) found in the soil and ground water has been traced in food items. According to Singh (2008) heavy metals (zinc, lead, copper, cadmium, chromium, manganese, nickel) were found beyond permissible and deadly level in vegetables like spinach, radish, cauliflower, eggplant, cabbage, amaranthus, tomato, lady finger and in crops irrigated with waste water. These affect the human body in long run in the form of reduced life span and fertility, increased cholesterol, high infant mortality and varied metabolic and genetic disorders.

In early years Indian agriculture was wholly dependent on organic (compost) and green (*Sanai* and *Dhaicha*) manures but their use started declining gradually with an increasing use of chemical fertilizers for taking maximum benefit of Green Revolution. But more use of chemical fertilizer led to decline of carbon content in the soil. For instance, the amount of carbon content was 0.50 % which reduced presently to only 0.25 %. Moreover, response of chemical fertilizer declined sharply and continuously in irrigated areas of Uttar Pradesh. In 1960 use of one kg of NPK helped farmers to get 13.4 kg of grain. The response came down to 11kg in 1970, 8.3 kg in 1980 and just 3.7

kg in 2010 i.e. around 10 kg less in over 50 years (Parashar, 2013). For the country as a whole, this response declined to 15.49 kg in 1975-80 to 8.3 kg in 1985-90 and 2.04 kg in 2000-2005 (Rao and Mandal, p. 16, 2007).

Suggestions

As per a conservative estimate India would be required to produce additional 3.2 million tons food grains each year (1 ton food is assumed to feed 5 persons for one year). To achieve this target, it would be necessary to produce 2 tons food grain per ha from rainfed areas and 4 tons per ha from irrigated areas (Rao and Mandal, 2007).

By using balanced dose of chemical fertilizer with organic fertilizer in 75 per cent and 25 per cent ratio, the agriculture of the country can be made sustainable. There is need to increase the use of organic fertilizer. Animal dung and agricultural biomass going waste need to be decomposed to produce organic fertilizer. In some parts of the country like north-west India lakhs of tons of rice and wheat straw is disposed by burning. This not only causes wastage of biomass but also creates lot of air pollution. It should be made mandatory for farmers to mix crop stuffs into the soil. This would enrich soil with the much needed organic content and increase the soil fertility for producing requisite amount of food in years to come.

The Green Revolution started in 1967-68 has promoted monoculture in the country. Initially farmers were producing crops of their need but today they are going for the crops which are high yielding and more money fetching. As a consequence, many traditional coarse grain crops have disappeared from many areas. Many of these crops such as bajra, jowar, ragi, sanwa, kodo, mandua, etc. are highly nu-

tritive. Some of these crops are on the verge of disappearing from many irrigated areas. Monoculture can prove to be very dangerous in the event of newly emerging pest as well as in terms of fertility nutrient depletion.

The loss of nutrients by growing sugarcane, maize and paddy per acre is much greater than any other crops. If these crops are harvested in each successive year on the same piece of land there will be a decreasing production tendency. Rotation of crops is good option from getting rid of this problem. The problem of over use of chemical fertilizer can be tackled by making farmers aware about proper proportion of chemical fertilizer (NPK - 4:2:1) and appropriate price structure for various chemical fertilizers.

In order to make agriculture sustainable in terms of food and nutrition security, there is need to work on reduction in average cost of food grain production. This requires increase in food grain production by tapping unexploited potential of rainfed and low productivity areas by ensuring use of improved technology at farmer's field. It is said that all improved agricultural technologies are not disseminated to users' end that requires rigorous efforts on extension front. It is also said that the yield of paddy can be raised 87 per cent in Punjab.

Low investment in agriculture in the country requires urgent attention. The public and private sources are the only option to create infrastructure in the country. Analysis of capital formation in agriculture sector indicates that the development of infrastructure for agriculture failed not only to keep pace with growth of the sector but laggard far behind the growth in the sector. Thus it becomes imperative to promote community participation in agricultural infrastructural development and management such as in irrigation, forest and common lands.

To cope up the damage caused by natural calamities, launching of insurance scheme covering all crops and all farmers throughout the country may be able to protect farmers from financial distress. Another way is enhancing flood and drought proofing and ensuring remunerative prices, this will also help in encountering the problem of price fluctuation.

In order to achieve agricultural growth 4 per cent and above, there is urgent need of harnessing potential of under developed regions through area specific strategies for development of specialized pockets on the line of dairying in Gujarat, rice-wheat in Punjab, apple in west Himalayan region, grapes in Nasik region of Maharashtra and mangoes in Royalseema region of Andhra Pradesh. Effective incentive policy for adoption of drip, sprinklers and other water efficient technologies is needed to increase production and productivity on the one hand and to curb the over use of irrigation water for controlling water logging.

It has been reported from different parts of the country that chemical fertiliser and pesticides residues are entering the water sources and land resources and ultimately making way in various foods and crossing the safe limits. Thus farmers need to be educated for balance and judicious use of chemical fertilizers and pesticides.

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Agricultural Modernization and Rural Development: A Case Study of Mahamaya Nagar District, Uttar Pradesh

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Abstract

In the present paper an attempt has been made to examine the impact of agricultural modernization on rural development in Mahamaya Nagar district, Uttar Pradesh. The study is based on secondary sources of data obtained from District Census Hand Book (2011) and Sankhyikiya Patrika (SP) published by Economics and Statistical Division (ESD), Government of Uttar Pradesh (2014). Block has been taken as unit of study. The level of agricultural modernization is determined with the help of sixteen indicators while eighteen indicators for rural development. Z-score technique has been applied to calculate the levels of Agricultural Modernization and Rural development and finally agricultural modernization vis-à-vis rural development map has been prepared through standard deviation formula of high, medium and low. The study reveals that there are integrated as well as reverse relationships between agricultural modernization and rural development in the district.

Keywords: *modern technology, agricultural modernization, rural development*

Introduction

Agriculture is unquestionably the largest livelihood provider in India, more so in the vast rural areas. India lies in its village (rural area) said by Mahatma Gandhi, still holds true even in the twenty first century. Modernization is one of factor that has had a significant effect on total factor productivity since the Green Revolution (1966-67) in India. It was the initiative plan to increase land productivity, enhance farmer's standard of living and eradicate hunger and poverty through modernization, diversification, marketization and commercialization of agriculture.Swaminathan M.S. (1999) concluded that before the mid-sixties, increase in

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foodgrain output in the country was attributed mostly to the growth of the cultivated area and the extension of irrigation, since, the new farming system symbolized by high yielding varieties of seeds, use of agro-chemicals and mechanization had the powerful impact in the food sector of the country. Nath (1969) on his study analysed three indicators- use of chemical fertilizers, use of mechanical power, and use of cooperative credit that have been selected as indicators of the adoption of modern technology in agriculture.

Modernization of Indian agriculture through new technology of production is based on the use of fertilizers, high yielding varieties of seeds, pesticides, improved irrigation and other agronomic practices (Kanwar, 1970). Utpal Baruah (1979) on his study emphasizes that the role of technological factors is more than of environmental factors in determining the agricultural growth. Patil and Patil (2007) considered agricultural modernization for production increase has become all the more important as the scope for increasing land under agriculture is very low. Mayor et al (2014) conducted study on impact of agricultural modernization on sustainable livelihood among the Tribal and Non- tribal Farmers and concluded that agricultural modernization is positively but non-significantly correlated while it is positively as well as significantly correlated with non-tribal respondents.Bhalla (1978) suggested that agricultural output is increased due to the improvement in infrastructure, the acreage structure of land holdings and institutional factors but variation in output growth is due to lack of various inputs of technology.

Ramesh and Raju (2009)analysed the changing instability in agricultural production during first phase of green revolution (1968-88) of improved technology and latest phase of green revolution (1989-2007) of adoption of wider technology diffusion. It is concluded that former phase of green revolution had wide instability in production of food grain and non-food grain crops while latter phase witnessed a declining trend of instability. It also reveals that the state of Punjab followed by Harayana, Uttar Pradesh and West Bengal are highly stable while Maharastra followed by Tamil Nadu, Orrisa, Madhaya Pradesh, Rajasthan and Gujarat are highly unstable in food grain production. Thus, agricultural modernization increased food supply to humanity and raise the level of farmers income.Chand and Chauhan (2002) reported that due to favourable irrigation facility, Haryana continued to shift the cropping pattern towards rice and thus attained the top position in diversification.

As per World Bank Report (2007) higher agriculture and rural growth rates are likely to have a strong, immediate and favourable impact on poverty and rural development. Birthal and Negi (2012) mentioned that agricultural growth is essential to ensure national food security, alleviate poverty and reduce rural-urban disparities. About 70 percent India's population lives in rural areas and 69 percent of them depend on agriculture and allied activities including animal husbandry and fisheries for their livelihood. Agriculture has played an important role in the poverty reduction, upliftment of standard of living of low and middle class people and to the development of rural area because most poor live in rural areas which have agriculture as the only source of living.

India is the home of world third largest food insecure country mainly because of rapid population growth and lack of mechanization (only 40%) in farm production. Out of 217 million poor population of India, more than 170 million live in rural area (FAO, 2014). The problems of rural development are always being a great concern of geographers. Agriculture occupies a dominant position in the national economy but the sad part is that its production efficiency is not up to the mark if compared with others, agriculturally advanced countries of the world due to improper cultivation of land and less use of modern agricultural inputs (Naim and Umar, 2015). Thus, adaptation of modern technological innovations in agricultural sector helps farmer to increase production on limited cultivated land which brings change in standard of living of people live in rural area. A developed region is always being a place of attraction of government, planners, industrialists as well as educationists to set-up different project, institutions, industries and so on. Hence, agricultural modernization and rural development are the two sides of a coin.

Study area

Mahamaya Nagar, a newly created district (1997) of Uttar Pradesh curved out from Aligarh, Agra, Mathura and Eta is located in the western part of the state. It has 1840 Km^2 (0.72 percent of the state) of total land and approximately 90 percent of it's devoted to agriculture. About 21.3 percent people live in urban area which signifies that 78.7 percent rural people are dependent on agriculture as means of livelihood. But the climatic character of hot summer and dry winter with unpredictable rainfall in monsoon season creates major hurdle to farmers. This district of western Uttar Pradesh comes under the influence of green revolution since 1960s. Fertile alluvial soil, 100 percent assured irrigation, fertilizers, high use of mechanical tools, high rural literacy etc. make this district agriculturally well developed.

Objectives

The following are the main objectives of the study:

1. to analyze the level of agricultural modernization based on selected indicators of the district.

2. to examine the levels of rural development of the region.

3. to establish the relationship between agricultural modernization and rural development in the study region.

Data base and methodology

The present study is entirely based on secondary sources of data obtained from District Census Hand book (2011) and Sankhyikiya Patrika (SP) published by Economics and Statistical Division (ESD), Government of Uttar Pradesh (2014). Block has been taken as a unit of study. Sixteen indicators for agricultural modernization and eighteen indicators for rural development have been selected. Z-score statistical technique has been applied to calculate the levels of Agricultural Modernization and Rural development and finally agricultural modernization vis-à-vis rural development map has been prepared through standard deviation formula of high, medium and low category.

Smith formula of z-score: $z = \frac{x - \bar{x}}{\delta}$

Where,

z = Standardized value of the variable i in block j

X = Actual value of variable i in block j

X = Mean value of variable i in all blocks

S = Standard deviation of variables i in all blocks

Composite Score (CS) has been calculated- C.S. = Zij/N

Where,

Zij = z- score of all variables i in block j

N = No. of variables

Table 1: List of selected Indicators of Agricultural Modernization

Indicators	Description
X1.	Percentage of area under high yielding varieties of Seeds to the Gross Sown Area
X2.	Use of Fertilizers per hectare of Gross Sown Area
X3.	Percentage of Net Irrigated Area to the Gross Sown Area
X4.	Number of Wooden Plough Per 10,000 of Gross Sown Area
X5.	Number of Iron Plough Per 10,000 of Gross Sown Area
X6.	Number of Advance Harrow and Cultivators Per 10,000 of Gross Sown Area
X7.	Number of Advance Thrasher Machine Per 10,000 of Gross Sown Area
X8.	Number of Sprayer Per 10,000 of Gross Sown Area
X9.	Number of Advance Sowing Instruments Per 10,000 of Gross Sown Area
X10.	Number of Tractors Per 10,000 of Gross Sown Area
X11.	Productivity based on Yang Yield Method
X12.	Number of Livestock per 1000 of Human Population
X13.	Number of Rural market Per 100000 population
X14.	Number of Cold Storage Per 100000 population
X15.	Number of Seed Sale Centre Per 100000 population
X16.	Number of Pesticide Sale Centre Per 10,000 population

Source: *Sankhyikiya Patrika* (SP) published by Economics and Statistical Division (ESD), Government of Uttar Pradesh (2014).

Table 2: List of selected Indicators of Rural Development

Indicators	Description
Y1.	Number of Primary School Per 10,000 population
Y2.	Number of Upper Primary School Per 10,000 population
Y3.	Number of Secondary School Per 10,000 population

Y4.	Number of Degree College Per 100000 population
Y5.	Number of Health care Centre Per 10,000 population
Y6.	Number of Dispensary Per 10,000 population
Y7.	Number of Veterinary Hospital Per 10,000 population
Y8.	Number of Animal Service Centre Per 10,000 population
Y9.	Number of Artificial Breeding Centre Per 10,000 population
Y10.	Percentage of Village having Public distribution system to the total village
Y11.	Number of Post Office Per 10,000 population
Y12.	Number of Railway Station Per 100000 population
Y13.	Number of Bus stop Per 100000 population
Y14.	Number of Biogas Plants Per 100000 population
Y15.	Percentage of electrified village to the total Village
Y16.	Length of Pucca road in km.
Y17.	Percentage of drinking water facilities in villages to the total Village
Y18.	Literacy rate (percentage)

Source: Sankhyikiya Patrika (SP) published by Economics and Statistical Division (ESD), Government of Uttar Pradesh (2014).

Analysis and discussion

Agricultural modernization

Adoption of modern agricultural techniques and institutional facilities to increase land productivity has a great concern since long. The primary focus of the present study is to give an analytical overview of the inter-block variation in the level of agricultural modernization in the district. Thus, the computation of the indices of different indicators and their share has been calculated by applying the above said statistical techniques. The composite score of the selected indictors have been classified into three categories, viz. high, medium and low to show the levels of agricultural modernization for the year 2014 (Appendix- I and Table 3).

Table 3: Levels of Agricultural Modernization in Mahamaya Nagar district, 2014

Category	Composite Score	No. of Blocks	Percentage of the Total Blocks	Name of the Block
High	Above 0.23	3	42.86	Hathras, Sahapao, Sadabad
Medium	-0.23 to 0.23	2	28.57	Sasni, Murasn
Low	Below -0.23	2	28.57	Hasayan, Sikandrarao
		7	100.00	

About 42.86 percent area of the district has been reported high level of agricultural modernization. There are three blocks namely Sadabad (0.49), Sahapao (0.43) and Hathras (0.41) where agriculture is highly modernized because of highest net irrigated area, use of modern farm inputs, high yielding varieties of seeds, consumption of fertilizers, local governmental support like rural market, cold storage facility, seed sale centre , pesticide sale centre and livestock farming.

There are two blocks which fall under moderate levels of agricultural modernization namely, Sasni (-0.06) and Mursan (-0.16), covering about 28.57 percent area of the district. It is found that modern farm inputs, productivity, cold storage and rural market facility are quite good in the Sasni block, while the use of HYV seeds, consumption of fertilizer and area under irrigation are very low. On the other hand, Mursan block has been reported relatively good in the consumption of fertilizer, net irrigated area, modern farm inputs like advance thrasher machine, sprayer, sowing instrument, tractor, rural market, cold storage, seed sale centre and pesticide sale centre, but lack behind in terms of the use of HYV seeds, productivity, livestock farming, wooden plough, iron plough and advance harrow and cultivator.

About 28.57 percent area of the district comes under low level of agricultural modernization (fig. 2). There are two blocks namely, Sikandrarao (-0.48) and Hasayan (-0.62), where agricultural modernization is least. The reason for such condition can be attributed to many factors like very low consumption of fertilizer, irrigation, modern farm inputs, productivity and local governmental facilities which are not in favour for agricultural modernization in these two blocks.

Rural development

The analysis of the study shows that about 42.86 percent of the district comes under high level of rural development (Appendix-I and table 4). There are three blocks namely, Sikandrarao (0.24), Sahapao (0.22) and Hathras (0.19) that show high levels of rural development. It is due to large number of Upper primary school, Secondary school, Health care, Dispensary, Veterinary hospital, Animal service Centre, Artificial breeding centre, Post office, Biogas plant, *Pacca* road and drinking water facilities. Beside this, primary school, degree colleges, Public distribution centre, transportation, electricity and high literacy rate are also attributed to the development of rural area in these blocks (Fig.3).

There are two blocks namely, Mursan (0.07) and Sasni (-0.07) that come under medium levels of rural development, covering about 28.57 percent area of the district. It is observed that educational institutions, veterinary hospital, Public distribution centre, Bus stop, biogas plant, electricity and literacy rate are relatively good in the Mursan block, but there is a lack in number of health care, dispensary, animal service centre, artificial breeding, transport and drinking water. On the other hand, Sasni block has maintained a fairly good position in primary school, degree colleges, dispensary, Public distribution system, bus stop, pucca road and literacy rate but poor condition in rest of the other facilities.

Table 4: Levels of Rural Development in Mahamaya Nagar district, 2014

Category	Composite Score	No. of Blocks	Percentage of the Total Blocks	Name of the Block
High	Above 0.14	3	42.86	Hathras, Sahapao, Sikandrarao
Medium	-0.14 to 0.14	2	28.57	Sasni, Mursan
Low	Below -0.14	2	28.57	Sadabad,Hasayan
		7	100	

The remaining two blocks namely, Hasayan (-0.30) and Sadabad (-0.36), covering about 28.57 percent of the district are reported with low levels of rural development. It is found that Sadabad block is in a very pathetic condition in terms of rural development. This is due to the very poor condition in all determinants of rural development except secondary school, health care, *pucca* road and literacy rate. Similarly, Hasayan block has also very limited facility of secondary school, degree colleges, animal service centre, artificial breeding, bus stop, biogas plant and literacy rate.

Agricultural modernization vis-à-vis Rural development

The analysis of inter-block variation among agricultural modernization vis-à-vis rural development of the district has been shown in figure 4. X-axis of the map represent agricultural modernization and Y- axis for rural development. Analytical result of the study shows that there are integrated relationship between agricultural modernization and rural development in two blocks namely Sahapao and Hathras where high level of agricultural modernization lead to high level of rural development. Simi-

larly, moderate level of agricultural modernization lead to moderate level of rural development has been observed in Sasni and Mursan blocks. It is also found that low level of agricultural modernization leads to low level of rural development in Hasayan block. The study is also the witness of reverse relationship in Sadabad block where high agricultural modernization leads to low level of rural development. This is due to the lack of educational institutions, health care facility, dispensary, Public distribution system, transportation, electrified village, *pucca* road and drinking water facility. This can be also attributed due to lowest rural female literacy rate and high level of poverty in the district. On the other hand, it is observed that low level of agricultural modernization lead to high level of rural development in Sikandrarao block due to availability of upper primary school, secondary school, health care centre, dispensary, post office, railway station, electrified village, pucca road and drinking water facility. This is also due to the development of pisciculture and animal husbandry.
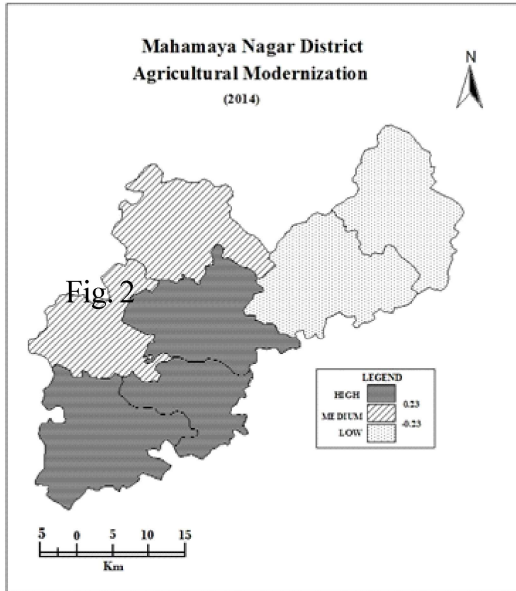
Fig. 1
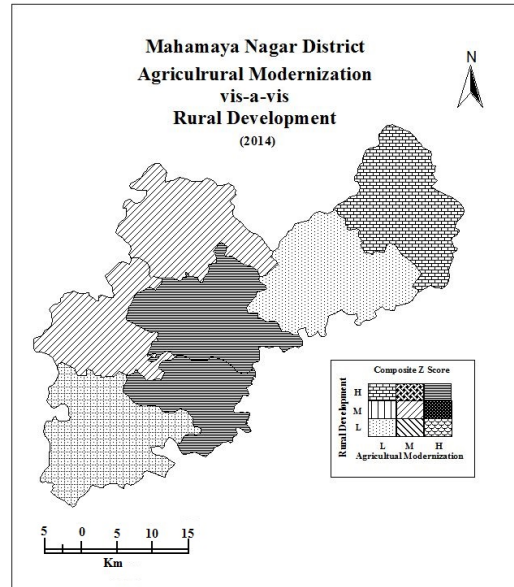
Fig. 2
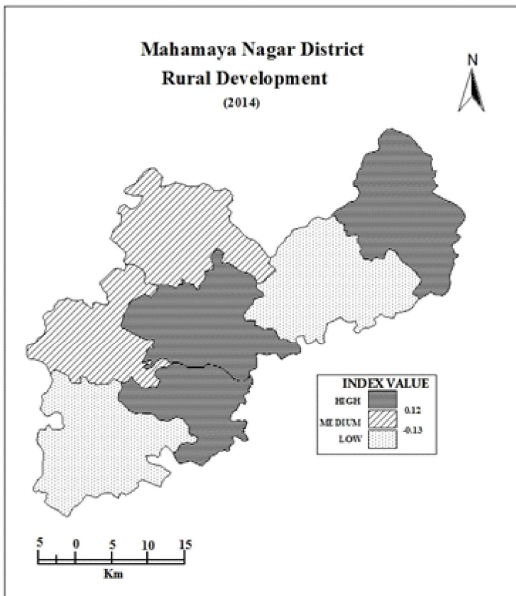
Fig. 3

Conclusion and suggestions

From the overall analysis it is clear that the Mahamaya Nagar district seize a good position in terms of agricultural modernization as well as rural development in the state of Uttar Pradesh, but there is inter-block variation in both the circumstances. Out of seven blocks, three blocks are well developed, two blocks are moderately developed and remaining two blocks are least developed in terms of agricultural modernization and rural development. Agricultural Modernization vis-à-vis Rural Development indicates that high level of agricultural modernization leads to high level of rural development except Sadabad block mainly due to lack of educational institutions and low rate of literacy. The instance of moderate agricultural modernization leads to moderate rural development is significantly correlated, but low level of agricultural modernization shows both high as well as low level of rural development.

The reason for such a high level of rural development can be attributed to animal husbandry and pisciculture.

Following are some important suggestions of agricultural modernization and rural development in the district-

1. Adoption of modern farm technology like iron plough, advance harrow and cultivator, tractor, thrasher machine, sprayer etc. could be increased for practice of multi-cropping on limited land.

2. Providing proper irrigation at scheduled time according to the need and demand of crop, so that it could maintain soil fertility and increased yield of crops.

3. Ensuring the availability of high yielding varieties of seeds, chemical fertilizer, pesticide, insecticide etc. in their fields and for this purpose number of fair price shops must be increased by the local government especially in the backward blocks.

4. Ensuring smooth trade and storage facility for agricultural commodities, so that farmers could not bother about their produces and price.

5. Make sure about the availability of educational institutions, health care centre, dispensary, transportation, electricity, pucca road and portable drinking water for the rural people.

6. Ensuring greater coordination and collaboration among the farmers, local governmental agencies, agricultural universities and research institutes and industries.

7. The inter-block variation can only be minimized if the government will take necessary steps and form equilibrium policies for both agricultural modernization as well as rural development in the district.

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Appendix-I

Composite Score of Agricultural Modernization in Mahamaya Nagar District, Uttar Pradesh, 2014

Name of Block	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16	Composite Score
Sasni	-0.51	-0.31	-0.10	-0.17	0.42	-0.30	-1.63	0.58	0.54	0.04	2.09	-0.42	0.25	0.28	-0.09	-1.66	-0.06
Hathras	0.29	0.09	-0.11	0.65	1.33	1.85	0.59	0.04	0.04	-0.37	-0.06	2.18	-0.31	-0.26	-0.35	0.89	0.41
Mursan	-0.65	0.57	0.00	-0.41	-0.26	-0.40	0.58	0.30	0.29	0.59	-0.35	-0.67	-1.56	0.40	-0.50	-0.47	-0.16
Sadabad	-1.01	-0.01	1.39	-0.03	0.17	0.56	-0.61	0.32	0.32	1.69	-0.46	-0.34	0.54	2.12	2.22	0.93	0.49
Sahapao	-0.78	1.78	1.15	1.85	0.87	0.26	1.12	1.39	1.43	0.29	-1.15	-0.70	-1.13	-0.72	0.36	0.80	0.43
Sikandrarao	1.14	-0.77	-1.15	-0.65	-1.22	-0.94	0.68	-1.18	-1.17	-0.95	-0.02	-0.04	1.54	-0.91	-1.14	-0.84	-0.48
Hasayan	1.51	-1.35	-1.18	-1.24	-1.31	-1.03	-0.74	-1.46	-1.45	-1.29	-0.05	-0.02	0.67	-0.91	-0.56	0.43	-0.62

Appendix-II

Composite Score of Rural Development in Mahamaya Nagar District, Uttar Pradesh, 2014

Name of Block	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18	Composite Score
Sasni	0.09	-0.70	-1.31	1.65	-0.65	0.16	-0.13	-0.36	-0.79	0.07	-0.10	-0.33	1.27	-0.36	-0.20	0.18	-0.30	0.46	-0.07
Hathras	0.50	0.69	-1.03	-0.28	-0.05	0.50	0.34	-0.90	-0.16	1.47	-0.57	1.68	0.80	0.17	0.91	-1.52	0.69	0.46	0.19
Mursan	1.77	0.96	1.07	0.31	-1.54	-0.50	0.24	-1.01	-0.33	0.86	-0.79	-1.10	0.58	0.60	1.51	-0.62	-1.65	0.90	0.07
Sadabad	-1.34	-1.37	1.03	-0.42	1.55	-1.42	-1.30	0.65	0.47	-0.46	-1.33	-1.10	0.48	-1.43	-1.44	-0.13	-0.16	0.82	-0.36
Sahapao	-0.25	-1.09	0.17	0.86	0.63	-0.76	1.44	1.53	1.17	-1.69	1.53	0.17	-1.04	-0.17	-0.12	1.79	-0.27	0.21	0.22
Sikandrarao	-0.86	0.87	0.75	-1.23	0.13	1.74	0.66	0.59	0.99	-0.13	0.75	-0.08	-1.04	1.75	-0.86	0.19	1.61	-1.32	0.24
Hasayan	0.07	0.67	-0.65	-0.86	0.12	0.04	-1.04	-0.87	-1.57	-0.12	0.55	0.78	-1.04	-0.56	0.19	0.08	0.08	-1.52	-0.30

Appendix- III

Absolute figure of selected indicators of agricultural modernization in Mahamaya Nagar district, 2014

Name of Block	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
Sasni	34.20	155.7	71.93	431.80	171.67	346.76	14.17	152.77	159.86	230.21	100.04	469.33	3.32	9.48	1.61	0.90
Hathras	50.59	169	71.90	540.51	217.30	888.76	21.59	130.95	138.72	192.55	94.22	726.65	2.30	5.17	1.49	1.44
Mursan	31.36	184.5	73.25	399.95	138.14	322.32	21.55	141.39	149.37	281.89	93.41	444.4	0.00	10.41	1.42	1.15
Sadabad	23.81	165.7	90.97	450.17	159.35	562.25	17.57	142.38	150.56	383.82	93.11	477.44	3.85	24.09	2.65	1.45
Sahapao	28.51	223.9	87.98	698.76	194.43	487.77	23.35	185.94	197.40	253.44	91.25	442.09	0.79	1.58	1.81	1.42
Sikandrarao	67.91	140.9	58.54	367.06	90.56	184.42	21.88	81.15	88.01	138.63	94.32	507.25	5.68	0.00	1.14	1.07
Hasayan	75.53	121.9	58.11	288.87	85.73	162.77	17.15	69.67	76.18	107.00	94.23	509.12	4.08	0.00	1.40	1.34

Appendix- IV

Absolute figure of selected indicators of rural development in Mahamaya Nagar district, 2014

Name of Block	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Y9	Y10	Y11	Y12	Y13	Y14	Y15	Y16	Y17	Y18
Sasni	5.45	3.37	1.28	1.42	0.19	0.09	0.14	0.24	0.14	78.26	1.14	0.47	5.69	27.16	4.64	14.65	40.43	72.5
Hathras	6.03	3.85	1.38	1.49	0.23	0.11	0.11	0.29	0.98	93.85	1.03	1.72	5.17	31.95	5.86	12.30	45.38	72.5
Mursan	7.84	3.94	2.14	1.31	0.11	0.11	0.11	0.27	0.33	87.10	0.99	0.00	4.93	35.94	6.52	13.53	33.69	73.6
Sadabad	3.42	3.13	2.12	1.69	0.00	0.05	0.19	0.34	0.34	72.38	0.87	0.00	4.82	17.35	3.28	14.21	41.11	73.4
Sahapao	4.96	3.23	1.81	1.58	0.08	0.16	0.24	0.39	2.28	58.74	1.50	0.79	3.15	28.91	4.73	16.86	40.56	71.9
Sikandrarao	4.10	3.92	2.02	1.52	0.38	0.13	0.19	0.38	0.38	76.06	1.33	0.63	3.15	46.47	3.92	14.65	50.00	68.1
Hasayan	5.42	3.84	1.51	1.51	0.17	0.06	0.12	0.17	0.99	76.19	1.28	1.17	3.15	25.28	5.07	14.51	42.33	67.6

Changing Pattern of Agricultural Land Use in Sonbhadra District, U.P.

S.K. Singh[1] and V.N. Sharma[2]

Abstract

The land available for cultivation is important for the people who engaged in agricultural activities. Sonbhadra district has 21.59 per cent net sown of the total land where a number of crops are grown by the farmers. The land occupied by different crop are food-grains (61.84 per cent) followed by pulses (19.66 per cent), oil seeds (7.62 per cent), commercial crops (2.19 per cent), others crops (8.50 per cent) and industrial crops (0.19 per cent). It provides food and various industrial raw materials to feed the agro-based industries. The main objective of the paper is to present an agricultural land use scenario in Sonbhadra district during 1995 to 2015.

Key Words : *Agricultural land use pattern, Area under food-grains, Pulses, Oil seeds, Commercial crops, Industrial crops, Area under other crops,*

Introduction

Agricultural land use represents the land occupied by different crops. It is the land where the people grow crops either one year or greater than one year. The farmer uses their land to produce different types of crops for the current period or for long time process. Human has been using land resources to fulfil their basic needs from beginning of their origin. He expanded his basic needs and desires which forced him to produce more and more goods and facilities on land that resulted various problems of environmental and socio-economic degradation. Pressure of rapid growth of population and heavy demand of goods compelled to change in land use pattern. The proper management and sustainable use of land can help to improve the eco-system and its productivity of a particular region. And, it may also manage a balance between human being and natural resources. The land which is used for agriculture is called agricultural land that has efficiency to produce something again and again regarding food etc. by way of natural or man-made. With reference to India, it is well known that

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agriculture is the primary economic activity as well as source of income in rural areas.

The use of land and its development have been major concern of the geographers for long time. Many works have been done by researchers related to land use. Kostrowicky (1983) opined that land use system study should be done not only from the point of view of their differentiation but also of impact on environment. Tripathi (2001) traced out the land use pattern of Mirzapur district and explained cropping pattern and agricultural productivity. He also delineated the agro-ecological zones on the basis of physical and cultural factors. Prasad (2006) analyzed the causes and effects of land degradation created in Dhanbad district. Singh and Singh Dwivedi (2010) analysed the land use pattern, cropping pattern, intensity and coverage under vegetable crops in different farm size groups in Eastern Uttar Pradesh. Singh and Dwivedi (2012) depicted the population pressure and its impact on land use in Chakia Block of Chandauli District U.P. Tonape and Barakade (2011) analyzed the agricultural land use pattern at micro level in Satara district (Maharashtra). Talukdar and Singh (2011) traced out the changing land use pattern in Tinsukia District of Assam. Pandey and Sharma (2012) analyzed land use pattern in Saryupar plain of Uttar Pradesh. Singh and Sharma (2015) analysed the broad scenario of land use pattern and its changes in Sonbhadra district. Singh and Kumar (2016) presented theoretical and conceptual understanding of land, land use, land use change and land use pattern through inter-conceptual relationship model. And again explained geographical review of land use pattern of Mirzapur district

Sonbhadra District, the study area, is extended between 23^0 52' to 25^0 32', N latitudes and 82^0 72' to 83^0 33' E longitudes, covering an area of 6806.61 km^2 in south eastern part of Uttar Pradesh and consisting of 8 community development Blocks (Fig.1). The area is characterized by sub-tropical climate and extreme relief features like mountain, plateau, and plains which ultimately reflects different land use patterns.

Objective and methodology

The main objective of the study is to analyse the changes in agricultural land use in Sonbhadra district during 1995 to 2015. The study is based on the secondary data which are obtained from the governmental web sources. Statistical calculation, tables and diagrams are drawn on MS-Excel and Power Point with the help of computer.

Present agricultural land use pattern

The agricultural land use (2014-15) can be divided into six major groups viz., area under food-grains, pulses, oil seeds, commercial crops, industrial crops and others crops which present various distribution pattern and fulfil the food requirement of the people. The food-grains include wheat, paddy, barley, sorghum, millet and maize which had high percentage share to other crops. Total food-grains area was 61.84 per cent out of total cropped area of Sonbhadra district. Chatra (80.25 per cent), Robertsganj (70.39 per cent), and Ghorawal (66.69 per cent) blocks had more than sixty per cent share while Chopan (54.42 per cent), Duddhi (54.13 per cent), Nagwa (52.16 per cent), Myorepur (50.19 per cent) and Babhani (49.94 per cent) blocks had less than fifty per cent share of food-grains area during 2014-15 (Table-1).

Table 1: Agricultural land use pattern, 2014-15

Name of blocks	Total area	Food-grains		Pulses		Oil seeds		Commercial crops		Industrial crops		Other crops	
		Area	Per cent	Area	Per cent	Area	Per cent	Area	Per cent	Area	Per cent	Area	Per cent
Ghorawal	82141	34390	66.69	12182	23.62	3305	6.41	1762	2.54	81	0.16	212	0.57
Robertesganj	52469	22875	70.39	6428	19.78	1720	5.29	1414	4.33	66	0.20	239	0.00
Chatara	29389	12826	80.25	1791	11.21	1031	6.45	355	1.95	24	0.15	51	0.00
Nagawan	90786	3775	52.16	1769	24.44	1356	18.73	82	1.11	0	0.00	131	3.56
Chopan	156045	11743	54.42	6238	28.91	2120	9.82	236	1.08	57	0.26	595	5.51
Myorepur	139610	12710	50.91	3277	13.13	2081	8.34	275	1.06	38	0.15	3300	26.42
Duddhi	66929	8641	54.13	3300	20.67	1807	11.32	393	2.26	35	0.22	910	11.40
Babhani	61136	8186	49.94	1627	9.92	772	4.71	114	0.63	45	0.27	2830	34.53
Total District	678505	115232	61.84	36663	19.66	13895	7.62	4128	2.19	346	0.19	8268	8.50

Source: Calculated from *Sankhyikiya Patrika* of Sonbhadra district (www.updes.up.nic.in)

Crops included under pulses are black gram (*Vigna mungo*), green gram (*Vigna radiata*), red lensesamum indicum (*Lens culinaris*), gram, pea, red gram (*Cajanus cajan*) and moth (*Vigna aconitifolia*). This types of land use had 19.66 per cent to total cropped area of the district. Chopan (28.91per cent) had the highest area under pulses followed by Nagwa (24.44 per cent), Ghorawal (23.62 per cent) Dudhi (20.67 per cent) Robertsganj (19.78 per cent), Chatra (11.21per cent), Myorepur (13.13 per cent), and Babhani (9.92 per cent) (Table-1). Crops included under oil seeds are mustard, flax seeds, *Sesamum indicum*, castor seeds, groundnut, sunflower and soybean which had 7.62 per cent area out of total cropped area. Only two blocks Nagwa (18.78 per cent) and Dudhi (11.32 per cent), had higher area under pulses while other blocks had less than ten per cent share of land under oil seeds (Table-1). Area under commercial crops (potatoes, onions, turmeric and other vegetables) had 2.19 per cent share out of total cropped area of the district where Robertsganj (4.33 per cent), Ghorawal (2.54 per cent), and Dudhi (2.26 per cent) had more than two per cent area covered by this crop group than other blocks (Table-1). Industrial crops include sugarcane and hemp (*Crotalaria verrucosa*) which had 0.19 per cent of the total cropped area and all blocks had less than 0.5 per cent of area during 2014-15 (Table-1). Other crops include *Echinochloa colona*, *Paspalum scrobiculatum* and all fodders which had 8.50 per cent of the total cropped area. Babhani (34.53 per cent) had the highest area under this group followed by Myorepur (26.42 per cent) and Dudhi (11.42 per cent) while other blocks had less than six per cent of cropped area (Table-1).

Changing pattern of agricultural land use

Total agricultural land was decreased by

26.75 per cent during 1995 to 2015 due to expansion in non-agricultural sector but there was increase in commercial crops (553.16 per cent) and pulses (12.60 per cent). The major decrease was in others crops (-68.61 per cent) followed by oil seeds (-36.23 per cent), food-grains (-28.86 per cent) and industrial crops (-17.62 per cent). It means the farmers moved to produce pulses and commercial crops. The most important thing is that the farmers, particularly schedule tribes, who have lands which had been provided by the government

Table: 2 Agricultural land use change during 1995 to 2015

Crops group	Condition of agricultural land use during 1995 to 2015			
	1994-95	2014-15	Difference	Change in per cent
Food-grains	161975	115232	-46743	-28.86
Pulses	32560	36663	4103	12.60
Oil seeds	21790	13895	-7895	-36.23
Commercial crops	632	4128	3496	553.16
Industrial crops	420	346	-74	-17.62
Other crops	26342	8268	-18074	-68.61
Total crops	243719	178532	-65187	-26.75

Source: Calculated from *Sankhyikiya Patrika* of Sonbhadra district (www.updes.up.nic.in)

under the law of Forest Right Act-2006, mostly sown the pulses and commercial crops in their land. Due to scarcity of water, the farmers were forced to grow only those crops which have less water requirements.

Food-grains

During the years 1999 to 2000, the major changes can be seen in area under millet (-265.25 per cent) which was highest negative change followed by barley (-3.27 per cent) while highest positive change was in the area of Sorghum (23.66 per cent) followed by wheat (13.43 per cent), paddy (12.61 per cent) and maize (5.83 per cent) (Table-3). During 2000 to 2005, the food-grains had the decreasing trend by -19.47 per cent. Only millet (58.93 per cent) and maize (3.87 per cent) had positive trend while other crops like, wheat, paddy, sorghum, barley had negative trend (Table-3). During 2005 to 2010 the area under food-grains decreased by 38.30 per cent. Major negative changes can be seen in millet (-164.57 per cent) followed by paddy (-131.66 per cent), maize (-22.74 per cent), barley (-16.42 per cent), and sorghum (-9.87 per cent). Only wheat area (4.11 per cent) had positive changed during 2010 to 2015, overall positive changed was seen in total food-grains area by 4.47 per cent while barley (-22.91 per cent) and sorghum (-1.35 per cent) had negative changed and others were in positive changed (Table-3)

Table 3: Agricultural land use area and its changes during 1995, 2000, 2005, 2010 and 2015

Crop group	Crop	1994-95 Area	1994-95 per cent	1999-2000 Area	1999-2000 per cent	2004-05 Area	2004-05 per cent	2009-10 Area	2009-10 per cent	2014-15 Area	2014-15 per cent	1994-95 to 1999-2000	1999-2000 to 2004-05	2004-05 to 2009-10	2009-10 to 2014-15
Food-grains	Wheat	50967	31.47	58876	32.46	52029	34.27	54258	49.43	59560	51.69	13.43	-13.16	4.11	8.90
	Paddy	74454	45.97	85193	46.97	68909	45.39	59746	27.10	31469	27.31	12.61	-23.63	-131.66	5.48
	Barley	18588	11.48	18000	9.92	11179	7.36	9602	8.75	7812	6.78	-3.27	-61.62	-16.42	-22.91
	Sorghum	2481	1.53	3250	1.79	2805	1.85	2553	2.33	2519	2.19	23.66	-15.86	-9.87	-1.35
	Millet	504	0.31	138	0.08	336	0.22	127	0.12	172	0.15	-265.22	58.93	-164.57	26.16
	Maize	14981	9.25	15908	8.77	16648	10.90	13482	12.28	13700	11.89	5.83	3.87	-22.74	1.59
	Total	161975	100	181365	100	151806	100	109768	100	115232	100	10.69	-19.47	-38.30	4.74
Pulses	Vigna mungo	3101	9.52	3311	8.02	2461	6.14	2635	6.99	2658	0.25	6.34	-34.54	6.60	0.87
	Vigna radiata	158	0.49	98	0.24	25	0.06	28	0.07	29	36.95	-61.22	-292.00	10.71	3.45
	Red lentil	5689	17.47	7984	19.35	9443	23.57	10438	27.70	9046	0.11	28.74	15.45	9.53	-15.39
	Gram	15284	46.94	14733	35.71	10435	26.04	11258	29.87	11107	0.07	-3.74	-41.19	7.31	-1.36
	Pea	1603	4.92	2498	6.05	3389	8.46	3495	9.27	3511	0.09	35.83	26.29	3.03	0.46
	Cajanus cajan	6715	20.62	12621	30.59	14313	35.72	9830	26.09	10312	-0.44	46.80	11.82	-45.61	4.67
	Vigna aconitifolia	10	0.03	14	0.03	0	0	0	0	0	0.00	28.57	0	0	0
	Total	32560	100	41259	100	40066	100	37584	100	36663	-0.02	21.08	-2.98	-6.32	-2.78
Oil seeds	Mustard	4452	20.26	4947	24.19	2891	21.04	3919	22.97	4012	28.87	10	-71.12	4.24	24.75
	Flax seeds	11181	50.89	9135	44.66	5942	43.31	5403	41.12	5136	36.96	-22.4	-53.48	-10.16	-5.20
	Sesamum indicum	6271	28.54	6065	29.65	4614	33.57	4719	35.91	4747	34.16	-3.4	-31.45	2.23	0.59
	Castor seeds	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Groundnut	66	0.30	306	1.50	286	2.08	0	0	0	0	78.4	-6.99	0	0
	Sunflower	0	0	1	0	0	0	0	0	0	0	100	0	0	0
	Soyabean	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	21970	100	20454	100	13743	100	13141	100	13895	100	-7.41	-48.83	-4.58	5.43
Commercial crops	Potato	629	99.53	835	99.76	828	23.26	911	24.23	1106	26.79	24.67	-0.85	9.11	17.63
	Onion	0	0.00	0	0.00	476	13.37	500	15.96	769	18.63	0.00	100	20.67	21.98
	Turmerc	0	0.00	1	0.12	2251	63.23	2245	59.71	2248	54.46	100	99.96	-0.27	0.13
	Other vegetable	3	0.47	1	0.12	5	0.14	4	0.11	5	0.12	0.00	80.00	-25.00	20.00
	total	632	100	837	100	3560	100	3760	100	4128	100	24.49	76.49	5.32	8.91
Industrial crops	Sugarcane	283	67.38	357	64.09	235	60.57	149	51.92	196	56.65	20.73	-51.91	-57.72	23.98
	Hemp	137	32.62	200	35.91	153	39.43	138	48.08	150	43.35	31.5	-30.72	-10.87	8.00
	Total	420	100	557	100	388	100	287	100	346	100	24.6	-43.56	-35.19	17.05
Other crops	Echinochloa cocolona	17089	64.87	10441	58.31	5701	55.40	6362	67.80	5281	63.87	-63.67	-83.14	10.39	-20.47
	Paspalum scrobiculatum	9183	34.86	7293	40.73	4273	41.53	2695	28.72	2629	31.80	-25.92	-70.68	-58.55	-2.51
	All fodder	70	0.27	172	0.96	316	3.07	327	3.48	358	4.33	59.30	45.57	3.36	8.66
	Total	26342	100	17906	100	10290	100	9384	100	8268	100	-47.11	-74.01	-9.65	-13.50
	Grand total	243899		262378		219853		174024		178532		7.58	-16.21	-20.85	2.59

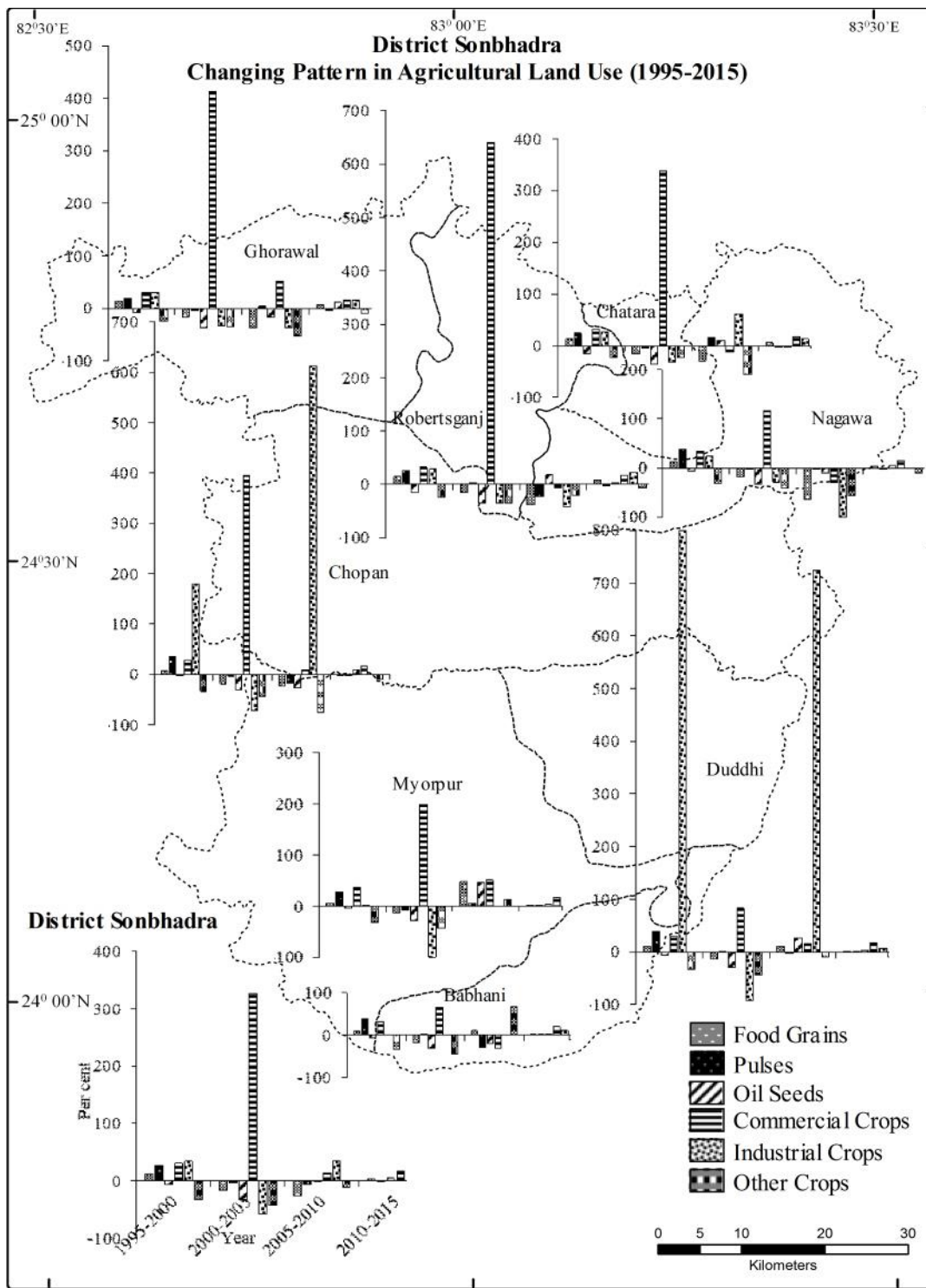Source: Calculated from *Sankhyikiya Patrika* of Sonbhadra district (www.updes.up.nic.in)

Fig.1

Pulses

The overall area under pulses increased by 21.08 per cent during 1995 to 2000 while during 2000 to 2015, it recorded negative growth rate. During 1995 to 2000, the area under Vigna radiata (-61.22 per cent) and gram (-3.74 per cent) decreased while Cajanus cajan, pea, Vigna aconotifolia, sesamum indicum and vigna mungo increased during this period. During 2000 to 2005, the highest decrease was recorded under Vigna radiata (-292 per cent) followed by gram (-41.19 per cent) and vigna mungo (-34.54 per cent). During 2005 to 2010, all pulses experienced as positive growth in area except cajanus cajan (-45.61 per cent). During 2010 to 2015, red lentil (-15.39 per cent) and gram (-1.36 per cent) faced negative growth (Table-3).

Oil seeds

During 1995 to 2010, change in overall area under oil seeds had negative trend, but during 2010 to 2015 it was increased. During 1995 to 2000, the major negative change was in area of flax seeds (-22.4 per cent) and Sesamum indicum (-3.4 per cent) while highest positive change was in area of sunflower (100 per cent) and groundnut (78.4 per cent). During 2000 to 2005, the area under mustard, flax seeds, Sesamum indicum and groundnut had decreasing trend. Only flax seeds had negative trend of change in area during 2005 to 2015 while mustard and Sesamum indicum both had positive trend of change in area (Table-3).

Commercial crops

Overall area under commercial crops had positive trend of change during 1995 to 2015. During 1995 to 2000, the area under potato (99.79 per cent) had the highest positive change while turmeric and other vegetable had less than one per cent positive change. During 2000 to 2005, the area under onion, turmeric and other vegetable had positive growth except potato (-0.85 per cent). During 2005 to 2010, the area under turmeric and other vegetable had negative growth while potato and onion had positive growth. During 2010 to 2015, the area under all commercial crops had positive growth (Table-3).

Industrial crops

Overall positive change in the area of industrial crops was recorded during 1995 to 2000 and 2010 to 2015 while negative change during 2000 to 2010. During 1995 to 2000, the area under sugarcane (20.73 per cent) and hemp (31.5 per cent) both had positive growth but during 2000 to 2005 and 2005 to 2010 both crops had faced negative change. During 2010 to 2015 sugarcane (23.98 per cent) and hemp (8 per cent) had positive change (Table-3).

Others crops

The overall area under other crops was continuously decreasing since 1995 to 2015. During 1995 to 2015, fodder had positive change in area but Barnyard millet and Paspalum scrobiculatum had negative change during 1995 to 2015 (Table-3).

Conclusion

The study area had more than 50 per cent area under food-grains of total cropped area followed by pulses (19.84 per cent), other crops (8.50 per cent), oilseeds (7.62 per cent), commercial crops (2.19 per cent) and industrial crops (0.19 per cent) in 2014-15. There was decreasing trend of cropping of all kind of

crops since 1995 to 2015 except commercial crops (553.16 per cent) and pulses (12.60 per cent) because these crops provide basic and daily needs of food supply to the people. On the other hand, food-grains, oilseeds, industrial crops and other crops had decreasing trend just because agricultural activity is the major work of the people. Mining, industries and forest based food and other products provide their need and enhance the economic condition. Decreasing trend of all cropped areas is major concern for the district. These trend happened because of use of agricultural land for another activities like, transportation, industries, housing etc. The farmers of the study area facing more challenges of livelihood due to transformation of agro-land into non-agro activities.

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Priorities of Infrastructural Development and Responses of Authorities in Udaipur City, Rajasthan

Barkha Chaplot[1] and Shamshad[2]

Abstract

The present paper is an attempt to analyse the priorities of infrastructural development perceived by household population and responses of authorities for the development in Udaipur city. The study is based on primary source of data generated through a comprehensive field survey in the city carried out during 2014. The boundary of the ward has been taken as the smallest unit for data collection while boundary of the zone was taken for spatial data analysis. The overall analysis of the present study reveals that more than one-third household population considered the responses of officers of Municipal Corporation, UIT, Traffic and Wards as good while nearly fifty percent households were dissatisfied with their works and responses. Further, only twenty percent households were satisfied with the responses and works of MLAs and MPs. Moreover, the households observed that the government should focus mainly on the sewerage management, solid waste management and potable water supply in the city; consequently household population has given the priority ranks to them as first, second and third respectively.

Keywords: *priorities, infrastructural development, responses, authorities, perceptions*

Introduction

Development is a multi-dimensional concept and has varied facets like social, cultural, political, institutional, psychological, ecological and ethical. It is often deemed as a process that attempt to improve the economic conditions of the people or to increase human welfare or to improve quality of life (Singh, 2005). Therefore, Drewnawskie (1966) rightly defines development as a process of qualitative change and quantitative growth of the social and economic reality which we call either society or economy because of the close interrelation of

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economic and social elements. No purely economic development is possible; consequently, it is better not to speak of social development which is best called simply development. Moreover, urban development is conceived as a change in land use pattern, transportation network and social and economic institutions. Urban centres with their dense population, industries, confluence of commodity flows, quick access to information, convenient transportation, advanced science & technologies and high productivity levels promote regional development, economies of scale as well as through spread effect. These kinds of interconnected processes accentuate urbanisation. The process of urbanisation expresses itself through a distinct set of land use as well as type of human behaviour leading to phenomenal socio-economic transformation in the surrounding rural areas (Jain, 2008: 1-2).

Nonetheless, development being dynamic process improves the socio-economic life of the urban poors may be called urban development. As the urbanisation shows decentralising tendency of social elites and resources from focal points for better performance of secondary and tertiary functions and the production of consumer goods through manufacturing industries for social satisfaction (Mandal, 1982: 335). Moreover, urban development signifies the carrying out of buildings, engineering, mining or other operations in, on, over or under land, or the making of any material change in the use of any buildings or other land on the urban landscape (Smith, 1984: 263). There has been a fast growth of urban population all over the globe, and hence it requires resetting for improvement and better quality of life in the urban scene. It is also a fact that urban land is scarce and a key factor in urban development

(Bhagat, 1976: 2). But unfortunately, urban development has long been rooted in convention and dogmas of physical landuse planning. Thus, urban development should be concerned not only with the physical improvement of the urban area, but also improvement of the quality of life, both from individualistic and community points of view (Krishnachand, 1976: 9).

The issue of urban infrastructure provision and service delivery mechanism hold as key in the processes of urban development. The increasing role of towns and cities in development of a region further emphasise the need of adequate infrastructure in urban centres,as towns and cities are the chief production centres of economy, the development of infrastructure is nothing less than immediate requirement and policy formulations seek to bridge the gap between demand and supply of urban infrastructure (Pradhan, 2015: 43). The city is a corporate entity for development. The local government of the city has a great deal of influence on the nature, extent and manner of development of the city. The various utility services and facilities provided by the centre, state and local governments affect the urban environment. The local government has to co-ordinate the various decisions which affect the physical development of the community. The local government needs some technical guidelines in making its decisions, policies, programmes and strategies for the orderly development of the community (Rao, 2012:79). The process of growth and location primarily determine the distribution and organisation of cities and city systems.For urban planning to exist, there must be a broad consensus among the population in a country that serious problems affect their cities and these can best be tackled through government interventions; and

UDAIPUR CITY
ZONE MAP
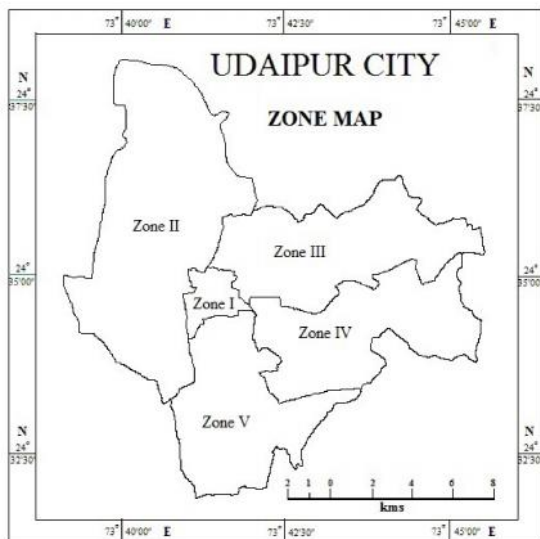
urban planning to be successful, there must be further agreement as to its objectives and mechanisms, that is, what is goals are and how it sets out to achieve them (Clark, 1990:181).

The cost-effective, reliable, and affordable infrastructure services are critical for sustainable development, and necessary conditions for reaching economic, social, and environmental goals. In most of the developing countries of the world, there is still an important unfinished core infrastructure access agenda: strengthening sectoral policies and institutions to improve the efficiency, affordability, quality, and reach of basic services (World Bank, 2008). There is a great need for a strategy of urbanisation to overcome the urban imbalances or inequalities arising out of the unplanned social and economic conditions (Bhardwaj, 1974:417). In order to improve and develop the urban water supply, roads, solid waste management system and other infrastructural facilities of a city, it is desirable that the existing set-up and procedure will have to be enlarged and modified for the purpose and entire programmes to be planned and directed with drive and vision (Bhardwaj, 1974:176).

Udaipur city being the part of smart city project should have good and holistic development policies. The present paper shows the priorities of infrastructural development experienced by household population and the responses of the civil authorities in Udaipur city. The paper describes that what kind of development is required by the people of Udaipur city, for better future of any city or place, the suggestions should be taken from the local population of that place, because only local resident population may know better situation of a place that which sector of the city should be focused primarily by the government for future development and which one not.

Objectives

The following objectives has been selected for the study:

1. to analyse the level of priorities of infrastructural development experienced by household population in Udaipur city.

2. to observe the responses of the concerned authorities in Udaipur city.

The Study Area

Udaipur city has been selected for the present study. The city is located at 24°35' north latitude and 73°44' east longitude. The UMC (Udaipur Municipal Corporation) is only Municipal Corporation in Udaipur district and covered an area of 64 sq. km. At present, the city is divided into 55 wards. However, for the easy analysis and representation of the data, the wards of city have been grouped into five zones by the researcher. Udaipur city is the sixth largest urban centre in Rajasthan. The north-south extension is 18.5 km and the east-west extension is 27.5 km and its location along

the major transport arteries of the country NH-8 connecting Delhi-Mumbai, NH-76 towards Chittaurgarh district, SH-9 and SH-32 connecting to Chittaurgarh and Banswara districts. National Quadrilateral through this city will make this study area more dynamic and vibrant. Udaipur city is drained by river Ahar on the eastern flanks of southern Aravallian range. The city is surrounded by the Aravalli hills and lies 577 meter above from the mean sea level in a bowl-shaped basin. According to Census of India 2011, the population of Udaipur city is 4.5 million (4, 50,729 persons). The density of population in the city is 7,042 persons per square kilometre. The general literacy rate is 80.15 percent, the respective figures for male and female are 54.44 percent and 45.56 percent, respectively. The general sex ratio of population is 927.

Database and methodology

The present study is based on primary source of data generated through comprehensive field survey in the Udaipur city. Primary survey was carried out during 2014 for the collection of the data through the direct questionnaire to the respondents in Udaipur city. Simple random sampling has been applied for the collection of data in each ward of the city and the boundary of the ward has been kept as the smallest unit of data collection. The individual slips were used to ease the task of survey in the city. The household has been taken as a smallest unit of enquiry. One percent households randomly from each ward were selected for the survey. On the basis of one percent random sampling, the survey consisted of 945 sampled households in Udaipur city out of 94,434 households.

Results and discussion
Priority for future development

Households' perceptions and priorities for future development of their neighbourhood and Udaipur city have been presented in the Tables from 1 to 10.

Priority of drainage system

The development of a good drainage system is very important in an area because of the interaction between human activities and the natural water cycle. Earlier drainage system of the city was good when city was confined within walled city, but with the growth and expansion of the city, drainage system of the city choked due to unplanned development of residential colonies. The water logging condition in many areas of the city has become a serious problem. The areas of Udayapole, Delhigate, Bhupalpura, UIT Bridge, Ayad, Sundarvas, *FootaTalab*, *Krishi Mandi*, etc. used to remain flooded during monsoon time; and in few monsoon years, the boats were running to rescue the people who stuck in their houses. The main reason behind this is the unorganised landscaping and subdivision of the land into building sites, which usually shorten the distances over which water flows before reaching a drainage channel and thereby reduce the time lag between rainfall and channelled runoff, further, sediments deposition in sewer lines and human settlement in flood plains reduce the space available for storing flood water in the valley bottom, consequently water level is forced to rise and creating inundation condition in the city.

Table 1: Distribution of Households'Perceptions on Priority of Drainage System

Zones	Priority of Drainage System (Percent)			
	High	Moderate	Low	Total
Zone I	13.91	17.21	68.88	100.00
Zone II	6.15	24.11	69.74	100.00
Zone III	41.53	22.41	36.07	100.00
Zone IV	35.50	32.00	32.50	100.00
Zone V	24.65	39.53	35.81	100.00
Total	24.69	27.86	47.45	100.00

Source: Based on primary survey anducted in 2014 and calculation.

An analysis of the Table 1 exhibits that percentage of households preferring high priority of improvement in drainage system of the city was identified the highest in Zone III (41.53 percent) and the lowest in Zone II (6.15 percent). More than one-fifth households in each zone of the city, except the Zone I, need moderate improvement in drainage sector because it is a part of walled city which has old drainage system (see Figure 1 in Plate 1). Similarly, more than one-third households in all the zones of the city required low priority for the drainage system improvement of the city. Now the city should have well developed interconnected drainage lines between walled city and outer parts of walled city to overcome the problems of water logging and floods.

Priority of solid waste management

The inadequate management of solid wastes is also one of the serious problems of the city because the volume of solid waste generation is continuously increasing day by day. With the growth of city population and huge influx of tourists in the city, the problem of solid wastes has been continuously getting deteriorated. At present,according to *Nagar Nigam,* the city on an average generates about 160 metric tonnes of solid wastes per day, out of which, about 120 tonnes waste is collected daily and disposed off, but the ground reality witnessed that generation of wastes is much higher than the data supplied by the department. In fact, no single unit of decentralisation for the management of wastes has been instituted by city administration. No processing of solid wastes is being done right as on date.

Table 2: Distribution of Households'Perceptions on Priority of Solid Waste Management

Zones	Priority of Solid Waste Management (hercent)			
	High	Moderate	Low	Total
Zone I	78.15	6.61	15.23	100.00
Zone II	41.53	14.87	43.59	100.00
Zone III	71.58	16.39	12.03	100.00

Zone IV	62.50	16.00	21.50	100.00
Zone V	76.27	16.28	7.44	100.00
Total	65.57	14.41	20.03	100.00

Source: Based on primary survey conducted in 2014 and hersonal calculatture

Zone wise distribution of household population who felt priority of solid waste management in Udaipur city has been given in Table 2. More than sixty percent (nearly two-third) households observed that there should be improvement in sector of solid waste management in Udaipur city. The household population experiencing the priority of solid waste management as moderate and low levels were recorded 14.41 percent and 20.03 percent respectively. An analysis of Table 2 shows that households living in Zone I observed the maximum solid waste problem, consequently the improvement in the solid waste management was on the higher priority in this zone, followed by Zone V (76.27 percent), Zone III (71.58 percent), Zone IV (62.50 percent) and Zone II (41.53 percent). The proportion of households who felt low priority for improvement in solid waste management was witnessed the highest in Zone II and the lowest in Zone V in Udaipur city. The moderate priority for the solid waste management was felt by maximum households of Zone III and minimum in Zone I. Zone I come under core area of the city where both domestic as well commercial waste generation is high. This zone has maximum un-dulating mountainous shops in the city, all main markets are located in this zone, consequently the flow of customers and tourists are higher in comparison to other zones that is why people felt high level of priority to solid waste management in Zone I.

Priority of potable water supply

The main sources of water supply in Udaipur city are surface water and ground water to fulfil the daily requirement of water. Fatehsagar, Pichola, Jaisamand Lakes and Mansi Wakal Dam are the main surficial sources of water for the residents of Udaipur city. In addition to it, PHED has 53 tube wells and 29 open well/ borings, which are supplementing the existing water supply system in the city. The data regarding the percent distribution of households feeling priority of development in the sector of potable water supply has been presented in Table 3. More than fifty percent households felt high degree of improvement in the potable water supply in Udaipur city. Nearly one-third household population experienced moderate priority of development of potable water supply, while, the 12.29 percent households have low priority of improvement in potable water supply in the city.

Table 3: Distribution of Households' Perceptions on Priority of Potable Water Supply

Zones	**Priority of Potable Water Supply (hercent)**			
	High	Moderate	Low	Total
Zone I	59.60	31.12	9.27	100.00
Zone II	63.59	27.69	8.72	100.00
Zone III	57.93	32.78	9.29	100.00

Zone IV	51.50	41.00	7.50	100.00
Zone V	45.11	30.23	24.65	100.00
Total	55.08	32.63	12.29	100.00

Source: Based on primary survey in 2014 and herrenal calculation

Zone wise analysis of Table 3 describes that the high priority of improvement in potable water supply was felt maximum by households of Zone II (63.59 percent) and minimum of Zone V (45.11 percent). Maximum and minimal ranges of households experiencing moderate priority of improvement in the sector of potable water supply were identified in Zone IV (41.00 percent) and Zone II (27.69 percent) respectively. The low priority of development in potable water supply was identified the lowest in Zone IV (7.50 percent) and the highest in Zone V (24.65 percent). It is seen by researchers that in the inner core area of the city as well as some other parts of city, the colour of water are yellow; especially the water supplied from the lakes within the city peripheries which mean somehow still polluted water is flowing in the lakes.

Priority of sewerage nanagement

Flow of domestic wastewater into the lakes of the city is one of the major reasons identified for the deterioration of the condition of the lakes. Improper sewage collection and lack of conveyance system also resulted wastage of water flowing in the open drains, which simultaneously is marring aesthetic beauty of the city. Only a small part of Udaipur city has sewerage water system. The total area covered under sewerage system is about 13 percent out of the total area of the city. The population and business activities in city are continuously growing which are raising the standard of living of people, consequently demand of water in the city is further accentuated and, thus, a lot of wastage of water is occurred.

Table 4: Distribution of Households'Perceptionson Priority of Sewerage Management

Zones	Priority of Sewerage Management (Percent)			
	High	Moderate	Low	Total
Zone I	78.29	15.79	5.93	100.00
Zone II	63.08	27.18	9.74	100.00
Zone III	73.22	19.68	7.11	100.00
Zone IV	56.00	35.00	9.00	100.00
Zone V	63.72	25.12	11.17	100.00
Total	66.14	25.07	8.78	100.00

Source: Based on primary survey conducted in 1014 and personal calculation.

Table 4 exhibits the percent distribution of households who felt priority of sewerage management system in Udaipur city. This table shows that there are two-third households who

felt high priority to improve the sewerage system of the Udaipur city. One-fourth household populationperceived moderate priority for the improvement in the sewerage system, while, 8.78 percent households felt the low priority for the improvement in sewerage system in Udaipur city. An examination of Table 4 illustrates that the proportion of households having the high priority for the improvementin the sector of sewerage water management was witnessed the highest in Zone I (78.29 percent), followed by Zone III (73.22 percent), Zone V (63.72 percent), Zone II (63.08 percent) and Zone IV (56.00 percent). The low level of priority felt by households for sewerage management was found maximum in Zone V (11.17 percent) and minimum in Zone I (5.93 percent). More than fifteen percent households in all zones of the city felt moderate priority for the improvement in the sector of sewerage management.

Priority of good quality of roads

The good quality of roads plays an important role for the smooth functioning of transport system of a city. Table 5 describes the percent distribution of households feeling priority of good quality of roads in Udaipur city. Nearly thirty percent households felt that there should be high priority level of good quality of roads in the city and more than forty percent households would like to have moderate priority for the improvement in the sector of good quality of roads in Udaipur city. More than one-fourth household preferred low priority for the development of good quality of roads in the city.

Table 5: Distribution of Households' Perceptions on Priority of Good Quality of Roads

Zones	Priority of Good Quality of Roads			
	High	Moderate	Low	Total
Zone I	34.44	48.34	17.22	100.00
Zone II	40.51	37.43	22.06	100.00
Zone III	17.49	45.89	36.61	100.00
Zone IV	33.00	32.50	34.50	100.00
Zone V	24.19	50.70	25.12	100.00
Total	29.77	42.80	27.44	100.00

Source: Based on primary survey in 2014 and personal calculation.

The Zone wise analysis shows that the proportion of households who need good quality of roads have been identified highest in Zone II (40.51 percent) and the lowest in Zone III (17.49 percent). More than one-third households' priority for quality road development in all zones is observed as moderate. The maximal and minimal share of households' perceptions of low priority for the development of roads was witnessed in Zone III (36.61 percent) and Zone I (17.22 percent) respectively.It has been seen that the life of newly constructed roads in the city is not much durable and they hardly endure perfectly one rainy season. The numerous pot holes and inappropriate slopes on roads may produce the water logging prob-

lem in the city. The quality of road materials used in road construction is not durable and good,consequently newly constructed roads were not able to sustain a year.

Priority of traffic management

The data regarding zone wise percent distribution of households who felt priority of traffic management in the Udaipur city has been presented in Table 6. This table shows that the more than one-fifth household population felt high priority level of improvement in the traffic management of the city. While, more than half share of the households required moderate priority for the development and improvement in traffic management and one-fourth population have low priority of improvement in traffic management in the city.

Table 6: Distribution of Households' Perceptions on Priority of Traffic Management

Zones	Priority of Traffic Management			
	High	Moderate	Low	Total
Zone I	15.24	58.95	25.83	100.00
Zone II	23.60	49.23	27.18	100.00
Zone III	21.32	60.66	18.03	100.00
Zone IV	19.50	52.50	28.00	100.00
Zone V	31.63	40.46	27.91	100.00
Total	22.78	51.69	25.53	100.00

Source: Based on primary survey in 2014 and personal calculation.

Further examination of Table 6 explains that the proportion of households who want improvement in the existing system of traffic management was identified the highest in Zone V (31.63 percent), followed by Zone II, Zone III, Zone IV and Zone I, as 23.60, 21.32, 19.50 and 15.24 percent, respectively. Less than three-tenth households' priority was low for traffic management in all zones of the city. It is noticed that the traffic and parking are the main problems of transportation of the city; and it has been due to the lack of traffic sense in the population of the city, because people do not follow traffic rules properly and used to park their vehicles here and there which may cause the traffic conjunction.

Priority of street light

Table 7 narrates the percent distribution of households feeling priority of street light in Udaipur city. Only 13.56 percent households felt high level of priority for good street light in Udaipur city. The proportion of moderate and low priority of street light felt by household population in the city were recorded 31.36 percent and 55.08 percent, respectively. An analysis of Table 7 describes that the high degree of priority of street light noticed by households was found the highest in Zone II (27.69 percent) and the lowest in Zone III (6.57 percent). More than twenty percent households' primacy of development in sector of road lights in all zones was recorded as moderate. Maximal and minimal ranges of households witnessing low priority of street light were witnessed maximum in Zone III (69.95 percent) and minimum in Zone II (39.48 percent).

Table 7: Distribution of Households' Perception on Priority of Street Light

Zones	Priority of Street Light			
	High	Moderate	Low	Total
Zone I	9.93	38.41	51.66	100.00
Zone II	27.69	32.82	39.48	100.00
Zone III	6.57	23.49	69.95	100.00
Zone IV	10.50	21.50	68.00	100.00
Zone V	12.10	40.92	46.98	100.00
Total	13.56	31.36	55.08	100.00

Source: Based on primary survey in 2014 and personal calculation.

Priority of affordable housing

Table 8 describes the zone wise percent distribution of households who need priority of affordable housing in Udaipur city. Nearly thirty percent households wanted moderate priority of affordable housing and only 9.11 percent household populationneeded high priority for the development and improvement in the sector of affordable housing in the city. In fact, larger proportion (61.66 percent) of the household population felt low priority of affordable housing in Udaipur city.

Table 8: Distribution of Households' Perception on Priority of Affordable Housing

Zones	Priority of Affordable Housing			
	High	Moderate	Low	Total
Zone I	7.28	27.81	64.90	100.00
Zone II	9.23	42.56	48.20	100.00
Zone III	7.10	27.87	65.03	100.00
Zone IV	10.00	25.50	64.50	100.00
Zone V	11.17	22.79	66.04	100.00
Total	9.11	29.23	61.66	100.00

Source: Based on primary survey in 2014 and personal calculation.

A detailed examination of Table 8 shows that the less than twelve percent household population in all zones of the city need high priority level of affordable housing. The proportion of households, whose requirement of affordable housing is moderate, has been identified maximum in Zone II (42.56 percent) and minimum in Zone V (22.79 percent). More than sixty percent household population have low priority for the development in the sector of affordable housing in all zones of the city, except Zone II (48.20 percent).

Priority of good quality of urban environment

The data regarding zone wise percent distribution of households who noticed priority of good quality of urban environment of Udaipur city has been shown in the Table 9. This table shows that out of total households, more than eighty percent households felt moderate quality (44.92 percent) and low quality (41.63 percent) of urban environment of Udaipur city. Only 13.45 percent households perceived high priority for the improvement in the good quality urban environment of the city.

Table 9: Distribution of Households' Perceptions on Priority of Good Quality of Urban Environment

Zones	Priority of Good Quality of Urban Environment			
	High	Moderate	Low	Total
Zone I	2.64	52.98	44.37	100.00
Zone II	23.07	45.64	31.27	100.00
Zone III	8.20	51.37	40.45	100.00
Zone IV	18.50	45.00	36.50	100.00
Zone V	12.09	33.03	54.89	100.00
Total	13.45	44.92	41.63	100.00

Source: Based on primary survey in 2014 and personal calculation.

Data in the Table 9 reveals that the percental range of households, whose priority is higher for the improvement in urban environmental quality, lies between 23.07 percent Zone II (the highest) and 2.64 percent in Zone I (the lowest). The largest share of household population experiencing moderate primacy of good quality of urban environment is witnessed the greatest in Zone I (52.98 percent) but households in each zone of the city also felt moderate quality of urban environment. More than one-third households' priority is registered for low quality of urban environment in all zones of the city, except Zone II. As day by day number of vehicles is increasing by which the level of pollution is also increasing in the city. Even urban environment of Udaipur city that was being conceived pollution free, crime free and safe for living, is declining day by day.

Priority of future development

Table 10 provides the information about households' priority of future development of Udaipur city in different sectors. It is clearly seen from the Table 10 that the household population wish that the government should focus mainly on the sewerage water management, solid waste management and potable water supply, and household population have given the ranks to them as 1st, 2nd and 3rd, respectively.

Table 10: Households Priority for Future Development

Sector	Priority for Development
Drainage System	5

Solid Waste Management	2
Potable Water Supply	3
Sewerage Management	1
Good Quality of Roads	4
Traffic Management	6
Street Lighting	7
Affordable Housing	9
Good Quality of Urban Environment	8

Source: Based on primary survey in 2014 and personal calculation.

Apart from these sectors of the city, there should be development in the sectors of good quality of roads, drainage system and traffic management of Udaipur city. At last, household population ranked the street light, good quality of urban environment and affordable housing as 7th,8th and 9th, respectively. For the future development, household population observed that there should be proper monitoring of all the plans and policies which are implemented for the development of Udaipur city.

Nature of Responses of Civil Authorities and Elected Representatives

Every area, place, city or country is controlled and managed by the commitments and responses of civil authorities and elected representatives of the respective place. Tables from 11 to 16 represent the nature of the civil authorities and elected representatives felt by household population in Udaipur city.

Responses of Municipal Corporation

Table 11exhibits the nature of responses of Municipal Corporation felt by household population in Udaipur city. More than one-third household population rated the responses of Municipal Corporation as good, and less than one percent households noted it as excellent. However, more than fifty percent households are not satisfied with the works and responses of Municipal Corporation. Only 6.36 percent households don't know about the works of the *Nagar Nigam.*

Table 11: Nature of Response of Municipal Corporation

Zones	Nature of Municipal Corporation				
	Excellent	Good	Poor	Can't Say	Total
Zone I	0.66	33.11	62.91	3.31	100.00
Zone II	0.51	32.82	63.59	3.08	100.00
Zone III	0.00	54.64	41.53	3.83	100.00
Zone IV	1.50	27.00	55.50	16.00	100.00
Zone V	1.40	44.19	49.77	4.65	100.00
Total	0.85	38.45	54.34	6.36	100.00

Source: Based on primary survey in 2014 and personal calculation.

Further analysis of Table 11 shows that more than fifty percent households are satisfied with the works of the Municipal Corporation in Zone III and rated it as good, but no single household felt excellent in this zone. The largest proportion of households who rated the responses and works of the Municipal Corporation was identified maximum in Zone II (63.59 percent), followed by Zone I, Zone IV, Zone V and Zone III, like 62.91, 55.50, 49.77 and 41.53 percent, respectively (see Figure 7 in Plate 2). Households, who cannot judge the responses of the Municipal Corporation, are found the highest in Zone IV (16.00 percent) and the lowest in Zone II (3.08 percent). The field observations show that the municipal corporation do not perform its duties with punctuality and regularly, because its management and implementation part is not as per demand.

For example, dustbins have been placed at various places in the city but the garbage collection from these selected points is not done on time, consequently the people suffered a lot from unpleasant smell. Simultaneously, the cleaning of drainage and sewerage lines is also not on time which used to cause water logging problem in rainy seasons.

Responses of Urban Improvement Trust

The data regarding the nature of responses of Urban Improvement Trust (UIT) in Udaipur city has been shown in Table 12. The largest proportion of households rated the works of the UIT as poor, while, twenty percent households have no knowledge about the works of UIT. Nearly one-third households are satisfied with the responses of UIT and rated it as good but less than one percent households rated the works of UIT as excellent.

Table 12: Udaipur City-Nature of Response of Urban Improvement

Zones	Nature of UIT				
	Excellent	Good	Poor	Can't Say	Total
Zone I	1.32	23.84	44.37	30.46	100.00
Zone II	0.51	26.15	56.41	16.92	100.00
Zone III	1.09	38.25	43.17	17.49	100.00
Zone IV	-	29.50	40.50	30.00	100.00
Zone V	1.40	37.21	50.70	10.70	100.00
Total	0.85	31.36	47.25	20.55	100.00

Source: Based on primary survey in 2014 and personal calculation.

It may also be seen from the Table 12 that the ratio of dissatisfaction level of household population on the responses given by the UIT is recorded higher in all the zones of the city. The proportion of satisfied households with the responses and works of UIT was identified the highest in Zone III and the lowest in Zone I.

Thirty percent of households in Zone I and Zone IV don't the about the works of UIT. It has been noticed that there is a lot of corruption in UIT because officers of UIT are not very much committed towards their duties for the welfare of city people, until and unless they are offered some monetary and non-monetary things.

Responses of Traffic Officer

A detailed account of nature of responses of traffic officers felt by household population in Udaipur city is given in Table 13. Thirty percent households felt that the works done by traffic police at the major centres of Udaipur city is good, while, more than fifty-five percent households observed that traffic officers do not work properly and responses towards their duties is very poor. An analysis of Table 13 exhibits that the percentage of the satisfied households with the works and responses of traffic officers was witnessed the highest in Zone V (36.28 percent) and the lowest in Zone II (22.05 percent).

Table 13: Nature of Response of Traffic Officer Felt by Household Population

Zones	Nature of Traffic Officer				
	Excellent	Good	Poor	Can't Say	Total
Zone I	0.66	29.80	62.91	6.62	100.00
Zone II	0.00	22.05	70.77	7.18	100.00
Zone III	0.00	33.33	47.54	19.13	100.00
Zone IV	0.00	30.00	48.50	21.50	100.00
Zone V	0.00	36.28	58.14	5.58	100.00
Total	0.11	30.40	57.42	12.08	100.00

Source: Based on primary survey in 2014 and personal calculation.

The highest proportion of households who rated poor responses of traffic officers was identified maximum in Zone II (70.77 percent), followed by the Zone I, Zone V, Zone IV and Zone III, their respective percent values are 62.91, 58.14, 48.50 and 47.54. The proportion of household population who can't say anything about the traffic officers' responses was witnessed the highest in Zone IV (21.50 percent) and the lowest in Zone V (5.58 percent). It is observed that many times traffic officers simply were standing on the signals but not managing traffic properly which might cause the congestion problems.

Responses of MLAs

The data about nature of responses of Members of Legislative Assembly (MLAs) felt by household population has been shown in Table 14. Nearly one-fourth household population are satisfied with the responses and works done by the MLAs for the city development, while, more than forty percent households felt that the work of MLAs was not up to mark and rated as poor. Nearly one-third households can't say anything about the MLAs' responses because they have never seen them after the election.

Table 14: Nature of Response of MLA Felt by Household Population

Zones	Nature of MLAs				
	Excellent	Good	Poor	Can't Say	Total
Zone I	0.66	21.85	47.68	29.80	100.00
Zone II	0.00	12.31	37.44	50.26	100.00
Zone III	2.19	32.24	40.98	24.59	100.00
Zone IV	0.00	13.50	46.50	40.00	100.00
Zone V	0.00	31.63	48.84	19.53	100.00
Total	0.53	22.35	44.28	32.84	100.00

Source: Based on primary survey in 2014 and personal calculation.

A detail analysis of Table 14 shows that proportion of households who don't know about the MLAs' responses are witnessed highest in Zone II (50.26 percent) and the lowest in Zone V (19.53 percent). The percentage of households feeling poor works of MLAs was found maximum in Zone V (48.84 percent) and minimum in Zone II (37.44 percent). Likewise, Zone II and Zone III observed the minimum (12.31 percent) and maximum (32.24 percent) good responses of MLAs in the city respectively, while the households only in two zones namely Zones I and III witnessed the responses of MLAs as excellent in the city.

Responses of MPs

Table 15 contains the percent distribution of data about the nature of responses of Members of Parliament (MPs) observed by the household population in Udaipur city. It will be seen from this table that nearly half proportion of household population observed that the responses of MPs were poor, while, one-fifth percent households felt that the works done by MPs was good. More than one-third households can't say anything about their works. Maximal and minimal values for poor responses of MPs felt by households were observed in Zone V (50.70 percent) and Zone II (35.38 percent) respectively. The proportion of the households feeling good works of MPs in Udaipur city was found the highest in Zone V (29.77 percent), followed by Zone III, Zone I, Zone II and Zone IV.

Table 15: Nature of Response of MP Felt by Household Population

Zones	Nature of MP				
	Excellent	Good	Poor	Can't Say	Total
Zone I	0.66	21.19	49.01	29.14	100.00
Zone II	-	14.36	35.38	50.26	100.00
Zone III	1.09	24.04	44.81	30.05	100.00
Zone IV	-	12.00	47.00	41.00	100.00

| Zone V | - | 29.77 | 50.70 | 19.53 | 100.00 |
| Total | 0.32 | 20.34 | 45.34 | 34.00 | 100.00 |

Source: Based on primary survey in 2014 and personal calculation.

In the remaining category, household population having no observation of the responses and works of MPs were identified the highest in Zone II (50.26 percent) and the lowest in Zone V (19.53 percent).

Responses of Ward Counsellor

Table 16 presents data regarding the nature of responses of ward counsellors felt by household population in Udaipur city. One-third share of household population was satisfied with the works of ward counsellors, while more than fifty percent households were not gratified with the responses given by the ward counsellors. The proportion of household population, who don't know about their ward counsellors and their works, were recorded 10.91 percent in Udaipur city.

Table 16: Nature of Response of Ward Counsellors Felt by Household Population

Zones	Nature of Ward Counsellor				
	Excellent	Good	Poor	Can't Say	Total
Zone I	0.00	40.40	52.98	6.62	100.00
Zone II	0.51	17.95	75.38	6.15	100.00
Zone III	1.09	48.63	44.26	6.01	100.00
Zone IV	0.00	22.00	55.00	23.00	100.00
Zone V	1.40	40.93	46.51	11.16	100.00
Total	0.64	33.58	54.87	10.91	100.00

Source: Based on primary survey in 2014 and personal calculation.

The data given in the Table 16 clearly depicts that the poor responses of ward counsellors observed by households were identified the highest in Zone II (75.38 percent), followed by Zone IV, Zone I, Zone V and Zone III; like 55.00, 52.98, 46.61 and 44.26 percent respectively. The proportion of the households who satisfied with the responses of the ward counsellors, were found the highest in Zone III (48.63) and the lowest in Zone II (17.95 percent), while the percentage of households can't say anything about their ward counsellors were registered the highest in Zone IV. People were not ready to speak about their respective MLAs, MPs and ward counsellors, but after bringing them into confidence, they replied that whenever they require vote, they came and make false promises to win the election, after that they used to disappear. People have called them several times to remind them about their promises which they have done during election. Although response rate of these civil authorities towards problems of the city is not very good, but some ward counsellors work very efficiently in their wards and people are appreciating them for their works and re-

sponses. For the development of smart city, it is very important that public and civil authorities should work together and find out real solutions to the existing problems.

Conclusion

The overall analysis of present research work reveals that there is inadequate and poor drainage system in the city consequently most of the household population in each zone of the city preferred high priority of improvement in drainage system which was identified the highest in Zone III and the lowest in Zone II. Similarly, there is also a serious problem of solid wastes in the city because more than sixty percent household population observed that there should be proper management of solid waste materials in Udaipur city. Inadequate management of waste materials creates the unhygienic conditions in the living environment which consequently results the appearance of several kinds of diseases among the population. The supply of water is the main issue in Udaipur city because more than three-forth share of household population required a lot of improvement in the potable water supply. The surface water namely Fatehsagar, Pichola, Jaisamand Lakes and MansiWakal Dam are the main sources of water supply for the majority of residents of Udaipur city. Thus, there should be proper management of water supply because the volume of water in these lakes used to vary with seasons. Moreover, about two-third proportion of households felt high priority level to improve the existing sewerage water system of Udaipur city, while, one-fourth household have given the moderate priority to improve the sewerage system in city. The Udaipur city being the walled city has a lot of traffic problems in its inner parts rather than outer parts of the city, furthermore, the surfacial landscape

nature of Udaipur city is very undulating which also produces several traffic problems in outer peripheries of the city. Therefore, more than half share of household population wanted the improvement in the traffic management system of the city. The housing status in the city is little bit better as compared to other cities of India because only about forty percent households needed high as well as moderate level development in affordable housing in the city. Further analysis of the study reveals that out of total households, more than eighty percent households felt moderate and low priority for good quality of urban environment in Udaipur city.

For the development of any area or region, an administrative and political commitment has become very necessary now days. In the present study, the responses of civil authorities regarding the developmental activities in the city have been perceived by household population. For example, more than one-third household population rated the responses of Municipal Corporation for its duties as good and less than one percent households as excellent, while more than half share of the household population was not satisfied with the works and responses of Municipal Corporation. The largest proportion of households rated the works of the UIT as poor, while, twenty percent households have no knowledge about the works of UIT. However, nearly one-third households are satisfied with the responses of UIT and rated it as good and less than one percent households rated the works of UIT as excellent. Further, nearly one-fourth household population are satisfied with the responses and works done by the MLAs for the city development, while, more than forty percent households felt that the works of MLAs were not up

to mark and rated them as poor. Likewise, around fifty percent household population observed that the responses and works made by MPs for city development were poor, while, one-fifth proportion of households rated the works of MPs as good. At last, one-third share of household population was satisfied with the works of ward counsellors, while more than fifty percent households were not gratified with the responses given by the ward counsellors. Thus, it can be said that overall the response rate of civic authorities, who are responsible for development of city life, was not satisfactory for population living in Udaipur city.

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Quality of Life in Selected Slum Localities of Varanasi City

Sweta Yadav[1] and Ram Bilas[2]

Abstract

One of the most enduring physical manifestations of social exclusion in Indian cities is the proliferation of slums and informal settlements. People living in these settlements experience the most deplorable living and environmental conditions, which are characterized by inadequate water supply, squalid conditions of environmental sanitation, breakdown or non-existence of waste disposal arrangements, overcrowded and dilapidated habitation, hazardous location, insecurity of tenure, and vulnerability to serious health risks. Slum residents are also excluded from participating in the economic, social, political and cultural spheres of the city all of which create and nurture capabilities. This paper accounts for variations in socio-economic condition of slums dwellers in Varanasi city. For this purpose a total number of 401 respondents were interviewed by using the structured questionnaire blended with suitable open-ended questions to study their socio-economic conditions, migratory status and other infrastructural studies.

Key Words: *physical manifestations, proliferation, deplorable, dilapidated habitation.*

Introduction

A slum can be defined as a "compact settlement with a collection of poorly built tenements, mostly of temporary nature, crowded together usually with inadequate sanitary and drinking water facilities in unhygienic conditions." The growth of metropolitan cities in India has been largely unplanned and haphazard and this can be seen from the fact that one-fourth of total urban population lives in slum and squaller settlements (Mandal, 2014). They put their establishments in the left over spaces along the roadsides, river banks and railway lines etc. They use open spaces or drains for defecation purpose and unhazardously dispose of solid waste, making the atmosphere of the city unhealthy and unhygienic. Due to insufficient in-

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come and poor living conditions, many slum dwellers adopt bad habits such as using alcohol during crime and prostitutions as aspects of social pollution.

The slum dwellers belong to among one of the poorest section of the urban areas. Slum is also defined by UN-HABITAT (2003) as the settlement having lack of basic services, substandard housing or illegal and inadequate dwellings, overcrowding and high density, unhealthy living conditions and hazardous locations, insecure tenure or irregular or informal settlements, poverty, social exclusion and highly congested settlement. Slums as defined in Census of India, is a compact area of at least 300 populations or about 60-70 households of poorly built congested tenants, in unhygienic environment usually with inadequate infrastructure and lacking in proper sanitary and drinking water facilities. According to ford (1936), a slum may be defined as "A blighted district in which the large majority of buildings, whether commercial, industrial and residential, are old and in which there is poor upkeep of dwellings and premises may be called blighted district which becomes a potential slum locality. Any area of old neglected and deteriorating housing is a slum as soon as it becomes in sanitary or otherwise injurious to its occupants." A United Nations report (1957) mention that, Slums and squatters are uncontrolled settlements whose marginal inhabitants are not fully integrated socially and economically into the development process. The concept of slum differs from region to region and person to person. Several studies have been carried out in India on the creation, growth, identifications of slums. Singh (1990) defines it as "the area of self-generating communities who struggle to achieve a stable social life by adapting con-

gestion, insanitation and lack in basic amenities. They build their dwellings themselves and make a search for employment and try to stabilize themselves as far as possible. In an ecological sense, slums are a process of invasion by individuals or groups of vacant lands, owned by private, semi-government agencies in the city, and occupy them illegally. Generally the residents of slums are hated by the surrounding well-to-do people, treating them as inferior, socially backward and outcasts. They have no record in the administrative structure; they have becomes places of suspicious character, criminals and outlaws. Therefore, slums have been designated as 'evil areas' and 'vice areas' (Srivastava and Singh, 1996). Thus in this study, socio-economic condition of slum dwellers and their distribution have been discussed in detail.

Objectives

1. to evaluate the quality of life and problems faced by slum dwellers in selected slum localities.

2. to assess the socio-economic condition of slum dwellers.

3. to suggest some remedial measures to improve the quality of their life.

Methodology

Present study represents a cross-sectional survey of different group and to assess the existing status of slum population and their socio-economic status in the city. A total number of 401 peoples were interviewed by using the questionnaire blended with suitable open-ended question on socio-economic conditions, migratory status.

The data was analyzed using SPSS 12 version. Different categories of respondents

have been grouped on the basis of their occupation, income, and education etc. Secondary data has been collected from various sources such as Municipal Corporation, DUDA, Vikas Bhawan, Kachehri and Statistical Office of Varanasi.

Study area

The ancient city of Varanasi (Latitude $25^0 15'$ N to $25^0 22'$ N and Longitude $82^0 57'$E to $83.1'$E) is situated on the left bank of the river Ganga. Varanasi is well connected through road, railways and airways with other parts of the country. It's unique in its architectural, artistic and religious expressions of traditional Indian culture even today. Varanasi city is known for its religious, commercial, educational and tourist importance and thus invites large number of people from India and abroad for various purposes.

With rapid urbanization, as in most developing countries, public health problems in India are increasingly assuming an urban dimension. In the 2001 Census, 27.8% of the population was found to be living in urban areas. Between 1991 and 2001, 14.3 million people were added to the urban population due to migration. In cities with a population over a million, nearly one-fourth (24.1%) of the population was residing in slums (Madhiwalla, 2007). Slums are commonly known by different terms in different regions such as, katras, gallis, jhuggi-jhopadi in Delhi, bustees in Calcutta, chawels in Mumbai, ahatas in Kanpur, Kachchi bustees in Jaipur, petas in Andhra Pradesh and Keris in Banglore etc. The concentration of slum population in metropolitan cities of India are given in Table 1. The largest slum populations are in major cities, Mumbai (6.5 million slum dwellers), Delhi (1.9 million), Kolkata (1.5 million), Chennai (0.8 million), and Nagpur (0.7 million). Even the "hi-tech" cities of Bangalore and Hyderabad have one million slum residents. By far the largest percentage of population living in slums is in Mumbai, a shocking 54 percent. Next are Faridabad (46 percent slum dwellers) and Meerut (44 percent), both in the Delhi National Capital Region, followed by Kolkata at 32 percent. Six million children under age 7 lived in slums in 2001, with 1.6 million in Maharashtra state alone.

Table 1: Slum population in million plus cities in India, 2001.

Name of the city	Total Population	Slum Population	Slum Population (%)
Greater Mumbai	11,978,450	6,475,440	54.1
Delhi	9,879,172	1,851,231	18.7
Kolkata	4,572,876	1,485,309	32.5
Bangalore	4,301,326	430,501	10.0
Chennai	4,343,645	819,873	18.9
Ahmedabad	3,637,483	473,662	13.5
Hyderabad	3,520,085	626,849	17.2
Pune	2,538,473	492,179	19.4

Kanpur	2,551,337	367,980	14.4
Surat	2,433,835	508,485	20.9
Jaipur	2,322,575	368,570	15.9
Lucknow	2,185,927	179,176	8.2
Nagpur	2,052,066	737,219	35.9
Indore	1,474,968	260,975	17.7
Bhopal	1,437,354	125,720	8.7
Ludhiana	1,398,467	314,904 .	22.5
Patna	1,366,444	3,592	0.3
Vadodara	1,306,227	186,020	14.2
Thane	1,262,551	351,065	27.8
Agra	1,275,134	121,761	9.5
Kalyan-Dombivli	1,193,512	34,860	2.9
Varanasi	1,091,918	137,977	12.6
Nashik	1,077,236	138,797	12.9
Meerut	1,068,772	471,581	44.1
Faridabad	1,055,938	490,981	46.5
Pimpri Chinchwad	1,012,472	123,957	12.2
Howrah	1,007,532	118,286	11.7
TOTAL	73,345,775	17,696,950	24.1

Source: Census of India, 2001.

The problem of slum growth and deterioration in environmental quality is not only in metropolitan cities but Varanasi is also suffering with associated problems. Slum in the city are a significant problem as they put more pressure on the existing facilities and covers large part of the city.

Table 2: Growth of slum population in Varanasi (1941-2001).

Year	Total Population	Total Slum Population	Percentage of the Total Population
1941	258646	26100	10.09
1951	341923	48300	14.12
1961	471258	69600	14.76
1971	583856	86700	14.84

1981	720755	120812	16.76
1987	316584	154735	18.73
1991	929270	200000	20.00
2001	1091918	453222	37.69
2011	1423711	578646	40.64

Source: Census of India, 2011.

Slums in Varanasi city has been continuously increasing from 1941 to 2001 (Table 2). It has been found that in 1991 the slum population in the city was 200,000 with a number of 119 slums throughout the city. At present Varanasi have 227 slums with the total population of 453,222 which is about 37.69 percent of the total population spread throughout the city, either on government or private lands (Fig.1.1). As from the information of DUDA, the total number of slum households is nearly 56,652 covering approximately 1372.6 hectares of land (approximately 17%) in the city. The average gross density in slum areas is approximately 330 persons/ha in the city area. The average household size in slums is approximately 8 as compared to the city's average of 7.3, which is comparatively high. The average income of slum household ranges from Rs.100-150 per day and most of them belong to sched-

uled casts and tribes. The major concentration of slums is found in the old city area near the ghats, areas near small scale industries (slum dwellers are weavers working in handloom industry) as well as at the Rajghat and central city area.
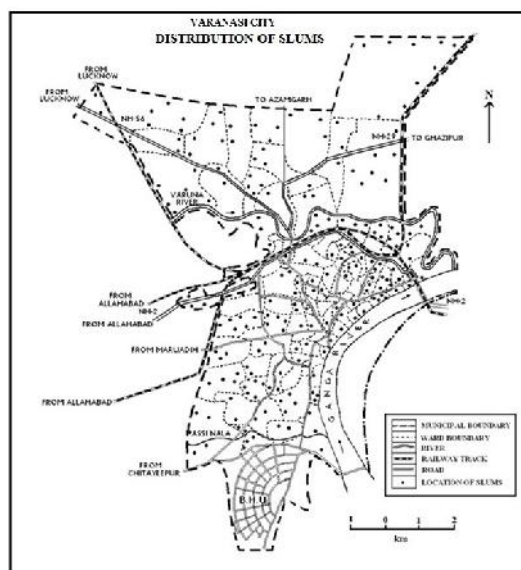

Fig. 1

Socio-economic condition of slum dwellers

According to an estimate of VDA, about 85 percent of the slum dwellers lacks sanitary and water supply facilities. Most of the slum dwellers are employed as sweeper, weaver, footpath seller, bidi makers, rag pickers and so on.

To know the problems associated with growth of slums study has been conducted in selected slums of the city. For this purpose about 12 slums (Fig. 2) has been selected. They

have been into 4 different categories such as:

Category I: Old City Area

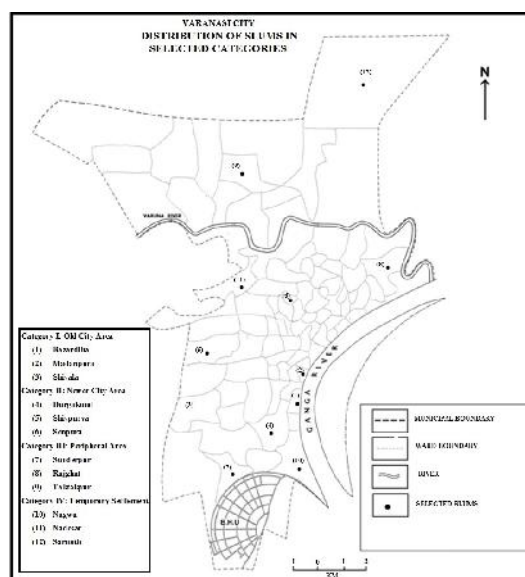(1) Bazardiha

(2) Madanpura

(3) Shivala

Category II: Newer City Area

(4) Durgakund

(5) Shivpurva

(6) Senpura

Category III: Peripheral Area

    (7) Sunderpur

    (8) Rajghat

    (9) Taktakpur

Category IV: Temporary Settlement

    (10) Nagwa

    (11) Nadesar

    (12) Sarnath

Occupation

Fig. 2

The slum dwellers are generally the un-skilled laborers engaged in odd jobs involving heavy manual labor occupations. Labors are the highest as construction workers and un-skilled office workers like peon. Among women, laborers occupy the first place followed by domestic servants like maid servants and then by cleaners and sweepers. According to the table 3 the population engaged in different categories of slums in different types of occupations are 25.2 percent in Govt. /Pvt. Service, 15.5 percent slum dwellers are engaged in some business, 13.2 percent respondents are rickshaw puller, 18.2 percent are rag pickers, 11.5 percent slum dwellers work as laborers, 11.7 percent of slum dwellers doing weaving works and about 4.7 percent slum dwellers engaged in some other types of work including mullah, beggars, farmers etc., respectively. Table 3 shows the occupational structure of slums of Varanasi city.

Table 3: Occupational structure of slum dwellers in selected slum categories.

Locality	Govt./Pvt. service	Business	Rickshaw Puller	Rag Pickers	Labor	weaver	Others	Total (n)
Category I	7.8	16.5	6.8	1.0	14.6	43.7	9.7	103
Category II	38.8	20.1	13.7	17.3	5.8	1.4	2.9	139
Category III	26.9	12.6	14.3	23.5	19.3	-	3.4	119
Category IV	17.5	5.0	25.0	50.0	-	-	2.5	40
Total	25.2	15.5	13.2	18.2	11.5	11.7	4.7	401

Source: Based on personal survey 2008.
Note: (n) Number of respondents.

As table 3 shows that, out of the total respondents' highest number 43.7 percent of slum dwellers are engaged in weaving works. Varanasi is an industrial city and it is famous for weaving of Banarsi sarees. Therefore a considerable number of slum dwellers are engaged in the above mentioned occupation in category I, while 1.4 percent of slum dwellers are engaged in category II in this work. About 15.5 percent of slum dwellers are employed in business activities. The highest proportion of 20.1 percent slum dwellers from category II, 15.5 percent from category I, 12.6 percent in category III and only 5 percent of slum dwellers are engaged in this occupation. The main business of these slum dwellers is running of vegetable and fruit shops on footpath thelas (Hand pulling trolley), petty tea stalls and cigarette, biri, battle shops in general etc. A good number of slum dwellers are engaged as daily labors in construction of private houses, government buildings, road construction etc. The percentage of such labors is highest in category III which is 19.3 percent. In category I, 14.6 percent and only 5.8 percent in category II in this job. The percentage of daily laborers is highest in category III due to illiteracy and poverty which force them to be engaged in self business. These daily laborers do not get regular work, they are unable to secure working days for their family expanses thus causing vary low standard of living. The percentage of workers is 38.8 percent in category II, while it is 26.9 percent in category III, 17.5 percent in category IV and 7.8 percent in category I are engaged in Government and private services as a sweeper on the permanent and contract basis is higher because of higher literacy. It is also owing to their almost permanent living in the category of the slums. About 13.2 percent

slum dwellers are also engaged in the Rickshaw pulling jobs. These poor persons hardly afford to purchase own rickshaw. They hire rickshaw from the business man on daily contract payment and pull them either in day shift or night shift. As table 3 shows the persons employee in this job are 25.0 percent in category IV, 14.3 percent in category III, 13.7 percent in category II and 6.8 percent in category IV respectively. It has increasing trend an account of poverty. It is evident from the table 3 that about 18.2 percent of the slum dwellers are working as rag pickers in the city of which 50.0 per cent from the IV category, 23.5 percent from category III, 17.3 percent from II category and 1.0 percent in I category respectively. There are generally poor woman and children's who pickup discarded recyclable from the streets bins and sell them to a dealer for a small price to earn a living. During the survey it was found that very low proportion (4.7 %) of slum dwellers are engaged in the other works including bagging, rag picking etc. About 9.7 percent from the category I, 3.4 percent in category III, 2.9 percent in category II and 2.5 percent in category IV respectively.

Income

The income structure shows that the residents of category II and I have the better condition in services and living permanently in the inner part of the city and are also better educated than the other residents of other categories. Further, the study reveals that the residents of category I were earlier in better conditions but now a days due to breakdown of the economy in the market of Baranasi sarees, weaver's community of especially in Bajardiha have found difficulties to get job and the people

are facing imminent problem of starvation. Thousands of weavers have migrated to other cities leaving their families behind in search of livelihood; many others are involved in menial jobs to feed their families and children. It has been seen that fraction of slum dwellers in cat-

egory IV could not afford their two times meals a day. They have no any fixed places to live, they are living along the road side or railway lines area or any open spaces with unhygienic conditions and they have no facilities provided by the corporation.

Table 4: Income structure of slum dwellers in slum categories (in Rs. /categories (in Rs. /month).

Locality	Below 2000	2000-4000	4000-6000	6000 above	Total (n)
Category I	64.1	25.2	4.9	5.8	103
Category II	48.2	38.1	1.4	12.2	139
Category III	53.0	36.0	3.0	8.0	119
Category IV	86.4	13.6	-	-	40
Total	59.1	30.7	2.5	7.7	401

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

Table 4 and shows classification of slum dwellers according to their monthly income, it has been found that household earning income below Rs.2000 per month is highest (86.4%) in category IV and lowest in (48.2%) category II. In slum income ranging from Rs. 2000-4000 is highest in category II (38.1%), 36 per cent in category III and 25.2 percent in category I and very lowest 13.6 percent in category IV. The reason for this is that the inhabitation in category IV slums have migrated recently from rural or other state like West Bengal and Bihar and due to that they could not get better job. The high percentage of low income in this cat-

egory indicates its poverty of this category. The percentage of households having income between Rs.4000-6000 per month is highest (4.9 %) in category I and in category IV there household having no income between this income groups. The percentage of households having income above Rs. 6000 per month is highest (12.2%) in category II and lowest in 5.8 percent category I.

Education

Education is one of the most social necessities of a community. It develops awareness and also helps in preserving the environment. To know the educational status of slum dwellers in the city the study has been also conducted during survey.

Table 5: Educational status of slum dwellers in selected category (2008).

Locality	Illiterate	Primary	J.H.S	H.S.	Inter	Total (n)
Category I	40.8	28.2	19.4	9.7	1.9	103
Category II	48.2	28.1	15.1	7.9	0.7	139
Category III	56.3	19.3	9.2	9.2	5.9	119

| Category IV | 82.5 | 17.5 | - | - | - | 40 |
| Total | 52.1 | 24.4 | 13.0 | 8.0 | 2.5 | 401 |

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

As per table 5, the proportion of illiterate slum dwellers highest 82.5 percent in category IV, 56.3 percent in III, 48.2 percent in category II and about 40.8 percent in category I. The highest proportion of 28.2 percent slum dwellers are educated at the primary level in category I, 28.1 percent in category II, 19.3 percent in category III and very lowest 17.5 percent in category IV. In the educational level of J.H.S, about 19.4 percent from the category I, 15.1 percent in category II, and 9.2 percent in category III. As per educational level of H.S., highest proportions (9.7%) of slum dwellers are in category I and lowest in (7.9%) category II. The table 5 indicates that highest proportion of slum dwellers from the education of inter level (1.9%) in category I and lowest (0.7%) in category II. The educational status shows that the educational level is high in category I and II because this locality is very old.

During the course of survey enquiries was made from head of household towards that how many children's attend and dropped out to going school for study (Table 6).

Table 6: Enrollment of children and drop out (%) from school in selected slum category.

Locality	Never attended	Dropped out	attend the school	Total (n)
Category I	44.7	45.6	9.7	103
Category II	36.0	41.7	22.3	139
Category III	50.4	42.0	7.6	119
Category IV	77.5	22.5	-	40
Total	46.6	40.9	12.5	401

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

The responses are recorded in table 6 that about 46.6 per cent of the children's from all categories of slums are not attended the school out of which 77.5 percent from the category IV, 50.4 percent in III, 44.7 percent from category I and about 36 percent from the category II. As from table 6 indicate that about 40.9 per cent are dropped out from the school due to some reasons of which, 45.6 per cent from the category I, 42 per cent from category III, 41.7 per cent from category II and 22.5 per cent in category IV. And during the survey it has been found that about 12.5 per cent children's are attend the school of which highest in 22.3 per cent in category II followed by 9.7 percent in category I and 7.6 per cent in category III.

Housing condition

Poor housing conditions are directly related with the mental health of the population. It is to mention here that the physical structure which man uses for shelter or that structure includes all necessary services, facilities equipments and devices needed for physical and mental health as well as social well-being of the family.

Table 7: Types of houses.

Locality	Pucca	Semi pucca	Kachcha	Total (n)
Category I	36.9	51.5	11.7	103
Category II	38.1	39.6	22.3	139
Category III	19.3	23.5	57.1	119
Category IV	-	-	100.0	40
Total	28.4	33.9	37.7	401

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

During the survey (Table 7) it has been found that in category I about 36.9 per cent houses are pucca but in dilapidated condition, such as in Bajardiha mostly houses are in dilapidated condition because of this old nature. As much as 38.1 per cent in category II, 19.3 per cent in category III. All houses in this category are kachcha who made from thatched and tatter which are temporary in nature. Table 7 shows that about 51.5 per cent of houses in category I, 39.6 per cent in category II, and 23.5 per cent in category III are semi pucca. It is clear from the table that the highest proportion of houses are kachcha in category IV which is temporary in nature and 'jhopad Patti' totally made from thatched and tatter, canvas or corrugate iron and mud followed by 57.1 percent in category III, 22.3 per cent in category II and lowest proportion 11.7 per cent of kachcha houses are found in category I.

The condition of the dwellers in slums is further illustrated with the help of material used for construction of house and its reliability.

Table 8: Types of building materials.

Locality	Thatched and Tatter	Tin shed and Rusty	Corrugated iron	Brick and Cement	Mud	Total (n)
Category I	2.0	16.7	10.8	61.8	8.8	103
Category II	14.4	9.3	12.9	49.6	13.6	139
Category III	25.0	13.0	10.0	34.0	18.0	119
Category IV	74.6	3.4	3.4	-	18.6	40
Total	22.8	10.0	10.3	41.5	14.4	401

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

Table 8 shows that which type of building materials have been used in all different categories of slums in the city. It is evinced that in category I, thatched houses are found at the lowest number which is only 2.0 per cent. This percentage goes to 74.6 per cent in category IV. The percentage of Mud house is highest in (18.6%) IV and (18%) III categories. Pucca houses or brick and cement made houses are mostly found in category I. About 10 per cent

of houses, of which 16.7 per cent in category I, 9.3 per cent in category II, 13 per cent in category III and 3.4 in category IV, are made from the material of tin shed and rusty. Further, it is noted that material have been used in out of the total about 10.3 per cent of houses, 10.8 in category I, 12.9 in category II, 10 in category III and 3.4 per cent in category IV are corrugated iron. Above study shows that the building material has been used in houses in slums localities indicates the poor condition of slum dwellers.

Electricity

It has been concluded on the basis of data collection by questionnaire that the slums areas lack some very important basic facilities like electricity.

Table 9: Distribution of respondents by sources of electricity in selected slum localities.

Locality	Kerosene	Street light	No any	Electricity	Total (n)
Category I	36.9	7.8	23.3	32.0	103
Category II	33.1	15.8	2.9	48.2	139
Category III	16.0	46.2	24.4	13.4	119
Category IV	10.0	47.5	42.5	-	40
Total	26.7	25.9	18.5	28.9	401

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

The analysis of table 9 shows that more than 70 per cent of amongst selected slum do not have electric connection. In category I, about 36.9 per cent of the slum dwellers using kerosene as a source for light, about 7.8 per cent dwellers using street light as a source of light, 23.3 per cent have no any source of light and about 32 per cent of slum dwellers using electricity as a source of light. In category II about 52 per cent of respondents have no electric connection they use kerosene, street light as a source of lighting in their houses and about 48.2 per cent of respondents having an electric connection as a source of light. About 16 per cent of slum dwellers in category III using a kerosene as a source of light. The highest proportion of dwellers use street lights along the roads as a source of light and very low portion of respondents have a electric connec-

tion and in category IV viz., Varunapul, Nagwa and Teliana along roads and railway track which are temporary in nature or 'jhuggi jhopadi' have not a single connection of electricity.

Sources of water supply

Regarding water supply, slums are the worst affected area where only a few public water connections serve the entire locality. To know the availability of water to the inhabitants of slums and squatter settlements survey has been conducted through questionnaires. From each identified categories of slums from localities has been selected and inadequacy of water supply has been assessed. Table 10 shows the availability of water from different sources in the slum in the four categories of slum area.

Table 10: Sources of drinking water supply in different slum localities.

Locality	Stand posts/ Municipal Supply	Open Well	Hand Pump	None	Total (n)
Category I	56.3	1.9	3.9	37.9	103
Category II	84.2	2.9	9.4	3.6	139
Category III	63.9	16.8	5.9	13.4	119
Category IV	-	-	20.0	80.0	40
Total	62.6	6.5	8.0	22.9	401

Source: Based on personal survey, 2008.
Note: (n) Number of respondents.

Table 10 clearly show that in category I slums, most of the houses have municipal tap although the supply is not round the clock. During the survey it has been observed that an account of limited water supply, people store water for drinking purpose. In category II and III, 84.2 per cent and 63.9 per cent of the dwellings respectively have been provided with municipal taps. While in category IV not a single dwelling has water tap. It is because of temporary nature in settlement. In category I, about 37.9 per cent of the houses do not have any source of water supply. This is higher in category IV (80 %), 13.4 per cent in III and 3.6 per cent in category II respectively. In slums of category IV, the dwellers are solely dependent a nearby River/Stream/Wet point or public taps/hand pumps. In absence of water supply, temporary hutments face acute crisis of potable water. About 6.5 per cent of which 1.9 per cent in I, 2.9 per cent in II, 16.8 per cent in III do not have water taps they get water from the open wells. It is evinced from the table that in the slum localities of category I most of the houses are provided water taps because these localities are old and they are fully developed. About 37.9 per cent of the families do not have water taps and they share with other families.

Conclusion

Slum in the city are a significant problem as they put more pressure on the existing facilities and covers large part of the city. Slums in Varanasi city has been continuously increasing since 1991. It has been found that in 1991 the slum population in the city was 200,000 with a number of 119 slums throughout the city. At present Varanasi have 227 slums with the total population of 578646 which is about 40.64 per cent of the total population spread throughout the city, either on government or private lands. The major concentration of slums found in the old city area near the Ghats, areas near small scale industries (slum dwellers are weavers working in handloom industry) as well as in the Rajghat area and in central city area the slum concentration is also very high. Mostly the slum dwellers of Varanasi do not get tap water adequately. They get water from different sources like well and hand pumps which are also contaminated affected the physical health of slum dwellers on the whole and more particularly the children health.

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An Assessment of Housing Quality in Uttar Pradesh: Spatial Inequality

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Abstract

Housing is universally considered as the second most essential human need after food and one of the major economic assets in every nation. Housing crisis and the deterioration in the quality of housing infrastructure as well are serious issues that need to be addressed on the top priority. This paper attempts to construct the Housing Quality Index (HQI) using Principal Component Analysis (PCA) by assigning weightage to each variable using Census household data 2011. For the construction of HQI, three sub-indices are calculated namely, Housing Structure Index, Housing Service Index and Proxy Wealth Index incorporating 19 indicators. The selected indicators are normalized by UNDP standardization method leading to calculated values that ranges between 0 (the highest value) and 1 (the lowest value). Further, the regression analysis is applied to highlight the causal relationship between the Housing Quality Index and the each individual quality indices viz., housing structure, housing services and proxy wealth assets. The result shows that Gautam Buddha Nagar (0.123) has occupied the first position in term of housing quality followed by Ghaziabad (0.207) and Lucknow (0.270) while on the other end, Shravasti district (1.126) is the least developed followed by Bahraich (1.109) and Chitrakoot (1.104). Finally, it is recommended that the government`s efforts at the state level be directed towards making available minimal standard of housing for the backward areas dominated by poor.

Keywords: *housing quality, principal component analysis, regression analysis.*

Introduction

Housing is universally considered as the second most essential human need after food.

According to Hayakawa (1983) "housing which does not provide space for contemplation will not allow for the growth and develop-

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ment of individuality. Thus, housing not only contributes to the development of man physically and mentally, but also contributes to the growth of culture and human morals". Housing is that issue which is linked with life of individual and potential to contribute in the process of national development (Agbola, 1998). Housing is the perfect reflection of social structure, level of development, contents and degree of civilization and attainment of human development. Housing is a complex and multidimensional concept. With all its essence, housing is not merely meant for shelter and the habitability of a house which depends not only on the physical characteristics of the dwellings, but also on the social, cultural and behavioral characteristics of the individual (Oladapa, 2006). Rapoport (1969) optioned that, " house- form is not simply the result of the physical forces or any single causal factor, but it is also the consequence of a whole range of socio- cultural factors- the specific characteristics of culture- the accepted way of doing things, and the socially unacceptable ways and implicit ideals which affect housing". In simple words housing is a set of mutidimensional package of goods and services extending beyond shelter itself. Term 'quality' is complex in whole because it is a product of subjective judgement which arises from the perception that an individual holds towards what is significant element at a particular point in time (Anantharajan, 1983). The definition of housing quality incorporates many factors that include the physical condition of the buildings and different type of facilities and services that make living in a particular area conducive. The quality of housing within any neighbourhood should be such that it satisfies minimum health standard and good living condition, apart from these it should be affordable

to all categories of households (Lanrewaju, 2012). Housing quality is a rather more complex concept with broader social and economic meaning. It comprises both qualitative and quantitative dimensions of residential areas, their immediate surroundings, and the demand of the dwellers. The quantitative aspect of housing quality primarily incorporate objective structural, material, social and economic constituents of housing products or we can say outcomes that can be measured. On the next side, the qualitative dimension is much more subjective and difficult to measure. It includes the perception and value of 'comfort' or 'quality of life' that are afforded by different dwelling types, lifestyles, and the preferences and expectations of the inhabitants (Meng and Hall, 2006). As a matter of fact that high variations in the quantitative and qualitative aspect of housing quality it is not possible to set one definite standard criteria and variables that is applicable to all regions at all times. And the measurement of qualitative concepts like comfort and quality of life is not possible because of differences in value judgments and perception with regard to these values. Here those indicators are taken into consideration that is available at districts level and comparable. Rapid growth in population creates demand pressure towards shelter and efficient supply and distribution of basic utilities and services for the individuals. According to the Technical Group on Housing Shortage (2012-2017), constituted by erstwhile the Ministry of Housing and Urban Poverty Alleviation, there is a shortage of 18.78 million housing units. Of these, the economically weaker section alone accounts for 10.55 million units of 56.2 percent of total shortage. The low income group require 7.41 million housing units or 39.4 percent whereas middle and above

income group have a deficit of 0.82 million or 4.4 percent. Ten states together contribute to 76 percent of the urban housing shortage. These states are Uttar Pradesh, Maharashtra, West Bengal, Andhra Pradesh, Tamil Nadu, Bihar, Rajasthan, Madhya Pradesh, Karnataka and Gujarat (Mishra, 2017). Poor housing infrastructure and deficient services, the absence of formal land authority and poor local environmental conditions are the common problems of developing countries like India. As per an estimate, Uttar Pradesh would need nearly 24 lakh dwelling units between 2012- 2017, of which 60 percent are to be under affordable housing schemes but still lot of work is to be done (Fareed, 2015).

Objective of the study

This paper attempts to develop suitable indices incorporating appropriate indicators to measure the housing quality index in Uttar Pradesh. The study allows a better understanding of housing conditions across the districts of the state.

Database and methodology

For the present study, data have been collected from census of India 2011 which provides information in detailed at district level. Data related to housing structure, services and assets across the districts of UP have been obtained from HH series table. To highlights the problems in housing quality in Uttar Pradesh a composite index will be prepared using sub-indices like housing structure index (HSI), housing services index (HSEI) and proxy wealth index (PWI) with the help of total 19 variables. These sub-indices then combined to form the Housing Quality Index (HQI) for the assessment purpose. To construct the composite indices data need to be standardized.

Therefore, for the purpose of normalization, UNDP standardization method has been used. The formula is written below as

$$X \text{ (standard score)} = \frac{\text{actual value-maximum value}}{\text{maximum value-minimum value}}$$

Principal component analysis- The Principal Components Analysis (PCA) or factor analysis produces component factors in descending order of their importance and factor loadings which explains the relative importance of different variables in explaining variance in the phenomenon. Composite Index is computed on the basis of the following formula.

HQI (Housing quality index) $= W_1 (X_1) + W_2 (X_2) + W_3 (X_3)................+ Wij (Xij)/ Wij$

Where,

W = Weight of Component score coefficients of the -variables in jth time,

X = standardized observed variables for the i-th state in j-th time point.

Weight of each variable will be obtained by multiplying the value of component score coefficients with its eigen value ignoring negative sign. This can be rewrite as

HSI (Housing Structure Index) = 1.858986 (X1) + 2.52826 (X2) + 2.433412 (X3) + 2.199922 (X4) + 1.832701 (X5) + 2.639186 (X6)/ 13.492466

HSEI (Housing Service Index) = 3.567763 (X7) + 3.718133 (X8) + 3.888413 (X9) + 3.345412 (X10) + 3.380891 (X11) + 1.702125 (X12)/ 19.60274

PWI (Proxy Wealth Index) = 1.8793 (X13) + 1.9158 (X14) + 2.4785 (X15) + 2.9502 (X16) + 2.2358 (X17) + 0.3205 (X18) + 2.8844 (X19)/ 14.6646

HQI (Housing Quality Index) = 2.6956 (X1) + 2.3354 (X2) + 0.4054 (X3) + 1.8368 (X4) + 1.8915 (X5) + 2.7107 (X6) + 6.8141(X7) + 5.6626 (X8) + 6.4103 (X9) + 5.7456 (X10) + 5.3005 (X11) + 6.5067 (X12) + 0.8160 (X13) + 1.2857 (X14) + 6.2600 (X15) + 6.4166 (X16) + 3.5363 (X17) + 1.8733 (X18) + 6.8767 (X19)/ 60.2213

Finally obtained value (HQI) of all the variables will be categories into 5 groups such as very high, high, medium, low and very low.

Regression analysis is a statistical tool for the investigation of causal relationships between variables (Kain and Quigley, 1970). Regression seeks to ascertain the causal effect of one variable upon another. Here it is used to test the validity and effect of sub-indices on the housing quality by using linear Regression. For the analysis purpose SPSS software and for pictorial representations Arc GIS 10 has been used. The framework of housing quality assessment is represented in figure 1.
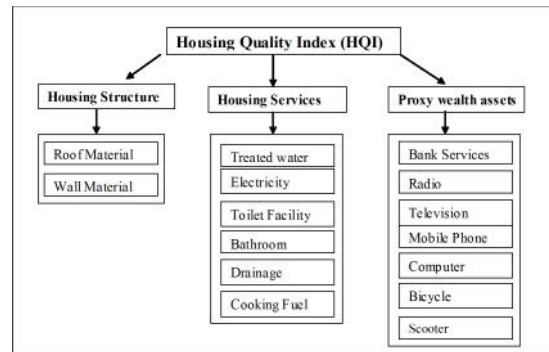

Figure 1: Structural Framework

Table 1: List of selected variables for HQI

Index	Symbol	Category	Description
House structure	X1	Burnt brick wall	Percentage of houses have burnt brick wall to total houses
	X2	Concrete wall	Percentage of houses have concrete wall to total houses
	X3	Burnt brick floor	Percentage of houses have burnt brick floor to total houses
	X4	Cemented floor	Percentage of houses have cemented floor to total houses
	X5	Burnt brick roof	Percentage of houses have burnt brick roof to total houses
	X6	Concrete roof	Percentage of houses have concrete roof to total houses
House services	X7	Electricity uses	Percentage of household using electricity as a source of lighting
	X8	Toilet Facilities	Percentage of household having toilet facilities within the premises to total household

	X9	Bathroom Facilities	Percentage of household having bathroom facilities within the premises to total household
	X10	Closed Drainage System	Percentage of household have closed drainage system to total household
	X11	Cooking Within the Premises	Percentage of household cooking with LPG PNG to total houses cooking inside the house
	X12	Tap Water	Percentage of household use tap water from treated source to total household
Proxy wealth	X13	Bank Services	Percentage of household availing banking ser vices to total household
assets	X14	Radio/Transistor	Percentage of household have radio/transistor to total household
	X15	T.V.	Percentage of household have radio/transistor to total household
	X16	Computer	Percentage of household have computer/laptop (with or without internet) to total household
	X17	Mobile Phone	Percentage of household have mobile phone to total household
	X18	Bicycle	Percentage of household have bicycle to total household
	X19	Scooter	Percentage of household have scooter to total household

Result and discussion In the following paragraphs, each index and its associated results have been analyzed systematically.

Housing structure index Housing structure refers to tangible housing attributes. Housing structure considered the dwelling type with durable material that meet the current building material like burnt brick and concrete for wall, roof and floor.

Table 2: Weight Score matrix of housing structure index (HSI)

Variables	Component		Weight Score
	1	2	
Burnt Brick Wall	0.144	0.855	1.858986
Concrete Wall	0.780	0.304	2.528260
Burnt Brick Roof	-0.723	0.333	2.433412
Concrete Roof	0.851	0.011	2.199922

Burnt Brick Floor	-0.131	0.859	1.832701
Cemented Floor	0.634	0.582	2.639186
Total Initial Eigen Values	2.563	1.742	13.492466
% of Variance Explained	42.721	29.041	
Cumulative %	47.721	71.761	

Source: Extracted from factor Analysis, Rotation Method.

Table 3 depicts the component score of six major variables of housing structure, first component explains 47.72 percent of total variance and its eigen value is 2.5. First factor gives highest score to concrete roof (0.851) followed by concrete wall (0.780), burnt brick roof (-0.723) and cemented floor (0.634). Component second has 1.74 eigen value and explains 71.76 percent of total variance and 29.04 percent of cumulative variance. Burnt brick wall has 0.855 score that followed by burnt brick floor with 0.859 score. From the weight score it is clear that concrete material is more important in the development of house structure as compared to burnt brick, as concrete structure is more durable with respect to brick.

The spatial pattern of housing service has been shown in figure 2. An examination of the map reveals that five districts namely, Ghaziabad (0.268), Gautam Buddha Nagar (0.287), Kanpur Nagar (0.345), Meerut (0.352) and Lucknow (0.367) come under the category of very high level of housing structure development. In contrast out of 71 districts, 14 districts, constituting 19.71 percent have attained a high level of development. Medium level of development includes 21 districts in which 10 districts from western region and eastern region each and only one district *i.e.* Barabanki with score 0.652 lies in the central region of Uttar Pradesh. 29.58 percent of dis-
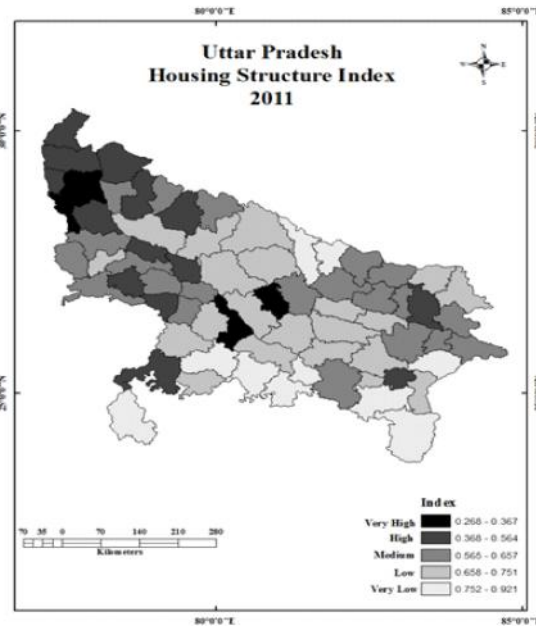

Figure 2

tricts come under low level of development. Districts of very low level of housing structure make an identifiable region consisting of Ghazipur, Shravasti, Hamirpur, Kaushambi, Mirzapur, Bahraich, Lalitpur, Sonbhadra, Banda, and Chitrakoot.

Housing services index Housing services are assumed to be homogenous and unobservable outcome that inhabitants consume. Electricity, toilet facilities, drainage, cooking fuel and water are among the many other housing facilities that would fulfill a household`s basic needs in its shelter.

Table 3: Weight Score matrix of Housing Services Index (HSEI)

Variables	Component		Weight Score
	1	2	
Electricity	0.907	0.051	3.567763
Toilet Facilities Within The Premises	0.913	0.161	3.718133
Bathroom Facilities	0.957	0.161	3.888413
Closed Drainage System	0.726	-0.469	3.345412
Cooking Within The Premises	0.853	0.071	3.380891
Water Treated Source	0.165	0.936	1.702125
Total Initial Eigen Values	3.871	1.138	
% of Variance Explained	64.525	18.959	19.60274
Cumulative %	64.525	83.484	

Source: Extracted from factor Analysis, Rotation Method

Table 3 represents the component matrix of six variables of housing services in which first factor explains 64.52 percent of total variance and second factor explains 18.95 percent. Component 1 gives highest loading to electricity, toilet facilities, bathroom facilities, drainage system and cooking within the premises. In second component only one variable that is water from treated source got the highest score 0.936. As far as weight score of variables is considered all the variables show the approx. equal weightage except for water from the treated source.

Spatial pattern of housing services makes clear that likewise housing structure index same five districts fall in the very high level of development as shown in figure 3.

Out of 12 districts, 11 districts viz. Moradabad, Muzaffarnagar, Saharanpur, Rampur, Bijnor, Agra, Jyotiba Phule Nagar, Baghpat, Aligarh and Bulandshahar are from western region that come under high level of development and only Varanasi district from eastern region shows high level of housing ser-
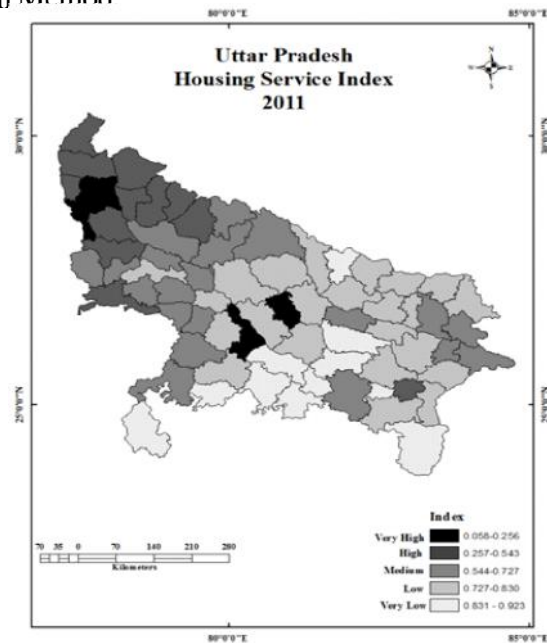

Figure 3

vices development. The areas of medium level of development are irregularly distributed over the space. This includes two districts from Bundelkhand region, seven districts from the eastern region and 12 districts from in the western region of Uttar Pradesh. Low level of development includes 22 districts which consti-

tute 30.98 percent. While 12 districts fall in the very low level of development mainly from eastern and Bundelkhand region, Raebareli and Fatehpur are the backward districts of the central region.

Proxy wealth index The material quality of life can be enhanced by possession of assets or consumer durables. Proxy wealth index creates a distribution of households by the assets they own as a proxy to measure relative levels of wealth. (Bhan and Jana, 2015)

Table 4: Weight Score matrix of Proxy Wealth Index (PWI)

Variables	Component		Weight Score
	1	2	
Bank Services	0.048	0.880	1.8793
Radio/Transistor	0.141	0.296	1.9158
T.V.	0.923	-0.250	2.4785
Computer	0.893	-0.053	2.9502
Mobile Phone	0.652	0.407	2.2358
Bicycle	-0.352	0.785	0.3205
Scooter	0.950	-0.082	2.8844
Total Initial Eigen Values	3.187	1.751	
% Of Variance Explained	45.533	25.013	14.664
Cumulative %	45.533	70.547	

Source: Extracted from factor Analysis, Rotation Method.

Table 4 shows the matrix coefficient of proxy wealth assets. Here the first factor explains 45.53 percent of total variance with 3.18 eigen value. Factor 2 explains 25.01 percent of total variance and 70.54 percent of cumulative variance. Its eigen value is 1.75. Component 1 gives high score to television (0.923), computer (0.893), and scooter (0.950) and mobile phone (0.652). All the variables in first component are positively related with each other except in the case of bicycle (-0.352). Second component gives highest score to bank services (0.880) followed by bicycle (0.785). Assets like television, computer and scooter show negative correlation with the other variables.
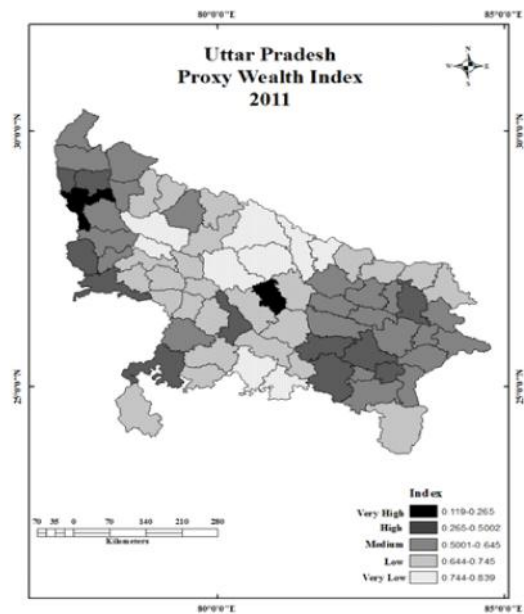
Figure 4 depicts clear cut variation in the

Figure 4

availability of assets. It has been analyzed that very high scores have been noticed only three districts of Uttar Pradesh, two districts from the western region (Gautam Buddha Nagar and Ghaziabad) and one district from central region (Lucknow). High level of wealth assets development shows scattered distribution and found only eleven districts namely, Varanasi, Meerut, Agra, Kanpur Nagar, Baghpat, Allahabad, Pratapgarh, Mathura, Jhansi, and Jaunpur. About 32.39 percent of districts come under the medium range of development. Low level of development includes 25 districts, out of which western region has eleven districts, eastern region has six districts, central region has five districts and Bundelkhand has three districts that come under low category.

Housing quality index The qualitative measurement of housing mentioned as Housing Quality Index (HQI) comprised of structural quality and physical amenities, together with the proxy wealth index. Composite scores of Housing Quality is, in fact, an aggregate of the factor scores of 19 variables that is discussed earlier.

Table 5: Factor Structure of Housing Quality

S. No. Factors	Variance Explained Percent of Total	Cumulative Variance Explained
1. Housing Services and Wealth Assets	39.577	39.577
2. Concrete Wall and Concrete Roof	14.519	54.096
3. Burnt Brick Wall and Burnt Brick Floor	11.590	65.686
4. Bank Services , Radio/Transistor and Bicycle	9.170	74.856

Source: Extracted from factor Analysis, Rotation Method.

Factor analysis of selected 19 variables related to housing quality for the year 2011 from the sub indices of the housing structure, housing services, and proxy wealth assets gives four components or factor for the construction of housing quality index (HQI) that explains 74.85 percent of variance and possess eigen values greater than one. In the analysis, factor score of each variable with factor coefficient more than 0.50 has been taken to measure the housing quality of Uttar Pradesh. The contributions of each factor vary slightly from each other. The first factor reveals 39.577 percent of total variance and is found to be strongly correlated with selected indicators. The second factor gives highest score to housing structure variables and explains 14.519 percent of total variance. Third factor gives high score to a burnt brick wall and burnt brick floors explain 65.68 percent of the cumulative variance. Fourth factor gives maximum loading to bank services (0.853), radio/transistor (0.624) and bicycle (0.700).
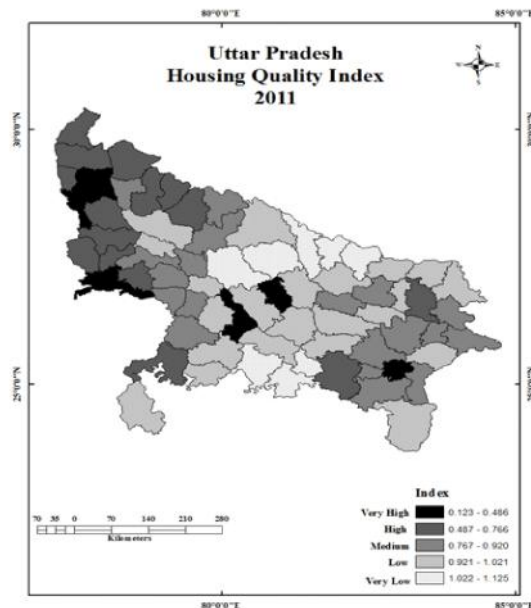

Figure 5

Figure 5 depicts the spatial distribution of housing quality in Uttar Pradesh for the period of 2011 (table 6). From the figure, it is clear that very high housing quality centered in only seven districts which are already developed in one or other way, these districts are Gautam Buddha Nagar and Ghaziabad (technical hub), Lucknow (capital city), Meerut (brass factories), Kanpur Nagar (industrial capital), Varanasi and Agra. It coincides with high factor scores of housing structure, housing services, and wealth assets apart from having high per capita income. The area of high level of housing quality covers 19.71 percent of total share with 14 districts from different regions of Uttar Pradesh. It is clear from the same figure that 20 districts comprising 28.16 percent have revealed medium level of development. The districts in low level of housing quality cover relatively larger portion with 29.577 percent. Districts like Kheri, Hardoi, Sitapur, Balrampur, Kaushambi, Banda, Chitrakoot, Bahraich and Shravasti are least developed districts of Uttar Pradesh during the period of 2011 in term of Housing Quality.

Table 7: Typology of Housing Quality Index (HQI)

Rank	Districts	Value	Category	Rank	Districts	Value	Category
1	Gautam Buddha Nagar	0.123	Very High	36	Auraiya	0.901	Medium
2	Ghaziabad	0.207	Very High	37	Sant Ravidas Nagar (Bhadohi)	0.909	Medium
3	Lucknow	0.270	Very High	38	Shahjahanpur	0.917	Medium
4	Meerut	0.381	Very High	39	Pilibhit	0.918	Medium
5	Kanpur Nagar	0.398	Very High	40	Mirzapur	0.919	Medium
6	Varanasi	0.465	Very High	41	Basti	0.920	Medium
7	Agra	0.486	Very High	42	Kannauj	0.932	Low
8	Saharanpur	0.597	High	43	Sant Kabir Nagar	0.934	Low
9	Baghpat	0.616	High	44	Pratapgarh	0.938	Low
10	Muzaffarnagar	0.628	High	45	Kanshiram Nagar	0.940	Low
11	Mathura	0.637	High	46	Sultanpur	0.942	Low
12	Jhansi	0.658	High	47	Rae Bareli	0.945	Low
13	Bareilly	0.685	High	48	Ambedkar Nagar	0.956	Low
14	Bijnor	0.689	High	49	Siddharthnagar	0.961	Low
15	Aligarh	0.699	High	50	Ghazipur	0.963	Low
16	Gorakhpur	0.732	High	51	Mahrajganj	0.970	Low
17	Allahabad	0.733	High	52	Bara Banki	0.973	Low

18	Moradabad	0.736	High	53	Hamirpur	0.978	Low
19	Bulandshahr	0.738	High	54	Unnao	0.978	Low
20	Firozabad	0.740	High	55	Gonda	0.985	Low
21	Rampur	0.762	High	56	Kanpur Dehat	0.987	Low
22	Mahamaya Nagar	0.767	Medium	57	Mahoba	0.991	Low
23	Jyotiba Phule Nagar	0.793	Medium	58	Kushinagar	0.996	Low
24	Etawah	0.796	Medium	59	Sonbhadra	1.003	Low
25	Jalaun	0.833	Medium	60	Lalitpur	1.009	Low
26	Mau	0.833	Medium	61	Fatehpur	1.009	Low
27	Farrukhabad	0.848	Medium	62	Budaun	1.019	Low
28	Deoria	0.849	Medium	63	Kheri	1.022	Very
29	Chandauli	0.878	Medium	64	Hardoi	1.046	Very
30	Mainpuri	0.882	Medium	65	Sitapur	1.055	Very Low
31	Ballia	0.889	Medium	66	Balrampur	1.056	Very Low
32	Azamgarh	0.890	Medium	67	Kaushambi	1.063	Very Low
33	Jaunpur	0.896	Medium	68	Banda	1.066	Very Low
34	Etah	0.897	Medium	69	Chitrakoot	1.104	Very Low
				70	Bahraich	1.109	Very Low
35	Faizabad	0.899	Medium	71	Shrawasti	1.126	Very Low

Source: Based on personal computation

Regression analysis: Testing of validity of model

Table 8: Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.984[a]	0.968	0.966	0.03923

a. Independent Variables:(Constant) Housing Structure Index, Housing Services Index, Proxy Wealth Index b. Dependent Variable: Housing Quality Index

Coefficient of multiple determinations R^2 is given to be 0.968 implying that 96.6 percent of the variation in the dependent variable could be explained by the predictors shown in Table 7.

Table 9: ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3.097	37	1.032	671.020	.000[b]
Residual	0.103	67	0.002		
Total	3.201	70			

a. Dependent Variable: Housing Quality Index
b. Predictors: (Constant),) Housing Structure Index, Housing Services Index, Proxy Wealth Index

Analysis of variance (ANOVA) technique is used to test the equality of means of two or more sets of observations (Kurian and Thampuran, 2011). ANOVA Table 9 shows that the model is significant at 1 percent level of significance ($P < 0.01$). It can also be observed from the Table 10 that the significant variables are obtained as housing structure, Housing services and proxy wealth. All the factors are significant at 1 percent level ($p < 0.05$).

Table 10 : Coefficient output

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	-.0067	0.027		-2.461	0.016
Housing Structure Index	0.1560	0.078	0.094	2.000	0.050
Housing Services Index	0.5920	0.052	0.550	11.334	0.000
Proxy Wealth Index	0.6620	0.050	0.422	13.243	0.000

a. Dependent Variable: Housing Quality Index

Conclusion and suggestions

There are some major obstacles in the line of housing provision in Uttar Pradesh like unavailability of land for housing, high infrastructure cost, high rate of rural urban migration, lack of proper finance mechanisms for low income housing, loopholes in administrative and legislative framework, lack of integrated housing planning programmes, inadequate involvement of private sector and inefficiency of house construction. According to new data released by the state government although 60 percent of the money for the construction has been sanctioned but not more than 27 percent of 24, 310 free dwellings intended for the poor had been built till August 2016 across 53 districts of Uttar Pradesh. Under the AASRA scheme (assistance) 6,442 dwellings were constructed but 5,500 dwellings are to be constructed and 12, 248 homes are under construction. About 8.5 million of 34.5 million people in urban area live in slums in Uttar Pradesh and it has about 18.5 percent population homeless (Chaturvedi, 2016). About 24 percent urban population of Uttar Pradesh live in temporary shanties, 30 percent do not have a main source of drinking- water at home, and

40 percent lack electricity as a source of lighting. The most acute maker of deprivation is that 71 percent of urban population do not have flush toilets at home (Chaturvedi, UP`s Free-Housing Mess A National Waring, 2015). Only a few districts like Gautam Buddha Nagar Ghaziabad, Lucknow, Meerut, Kanpur Nagar and Varanasi etc. are developed with respect to housing structure, in term of housing services like electricity, drainage and sanitation and having some assets like television, radio, computers etc. On the other side Sitapur, Sonbhadra, Kaushambi, Lalitpur, Bahraich, Shravasti, Banda and Chitrakoot districts are the most backward districts of Uttar Pradesh in term of housing quality. Government of India launches various housing scheme like *'Pradhan Mantri Awas Yojana* (Urban) - Housing for All Mission' for the economically weaker section and low-income group (GOI, 2016), Valmiki Ambedkar *Awas Yojana* (VAMBAY) is centrally sponsored scheme for the benefit of slum dwellers (Planning Commission, GOI, 2007). Jawaharlal Nehru National Urban Renewal Mission (JNNURM) for the provision of houses in urban areas (GOI, Jawahalal Nehru National Urban Renewal Mission : Overview, 2001), with the continuation of this same programme Govt. of India launched another scheme named as 'Integrated Housing and Slum Development Programmes (IHSDP) for the improvement of slums in the cities/town not covered under JNNURM (GOI, Model for DPR Integrated Housing and Slum Development Programmes (IHSDP), 2001). These are some popular initiatives taken by the Indian Government for providing better availability and affordability of houses in the backward areas. Apart from these the Uttar Pradesh Government initiated two schemes for

the poorer and weaker sections of the society. The first one was initiated in June, 2008 named *'Manyavar Shri* Kashiramji *Shahri Garib Awas Yojana* with the objective of building 1, 01, 000 dwelling units in the first phase for the poor. Second scheme was named as *'Sarvjan Hitay Garib Awas* (Slum Area) *Malikana Haq Yojna'* for the redevelopment of slum areas (Wadhwa, 2009). In order to make any program and policy to be successful, it is necessary to take an integrated view of the housing problems of all the sections of the population. Community level participation is crucial for the success of the schemes. It is clear from the analysis that in Uttar Pradesh about 40 percent of the population lives in abysmal housing conditions, the U.P. govt. effort must be directed towards making the available minimal standard of housing for the poor.

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Family Planning and Maternal Health: A Study of Jammu District

Tajinder Kour[1]

Abstract

A close interplay exists between the issue of population growth, developmental trends and problems of women's status. It is found that an improvement in women's status through education, employment, access to health services and increase age of marriage had a direct impact on their fertility behaviour. Indian planners have always acknowledged health as an important area for women's development. Access to safe, voluntary family planning is a human right. Family planning is central to gender equality and women's empowerment and a key factor in reducing poverty. In the present paper an attempt has been made to study the family planning and maternal health in Jammu district. The present study is based on both primary and secondary sources of data. The primary data is collected through field survey of 25 wards and 25 villages. The data was collected through interview schedules. The total sample size consists of 300 women respondents.

Key Words: *fertility, development, gender equality, family planning, maternal health.*

Introduction

India is a vast country with varying cultural and religious practices. Its diversity lies in its social and cultural variations, linguistic and region wise different basis of formation of its social institutions. In the area of demographic behaviour in different regional and cultural setting there exist different notions about the sex preferences as well as the size of family. The institution of marriage is the one area in which there are diverse types. In which respect diversity in marriage practices influence differ-ential fertility is not known due to the paucity of empirical data and studies. India in this context indicates a lower fertility for those women who marry at a higher age in comparison to those who get married at a relatively younger age.

Family planning involves an array of services which help the couples to decide the number of children they want and when they want. It also includes helping the problems of infertile couples. The key to improve the quality of family planning services is to broaden the contraceptives choices. Several modern methods

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have some undesirable side effects (Niranjna, 2000).

In India the first formal fertility regulation policy was adopted in 1952. This policy laid down emphasis on the provision of clinical services to the people for advocating family planning. This was called clinical approach. The basic and underlying assumption was that opening of family planning services through clinics would attract couples desirous of regulating the birth of their would be children, their fertility and limiting the size of the family. One of the fallacies committed by the government perhaps was over expectation with regard to voluntary opting for family planning by the people.

It was in view of the failure of the above mentioned policy that after almost one decade the government had to think of alternate strategies. Instead of asking people to visit clinics, the reformulated alternate policy frame work laid emphasis on the extension of family planning services to the people. The underlying assumption was that by offering services to women at their door steps, more and more families would come under the purview of the programme. Under this programme family planning camps were organised and sterilization were conducted. One of the characteristics of these programmes was achieving the targets, fixed by the state.

It was found that an improvement in women's status through education, imployment, access to health sarvices and increased age of marriage has a direct impact on their bertility fehaviors (Nayak and Nair, 2005).

Study area

Jammu district is located between 74^0 24' and 75^0 18', East longitude and 32^0 50' and 33^0 30' North latitude. It is approximately 600 Kms away from National Capital, New Delhi and is linked with National Highway, NH44 (earlier NH1A). Jammu district is situated on a hillock, on the bank of river Tawi and is bound by Udhampur district in the north and northeast, Kathua district in the east and southeast, Pakistan (Sialkot) in west and Rajouri district and POK (Bhimber) in the northwest. The city has numerous shrines for Muslims, Sikhs and Christians. Jammu also serves as base camp for the holy shrine of Vaishno Devi and is the Railhead of the state. The Jammu district covers an area of 3095 sq. Kms. The original inhabitants are Dogras, which are also the major ethnic group but an influx of Kashmir's migrant and peoples of other parts of the state has changed the demographic scenario. The major proportion of the population consists of Hindus, Muslims, Sikhs, Jains, Buddhist and Christian in lesser proportions. (District Census Handbook, 2001)
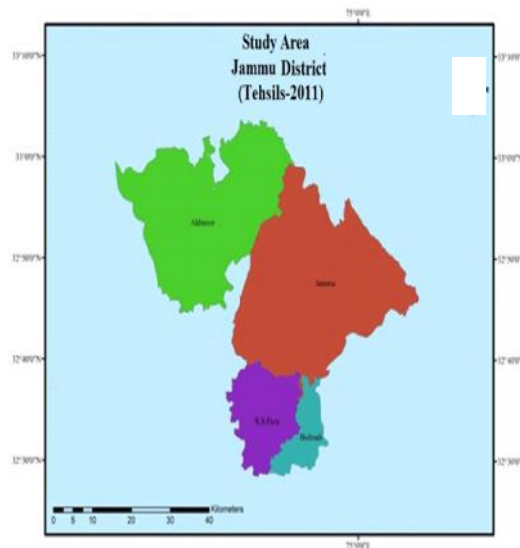
Objectives

The main objectives of the present study are to analyse the different measures/methods

adopted for family planning, age at marriage, average interval between children and number of children , knowledge about family planning/ welfare programme etc. in the study area and to suggest various measures related to family planning and maternal health.

Data base and methodology

This study is based on both primary and secondary data. The secondary sources include Statistical handbook of Jammu district(2011-12), Digest of statistics(2012-13), Government of Jammu and Kashmir.

For obtaining grass root level information sample villages and wards were selected from the four *tehsils* (Akhnoor, Jammu, R.S.Pura and Bishna) of Jammu district on the basis of infrastructure categorizing those with poor and good infrastructure available considering the parameters such as medical facilities, educational institutes, communication. Another consideration was regarding religion, caste, income and occupation of the female respondents. 25

villages were selected in the rural areas and 25 wards were selected in the urban areas of the Jammu district. 300 interviews were conducted in the study area in which 150 urban and 150 rural respondents were interviewed from each village and each ward.

Results and discussions

Maternal health and family planning

Though the family welfare and planning programmes have been a part of development planning since the first five year plan, but the actual achievements are below expectations. From the beginning emphasis has been placed on sterilizations rather than on temporary methods. Whereas in the early phases more Vasectomies were performed, during the last decade, female sterilizations have been promoted at a very high rate (Kumar, 2006). With the introduction of laparoscopy female sterilizations have reached high numbers. Table (1) and (2) show the different family planning methods adopted in Jammu and Kashmir state and in Jammu district, respectively.

Table 1: Showing number of sterilizations made in Jammu and Kashmir State:

S. No.	Year	Vasectomy	Tubectomy	Total
1	2000-01	223	14640	14863
2	2002-03	538	20311	20849
3	2004-05	482	21115	21597
4	2006-07	682	18826	19508
5	2008-09	1738	19469	21207
6	2010-11	1097	19867	20964
7	2012-13	912	17958	18870

Source: Directorate of Family Welfare MCH and Immunisation, Jammu and Kashmir.

Table 1 shows the number of sterilization *i.e.* Vasectomy and Tubectomy made in Jammu and Kashmir State. Vasectomy is a surgical

procedure for male sterilization or permanent contraception. During the procedure, the male Vas deferens are severed and then tied or sealed

in a manner so as to prevent sperm entering into the urethra and there by preventing fertilization Tubectomy is a surgical procedure for sterilization in which woman's fallopian tubes are clamped and blocked or severed and sealed, either of which prevents eggs from reaching into uterus for implantation. Tubal ligation is considered a permanent method of sterilization and birth control. The table clearly shows that in the year 2000-01 only 223 males adopted Vasectomy and 14640 females adopted Tubectomy in the state. In the year 2004-05 highest number of female adopted Tubectomy i.e. 21115, whereas only 482 males adopted Vasectomy. The data further depicts that the highest number of Vasectomy was made in the year 2008-09 i.e. 1738 followed by the year 2010-11 i.e. 1097, respectively.

In the year 2012-13 total number of sterilization i.e. 18870 were made in Jammu and Kashmir State. The year wise data clearly reflects that in Jammu and Kashmir state more couples adopted Tubectomy as compare to Vasectomy, it means women are more inclined towards sterilizations as compared to man in the state.

Table 2: Showing different family planning measures adopted in Jammu District:

S.No.	Year	Number of Sterilization Operation			Number of Loops inserted	Distributed Condom/ Pills	Oral Pills
		Vasectomy	Tubectomy	Total			
1	2001-02	60	6168	6228	3534	179333	9312
2	2003-04	164	6060	6224	4053	382189	18965
3	2005-06	26	2993	3019	1822	204499	17135
4	2007-08	203	4723	4926	3514	585107	32784
5	2009-10	161	3899	4066	2918	407824	25799
6	2011-12	239	3537	3776	2030	403754	21537

Source: Statistical Hand Book, District Jammu (2011-12), Jammu and Kashmir.

Table 2 shows the different family planning measures adopted in Jammu district in order to avoid or delay unwanted pregnancies. The data clearly shows that in the year 2001-02, 6228 sterilizations were made in Jammu district. As loops insertion is concerned 3534 loop insertion were made. 179333 condom/pills and 9312 oral pills were used as a family planning measure in the study area. The data also clearly depicts that in the year 2009-10, 161 males adopted Vasectomy and 3899 females adopted Tubectomy as a family planning measure. The data further shows that in the year 2009-10, 2918 loops insertions were made and 407824 condom/ pills were distributed in the study area. Similarly in the year 2011-12 maximum couples i.e. 403754 used condom/ pills as family planning measure. The data clearly reveals that maximum number of couples in Jammu district prefer condom/ pills as measure of family planning because most of them

think, condom as a safe method to avoid pregnancy and they have misconception about side effects of other methods of family planning.

Age at marriage

There is a direct link between marital relationships and physical health. Commonly, early marriages (marriage before the age of 18) are seen in developing countries and child brides can face serious life threatening issues such as complications during child birth, cervical cancer, unplanned pregnancy and often malnutrition offspring. According to district level household survey (DLHS) 2002-04, it is found that in Jammu district although the mean age of marriage for boys is 27.4 years but 0.7 percent of the boys get married below the legal age of marriage, similarly for girls the mean age of marriage is 22.7 years .The data regarding age at marriage from the field survey, is summarized in the given table 3.

Table 3 : Percent of sample respondents, as per their age at marriage, (2012-13)

Background Characteristics	Age at marriage of Respondents (Years)				
	11-15	16-20	21-25	26-30	Average
Rural/Urban Rural	5.6	65.7	28.56	0.20	19.2
Urban	0.0	47.3	50.35	2.44	20.7
Religion Hindu	2.5	46.9	50.0	0.5	20.4
Muslim	7.5	83.5	6.6	2.3	18.2
Sikh	1.2	42.7	54.0	2.0	20.8
Others	0.3	53.4	46.0	0.3	20.3
Category SC	0.9	64.5	33.9	0.6	19.7
ST	7.1	75.4	15.6	1.9	18.6
OBC	0.5	45.3	52.3	1.9	20.8
General	2.8	40.6	56.2	0.3	20.7
Monthly income of the family <10000	6.9	75.9	17.2	0.0	18.5
10000-20000	4.0	69.8	25.5	0.7	19.1
20000-30000	1.0	42.8	54.2	2.0	20.9
>30000	0.0	35.8	60.2	3.9	21.4
Occupation of the respondents Earner	0.8	37.6	58.8	2.8	21.2
Non- Earner	4.3	75.6	20.0	0.1	18.8

Source: Based on Field Survey, 2012-13

The above table clearly shows that the average age at marriage is relatively lower in rural women (19.2 years) than the urban women *i.e.* 20.7 years. The data also shows that in rural areas, 5.6 percent women marry at the age less than 15 years. The religion wise data shows that the average age at marriage is found to be significantly higher among Sikhs (20.8 years) in comparison to Hindu (20.4 years), others (20.3 years) and Muslims (18.2 years). The most striking feature of our study is that 7.5 percent of Muslim women married at the age less than 15 years. Further category wise data reveals that the average age at marriage is found higher in OBC *i.e.* 20.8 years followed by General (20.7 years), SC (19.7 years) and ST (18.6 years). The income wise data shows that 6.9 percent lower income group, whose monthly income less than 10000 marry at the age less than 15 years. The above data also depicts that, average age at marriage is significantly higher in higher income group *i.e.* 21.4 years. On the basis of occupation of respondents, the average age at marriage of earner is 21.2 years and non-earner is 18.8 years. In case of India it is well known fact that females who marry early may be less educated and thus may not be aware of the various modern contraceptive methods available, may lack interest in them and may have unfavourable attitude towards family planning and small family size norm.

Average interval between children and number of children

Longer intervals between consecutive births decreases the number of children a woman can have. Babies born to women who get pregnant very quickly after having a child or wait many years between children are at greater risk for potentially serious delivery related complications, including premature birth and low birth rate. The data from the field regarding average interval between children and number of children is summarized in the given table 4 :

Table 4 : Average interval between children and number of children of sample respondents, (2012-13):

Background Characteristics	Average interval between children (Years)					Number of children		
	1-2	2-3	3-4	>4	average	1-2	3-4	>4
Rural/Urban								
Rural	40.6	34.3	19.6	5.5	2.1	24.2	70.2	5.6
Urban	26.1	29.1	41.7	3.1	2.4	43.8	55.9	0.3
Religion								
Hindu	37.1	29.9	32.6	0.4	2.2	32.3	67.5	0.2
Muslim	42.3	38.6	18.0	1.1	2.0	31.6	66.6	1.8
Sikh	33.0	28.9	28.5	9.6	2.3	35.6	59.2	5.2
Others	20.6	28.2	42.1	9.1	2.6	36.1	62.1	1.8

Caste Category								
SC	33.1	30.5	20.7	15.7	2.3	28.8	68.2	3.0
ST	38.6	35.1	20.5	5.8	2.1	30.4	63.1	6.5
OBC	32.0	29.2	38.4	0.4	2.3	36.0	63.2	0.8
General	28.6	29.3	41.8	0.3	2.4	41.3	57.8	0.9
Monthly income of family <10000	38.6	33.4	21.3	6.7	2.1	31.1	65.1	3.8
10000-20000	35.7	34.1	26.1	4.1	2.2	32.4	64.3	3.3
20000-30000	35.6	30.1	32.7	1.6	2.2	34.1	65.1	0.8
>30000	25.4	26.9	41.2	6.5	2.5	39.6	58.0	2.4
Occupation of respondents Earner	29.6	31.4	29.4	9.6	2.3	42.1	56.8	1.1
Non- Earner	37.7	30.2	31.3	0.8	2.2	26.0	69.2	4.8

Source: Based on Field Survey, 2012-13

Table 4 shows the percent distribution of sample respondents regarding average interval between children and number of children. The data clearly shows that in rural areas of Jammu district, the average interval between children is 2.1 years, whereas in urban areas the average interval between children is 2.4 years. As far as number of children is concerned, in rural areas 70.2 percent respondents have 3-4 children, 24.2 percent respondents have 1-2 children and only 5.6 percent respondents have more than 4 children, on the other hand in urban areas more than 55 percent respondents have 3-4 children, 43.8 percent respondents have 1-2 children and only 0.3 percent respondents of urban areas have more than 4 children. The data also clearly depicts that religion wise average interval children- Hindu (2.2 years), Muslim (2 Years), Sikh (2.3 years) and others (2.6 years). The data further shows that maximum respondents whether Hindu (67.5 percent), Muslim (66.6 percent), Sikh (59.2 percent) or others (62.1 percent) have 3-4 children, on the other hand 32.3 percent Hindu, 31.6 percent Muslim, 35.6 percent Sikh have 1-2 children. Further caste wise data shows that average interval between children among respondents-SC (2.3 years), ST (2.1 years), OBC (2.3 years), General (2.4 years). The data also clearly reflects that low income group families, whose monthly family income is less than 10000, their average interval between children is 2.1 years, on the other hand among higher income group (whose monthly family income is more than 30000), average interval between children is 2.5 years. The data also clearly shows that among earner respondents average interval between children is 2.3 years, whereas among non - earners average interval between children is 2.2 years. The above table

also clearly reflects that 56.8 percent earner respondents have 3-4 children, 42.1 percent earner respondents have 1-2 children and only 1.1 percent have more than 4 children, on the other hand 69.2 percent non -earner respondents have 3-4 children, 26.04 percent have 1-2 children and 4.76 percent have more than 4 children.

Table 5 : Adaptation of any family planning Method of respondents (2012-13)

Background Characteristics	Adaptation of Family Planning Method						No
	Yes						
	Male Condom	Male Sterilization	Female Pill	Loop or Copper	Female Sterilization	Total	
Rural/Urban							
Rural	29.3	2.3	12.5	10.3	5.0	59.4	40.6
Urban	45.1	6.7	13.8	15.5	6.2	87.3	12.7
Religion							
Hindu	29.3	5.6	15.2	14.3	4.0	68.4	31.6
Muslim	26.4	3.3	11.6	10.5	3.2	55.0	45.0
Sikh	48.6	4.8	13.2	13.0	5.0	84.6	15.4
Others	44.2	4.2	13.0	12.8	8.0	82.2	17.8
Caste							
SC	35.0	2.3	10.8	9.2	8.0	65.3	34.7
ST	25.8	1.2	9.6	9.9	7.2	53.7	46.3
OBC	36.5	4.6	17.2	13.1	6.5	77.9	22.1
General	50.2	8.9	13.0	11.6	1.3	85.0	15.0
Monthly income of family							
<10000	7.3	2.2	8.6	13.0	1.2	32.3	67.7
10000-20000	27.6	2.9	18.7	19.2	8.8	77.2	22.8
20000-30000	49.4	4.6	11.9	12.9	6.6	85.4	14.6
>30000	65.5	8.5	14.8	6.0	3.7	98.5	1.5
Occupation of the respondents							
Earner	43.9	4.6	13.2	13.2	6.6	81.5	18.5
Non- Earner	30.6	4.4	13.0	11.6	5.2	64.8	35.2

Source:Based on Field Survey, 2012-13

Table 5 shows the percentage of sample respondents regarding adaptation of Family Planning method. The data from the field clearly shows that in rural areas 59.4 percent and in urban areas 87.3 percent women adopt Family planning method in order to avoid unwanted pregnancies. The data also reveals that 40.6 percent rural respondents do not adopt any family planning methods because some of them do not know any such method and some have misconception about the side effects of various methods. The data also indicates that in Jammu district whether the area is rural or urban, most couple prefer male condom in order to avoid pregnancies. Religion wise data shows that 84.6 percent Sikh respondents use family planning methods followed by Hindu (68.4 percent) and Muslims (55 percent) respectively. According to Muslim respondents, the use of any type of contraceptive is against their religion. Caste wise data reveals that maximum General category couples (85 percent) adopt family planning method followed by OBC (77.9

percent), SC (65.3 percent) and ST (53.7 percent). Low literacy level and the lack of widespread availability of birth control methods are also hampering the use of contraceptives in the study area.

Income plays a major role in the use of contraceptives. In the study area, maximum percentage of higher income group, more than 98 percent adapt Family planning method, whereas only 32.3 percent lower income group, whose monthly family income is less than 10000 use contraceptives because many of them do not know abaut any method or source regarding use of temporary methods of contraceptives to avoid pregnancy. The data also shows that 81.5 percent earner and 64.8 percent non-earner also use temporary method of contraceptives. The data also shows that 35.2 percent of non-earners do not adopt any method because they have misconception about the side effects of various methods and in some cases opposition to use these methods by husband or any other family member.

Table 6 : Knowledge about family planning programme of respondents, (2012-13)

Background Characteristics	Knowledge about Family Planning/Welfare Programme		
	Yes		No
	Government	Private	
Rural/Urban			
Rural	57.2	34.6	8.2
Urban	55.1	44.6	0.3
Per month income of the family			
<10000	65.3	20.5	14.2
10000-20000	58.6	35.4	6.0
20000-30000	50.1	48.3	1.6
>30000	48.1	51.9	0.0

Occupation of the respondents			
Earner	59.4	40.6	0.0
Non- Earner	52.9	38.7	8.4

Source:Based on Field Survey, 2012-13

Table 6 depicts the percentage of sample respondents regarding knowledge about Family Planning/ Welfare Programme. In Jammu district, there are various Government and Private agencies involved in imparting knowledge about Family Planning Methods/ programmes. The data clearly shows that in rural areas 57.2 percent respondents get knowledge regarding Family Planning from Government organizations and 34.6 percent from Private organizations and 8.2 percent do not have knowledge about any of these programmes run by various organizations. On the other hand, in urban areas of Jammu district, 55.1 percent women get information about Family Planning methods / Programme from Government organizations, 44.6 percent from private organizations and only 0.3 percent of respondents do not have any knowledge about any Family Planning Programmes run by any organization in Jammu district. The data further reveals that 65.5 percent of respondents whose monthly family income is less than 10000 also have knowledge about various family planning methods and programmes through Government organizations and 20.5 percent from private organizations and 14.2 percent of such women do not have any awareness or knowledge regarding these methods or programmes. The data also shows that respondents whose monthly family income is more than 30000 get knowledge for various family planning methods through Government organizations (48.1 percent) and through Private organizations (51.9 percent) respectively.

The data shows that 100 percent earner respondents have knowledge about family planning programme run by various organizations in Jammu district and more than 91 percent non earner also have knowledge about these methods.

Conclusion

By protecting women from the risk of pregnancy and its associated complications, family planning can play a vital role in the reduction of infant, child and maternal morbidity and mortality. The study shows that birth control pills, condoms, sterilization etc. are most commonly practiced family planning methods in the study area. The study clearly shows that the efforts of the Government in implementing the family planning Programme in the study area have significant impact. However, social factors like reluctance, traditions and socio-cultural beliefs towards larger family emerge as the major constraints towards adopting family planning methods.

Suggestions

Following are the few suggestions related to family planning and maternal health in the study area:

- Family planning policy should be such that it help women to have greater control over their bodies and enable them to make conscious choices of having or not having children and deciding the number of children they want.

- Health education should be available to all women especially the vast number of illiterate women in rural remote areas.

- Courses of instructions covering health family planning and nutrition are organized for extension workers of other government departments like *gram sewak*, teachers, agricultural extension workers etc.

- Family planning programme should be strengthened by distribution of condoms/contraception through ASHAs at village level at the door steps.

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Empowerment of Women through Economic Independency in Patna Metropolitan City

Purnima Pandey[1] and Gayatri Rai[2]

Abstract

Women empowerment is an essential tool to bring about changes in their socio-economic condition. Empowerment of women needs to begin with their participation in different spheres of life. Education is a great determinant in this regard. To achieve empowerment, women have to be educated about their rights and privileges in a modern society. It is the education that can bring about awareness in them related to their social status, injustice and differentiation meted out to them. In Patna metropolitan city, women plays a significant role not only in economic development but also in social, political, religious aspects etc.The present study is undertaken to analyze the importance of women's in decision making in regard to freedom of movement, family matters, purchasing home assets and family planning etc. This study examines the factors (particularly the independent variables) that might affect women's decision making power at the household level. In the present work both primary and secondary data have been used. The study indicates that status of women is not good, as they are depend on men's income and their occupational status is not equal to men. Therefore, they cannot take decision in the economic matters at family level.

KEYWORDS: *socio-economic condition, empowerment, decision making, freedom, home assets, and family planning.*

Introduction

Empowerment of women is a complex concept encompassing physical, social, economic and political aspects. Particularly after the declaration of 1976-85 as the decade for women by the United Nations, question of empowering women as equal partner in all

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walks of life becomes a prominent issue throughout the world. Women empowerment means giving powers to women. The word 'women empowerment' essentially means that the women have the power or capacity to regulate their day to day lives in the social, political and economic terms, a power which enables them to move from the periphery to the centre stage. Self-decision regarding education, participation, mobility, economic independency, public speaking, awareness and exercise of rights, political participation and many more factors ensure women empowerment. In short,women empowerment is the breaking of personal limitation.The concept of women empowerment originates from the idea of the Brazilian Educationist Paulo Freire. Empowerment as a form of development, change is brought about by local problem solving efforts and techniques. The term empowerment is frequently used to describe a process where in the power-less gain greater share of control over resources and decision making, and since women are generally accepted as being the most powerless members of the opposed classes. Empowerment has been described as nurturing, liberating,energizing the un-affluent and the un-powerful people (Barkat, 2008).Women empowerment is a global issue and discussion on women political rights are at the fore front of many formal and informal campaigns worldwide. The concept of women empowerment was introduced at the international women conference at NAIROBI in 1985.The empowerment of women and the improvement of their political, social, economic and health status is a highly important end in itself. In addition, it is essential for the achieve-

ment of sustainable development (Mishra, 2006). Empowerment is a process which relates to the power of an individual to redefine her possibilities and options and to have the ability to act upon them (Eyben et al., 2008). The full participation and partnership of both women and men is required in productive and reproductive life, including shared responsibilities for the care and nurturing of children and maintenance of the household (Jejeebhoy, 2002). In all parts of the world, women are facing threats to their lives, health and well-being as a result of being overburdened with work and their lack of power and influence. In most regions of the world, women receive less formal education than men, and at the same time, women's own knowledge, abilities and coping mechanisms often go unrecognized. The power relations that impede women's attainment of healthy and fulfilling lives operate at many levels of society, from the most personal to the highly public (Mason 2003). Achieving change requires policy and program actions that will improve women's access to secure livelihoods and economic resources, alleviate their extreme responsibilities with regard to housework, remove legal impediments to their participation in public life, and raise social awareness through effective programs of education and mass communication (Boender, 2002). In addition, improving the status of women also enhances their decision-making capacity at all levels in all spheres of life, especially in the area of sexuality and reproduction. This, in turn, is essential for the long- term success of population programs. Experience shows that population and development programs are most effective when steps have simultaneously been taken to improve the status of women.

Objectives

- To study status of women in the study area.
- To examine the involvement of women in decision making through economic independency in zonewise

Methodology
Sources of data

In the present work both primary and secondary data has been used. The source of primary data is questionnaire schedule distributed among sampled respondents and through field observations. While the secondary information was gathered from different sources like books, records, journals, National and International reports, reviews, websites and Government and Non-Governmental Organizations (NGOs), Census hand book of the Patna Metropolitan City, 2001 and 2011 year book and also some relevant informations from Patna Municipal Corporation .

Sampling and collection of data

This study focuses on geographical religion, linguistic and regional characteristics of population in Patna city while conducted in depth interview of women (500) to know their real life situation. Some quantitative tools has also been used to explain the status of women. The study area i.e. Patna city has been divided into 72 wards, which is further rearranged into 4 Circles, namely New Capital, Bankipur, Kankarbagh and Patna City. (District Gazette 2007) which occupies the Western, Central, Southern and Eastern parts of the city respectively.

Method and techniques of analysis

On the basis of the problems and objec-

tives of the study, the data are processed and analyzed through Microsoft excel 7 and SPSS 20 software.The collected data are together analyzed and interpreted with the help of statistical tools like percentages, average and chi square test.

Study area

Patna city the capital of Bihar is situated on the southern bank of the sacred river Ganga. It is located between 25^0 35' to 25^0 38' North latitude and between 85^0 5' to 85^0 16' East longitude and has a mean elevation of 53 m above the mean sea level. It is bounded in the west by river Son, holy river Ganga in the north, the flood plain of river Punpun lie in the south and the low lying area, near the confluence of river Punpun and Ganga near Fatuha fall in the east. It is one of the most important historical city of India and is situated along the natural levee of the river Ganga in the middle Ganga plain. A typical tropical city of northern India, It is famous for its glorious past, especially the period of Magadh and the Mauryan rule. Patna is hot and humid in summer and cold in winters. The climate of Patna varies from 43 - 30 °C during the summers and 21.4 - 5 °C during the winters. The rainfall in Patna is 1,100 mm during the months of June to September. It receives medium to heavy rainfall in the monsoon, relative humidity can go up to 100% during the winter. According to 2011 Census data, Patna city has a population of 1,683,200 (before expansion of the city limits) within the corporation limits, with 894,158 men and 789,042 women. The average density of population is 16,925 persons per sq. km. The sex ratio is 882 females per 1,000 males which is lower than the national average of 943. The overall literacy rate is 84.71%, with the male literacy rate being 87.71% and the female literacy rate

81.33%. Patna Metropolitan city is divided into 72 municipal wards, for every municipal ward present in the city there is a ward councilors that are chosen by this body. All the existing wards in Patna have been divided into four different circles, each administered by an officer who is selected by the State Government. At present, Patna Municipal Corporation encompasses an area of 109.218 sq.kms. The four circles are New Capital Circle (western zone), Kankarbagh Circle (Southern zone), Bankipore Circle (Central zone) and Patna City Circle (Eastern zone). The city is linear and shaped like sword with the handle in the west and points towards the east. The city is approximately 35 km long and 16 km to 18 km wide.

It is the administrative headquarters of the district, the division and the state. It provides shelters to local administration, judiciary, and legislature and is headquarters of educational, health, commercial and several other professional services.

Observation and discussion

The distribution of the women respondents by age is shown in table 1 which indicate that out of total respondents 18.8% are in the age - group of below 30, 43.0% are in the age group of 30-40, 17.6% are in the age group of 40-50 and 20.6% in the age group of 50 years

and above. Religion wise distribution of respondents shows majority of them being Hindu 66.2% followed by 19% Muslim, 12.0% Sikh and 2.8% Christian. In social group wise 36.5% respondents are General, 36.0% belongs to other backward class (OBC), 24.8% Schedule Caste (SC) and 2.7% are Schedule Tribes (ST). According to education 3.6% respondents are found to be illiterate, 10.6% respondents have received education up to primary level, 14.6% up to middle, 19.0% up to High School, 16.4% Intermediate, 25.8% up to Graduation level, and only 10 % have professional degree and diploma. According to occupational status of respondents about 55.6% are unemployed group and are mainly housewives and students, 12.2% are working in organized sector. In this group most respondents belonged to government schools, office and other places and 32.2% are working in unorganized sector and they are primarily public school teachers, engaged in small scale industries, shopkeepers, beauty parlor workers, vendor and maid servants etc. Therefor the relationship between socio economic condition and occurrence of violence among women in our study shows that violence is faced by respondents 44.6% among the verbal violence, 28.9% among the physical violence, 2.7% are sexual violence and 23.8% respondents have faced all of these violence.

Table 1: Profile of the Respondents

Sl no	Respondents	Per cent
1	Age Group	
	below 30	18.8
	30-40	43.0
	40-50	17.6
	Above 50	20.6
	Total	100.0

2	Religion	
	Hindu	66.2
	Muslim	19.0
	Sikh	12.0
	Christian	02.8
	Total	100.0
3	Social Group	
	General	36.5
	OBC	36.0
	SC	24.8
	ST	02.7
	Total	100.0
4	Education	
	Illiterate	03.6
	Primary	10.6
	Middle	14.6
	High school	19.0
	Intermediate	16.4
	Graduation	25.8
	Others	10.0
	Total	100.0
5	Occupation	
	Un-employed	55.6
	Employed in Organized Sector	12.2
	Employed in Unorganized Sector	32.2
	Total	100.0
6	Violence Against Women	
	Verbal	44.6
	Physical	28.9
	Sexual	02.7
	All of These	23.8
	Total	100.0

Source: Based on personal survey, 2014

Women empowerment is giving legitimate power or authority to perform the tasks. If women are empowered they would be able to participate in the planning and decision making task and contribute to the development programs and activities individually(Mahapatra, 2006). Women's status in a society gets reflected by their legal rights, educational standards, health status, employment position,and decision making roles they play in the families and communities (Jha, 2005). (Malhotra and Mathur's1997) analysis of the impact of education and work in women's decision-making in Sri Lanka, a combination of survey data, focus groups and life histories are used to test the relationship between employment and empowerment. They find that education and employment are important determinants of women's decision-making in terms of finances, but not in terms of household decisions related to social or organizational matters. They conclude that research on the links between education, employment and empowerment must include broader measures of education and empowerment. And, also incorporate a greater breadth of social, household and life course factors relevant to gender and family relations. The women's status has much greater influence than men on infant child mortality, on health and nutrition,on children's education and thus on fertility and population growth.Those social, cultural and religious attitudes have resulted in discriminatory laws and practices against women which prevent them in performing their due role in societies and economies. Especially in traditional and developing societies the discrimination against women from cradle to grave have often constrained them towards attainment of education, income earning capabilities,economic self-sufficiency and thus their status in the societies. This section purports to highlight women's decision making powers in the households in our areas of study.Decision making power of women in households is one of the important indicators of women empowerment.

Table 2. Decision making power of the Respondents in zonewise

(A) Freedom of Movement	Never	Sometimes	Often	Always	Total
Central	6	15	53	24	98
Eastern	22	32	57	21	132
Southern	12	15	37	23	87
Western	25	28	66	64	183
Total	65	90	213	132	500
x^2(chi-square)=11.31, df=8, significant at 0.05 level					
(B) Family Matters					
Central	17	36	41	4	98
Eastern	27	49	53	3	132
Southern	31	39	17	0	87

Western	33	76	63	11	183
Total	108	200	174	18	500
x^2(chi-square)=18.8, df=8, significant at 0.05 level					
(C) To Purchase Home Assets					
Central	0	50	39	9	98
Eastern	4	51	61	16	132
Southern	0	24	41	22	87
Western	3	67	99	14	183
Total	7	192	240	61	500
x^2(chi-square)=25, df=8, significant at 0.05 level					
(D) Family Planning					
Central	7	25	28	13	73
Eastern	6	32	43	17	98
Southern	4	9	32	15	60
Western	11	26	71	19	127
Total	28	92	175	64	359
x^2(chi-square)=25.00,df=8, significant at 0.05 level					
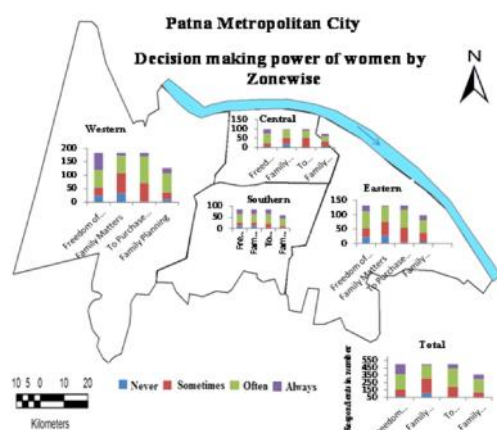
Source: Based on personal survey, 2014.

The decision making power of the respondents was related to the zone wise and is shown in the table 2(A-D). Table 2(A) show 65 respondents do not take any decisions to freedom of movement in which majority are western and eastern zone. 90 respondents sometimes take decision to freedom of movement. 213 respondents often take decision and among them majority are western and central zone respondents.132 always take decision related to freedom of movement in which majority are western zone.Its main reason in this area are related to administrative and commercial area so most of women are educated and employed so they take decision related to this matter Table. 2 (B) show the decision making related to family's matters. Out of 500, 108 respondents never take decision in family's matters. 200 respondents sometimes take decision in which highest are from western zone. 174 respondents often take decision related to family's matters and in this group, majority are unem-

ployed respondents. 18 respondents always take decision and in this group highest are from the employee of unorganized sector. Thus the data shows the western and eastern zone participate take more decision as compare to the southern zone respondents. Table 2(C) show the decision making related to purchase of home assets. Out of 500, 7 respondents don't take decision related to purchase of home assets. We have seen most of the respondent participate to decision in purchase to home assets. Table 2(D) show the decision making related to family planning matters. Out of 500 respondents 358 are married and 142 are unmarried so unmarried respondents are not related to this matters. Out of 358, twenty eight respondents never take decision related to family planning. 92 sometimes take decision in which maximum from western and eastern zone respondents. 175 respondents often take decision regarding the family planning matters. 64 take decision always and among them maximum are from western zone.

Since the calculated values of $\times^2$ for table 2 B, C, D are greater than the tabulated value it may be concluded that women participating in the economic activities tend to have their decision making power. However for table 2 A, the calculated value of $\times^2$ (chi-square) is smaller than the calculated value in these cases implying the participation of women in economic activities does not influence the freedom of movement (relative's home).

Conclusion

The empowerment is an aid to help women to achieve equality with men or, atleast to reduce gender gap considerably. Without empowerment certain social roles cannot be performed. Women play a distinct role in the eco-nomic development. She is the chief architect of family, the first teacher, supplier of labor power and by playing main role in the development of industry and agriculture, socio-culture etc, creates a civilized society. Women are slowly getting empowerment in sector like education, and getting more power within their own households. Empowerment of women is not only important for the very development of country, but it also increases the quality of human resources available for development.

Present study explores the decision making power related to women's empowerment. The relationship between decision making and empowerment is drawn multiple indicators towards gender equality, household decision making, and experiences of violence, knowledge of their rights about domestic support and freedom of mobility. Women's work participation in Patna presents many trends due to changing structural features of the economy. Industrial development and modernization has displaced quite a large number of women working in traditional occupations. In the process of industrial employment women are excluded from productive work and they are concentrated in marginal occupations and are increasingly segregated in terms of employment. The reasons for less participation of women in the workforce are heavy domestic work load, lack of assured work, irregular and under payment of wages, absence of public transport facilities in linear cities, lack of childcare centres and other supportive services. The spread of education has opened up employment opportunities for women in the tertiary sector with a marginal increase in the proportion of women in white colored jobs like doctors, nurses, teachers, clerks. The study area, conducted on 500 respondents reveals that western zone

which is mostly administrative and eastern and central zone being commercial so women doing work in outside or inside. Their family members are educated so they respect women and women status in the family is better. In Southern zone is newly developed under the Patna Municipal Corporation and most of the respondents belonged to village culture, so male person dominate and also women education as well as economy status are not equal to male person. So women decision making power is low.The data show zone wise decision making power of respondents is not good. This is because, our society mentality is not changed and after globalization and government has introduced various programs to increase the status of women, but all are not benefited due to the social stigma and low literacy. In education wise illiterate and lower educated women not take decision in comparison to literate, because they do not know their own rights.They depend on men's income and their occupational status is not equal to men. Therefore, they cannot take decision at their family level.

The above findings reveal a link between women decision making power and empowerment on some dimensions. On the dimensions of economic and non-economic domestic decision making, violence experiences although women enjoy autonomy but on other dimensions e.g. mobility, gender preference attitude, knowledge about their rights women empowerment is limited. At the same time, there are various employment characteristics and socio cultural background are attached with the indicators of empowerment. For example family status, employment status, regularity and level of income, educational level etc.It is concluded that to look deeper in to the link between employment and empowerment relationship, there is a need to develop a broader range and contextual indicators of empowerment for better understanding of the relationship between employment and empowerment.

Acknowledgments

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A Note on the Teaching Manual for Secondary School Geography Teachers

Sarfaraz Alam[1]

These {teachers'} handbooks should reach principals and teachers before the new textbooks do.   (National Curriculum Framework 2005: 90)

Introduction

A teaching manual is teachers' handbook containing a variety of resources for teacher trainers as well as classroom instructors of a subject. Teacher trainers use these manuals for training in-service school teachers. School teachers also use these manuals to meet the pedagogic transaction of specific topics of their subjects. In other words, teaching manuals are self-instructional teaching resources which are used by teacher-trainers/ classroom instructors to train/teach either the content or technique of a particular subject. The National Curriculum Framework 2005 considers that teachers' handbook can be designed in more than one way and for multiple purposes.

"They need not cover the content of the textbook chapter-wise, though that can be one of the approaches. Other formats can be equally valid: offering a critique of established methods and suggesting new ones, and including lists of resource materials, audio and video materials and sites on the Internet. These would provide tips for the teachers, which they could use for lesson planning. Such source books need to be available during in-service training of teachers and during meeting when they plan their teaching units" (NCF 2005: 90).

The pedagogic value of teaching manual of geography for schools is recognized across the world. However, North American and European countries have a rich tradition of preparing teaching manuals. In these countries, individual authors as well as teaching and research centres have developed teaching manuals for school teachers and teacher trainers. An example of a classic teaching manual is the *UNESCO Handbook of Suggestions on the Teaching of Geography* (1951). The

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UNECO Source Book for Geography Teaching (1965) is yet another important document containing resources for geography teachers. Iris M. L. Long and Bertrand Stanley Roberson produced a globally influential handbook titled *Teaching Geography* in 1966. This book gives a comprehensive account of various issues of geography teaching. Another important teaching manual for geography teachers with the title *Handbook for Geography Teachers* was edited by Iris M. L. Long in 1974. Recently, a very popular teaching handbook for secondary school geography teachers titled *Secondary Geography: Handbook* has been edited by David Balderstone (2006) under the aegis of Geographical Association of the United Kingdom. This book aims to inspire and support the professional learning of geography teachers, and to promote worthwhile and stimulating geographical learning for students.

Importance of teaching manuals

The importance of teaching manuals as teaching resource needs no fresh acknowledgments. Manuals and resources for teachers are just as important as textbooks. Therefore, any move to introduce a new set of textbooks or a new kind of textbook should include the preparation of handbooks for teachers (NCF 2005: 90). Teaching manuals can be used to enrich the teaching transaction in classroom. The availability of teaching manual can help in overcoming many limitations caused due to lack of trained teachers and availability of quality textbooks. In India, the development of teaching manuals is particularly critical for a subject like geography which is mostly taught by teachers who are graduates in geography subject nor do they have mandatory teacher training de-

gree (Alam, 2015). Moreover, because of its vast scope geography teachers give lecture on an array of diverse topics- ranging from physical and human attributes of the earth to the cartographic techniques. This very fact makes it practically difficult for teachers of geography to excel in teaching of all the topics.

It is against this backdrop that this paper argues that the development of teaching manuals can prove milestone in improving the content as well as technique teaching abilities of geography teachers. With the help of teaching manuals, teachers may teach geography with enthusiasm, élan and sensibility. In India, many educational institutions and organization such as the National Council of Educational Research and Training (NCERT), State Council of Educational Research and Training (SCERTs) of some states and some secondary and higher secondary school boards have developed teaching manuals for geography instructors. These teaching manuals contain content as well as teaching methods of school geography. The NCERT has developed a manual for the in-service training of teachers and teacher educators in geography for higher secondary stage (class XI and XII) with two-fold objectives.

"First, it should act as a resource for subject teachers who might turn to it for a ready reference in the interest of effectively transacting the geography themes which are taught at the higher secondary stage and second it should guide competent teacher's training organizations such as the *Kendriya Vidyalaya Sangathan, Navodaya Vidyalaya Samiti*, and SCERTs etc in organizing short-term training courses for higher secondary geography teachers in order to grade their teaching skills" (NCERT, 2006a, p. 4).

In the same way, a teachers' manual for the secondary schools (class VI to X) have been developed by the NCERT (2006b, p. 2) with following objectives:

- Facilitate the organisations which conduct training programme for teachers on a regular basis

- Equip teachers to understand the nuances of the components of social sciences and develop a social science perspective.

- Acquaint with the new development and changes in the field of knowledge and method of inquiry as reflected in the NCF -2005 syllabi and textbooks.

- Making teachers understand not only the subject but enable to analyse the topic through interdisciplinary approach

- Empower teachers to know how learners construct knowledge and facilitate the process in classroom

- Help them to acquire different strategies, competencies and skills for transacting new upcoming areas.

- Develop the competencies among the teachers to relate the topic in context of their local surrounding/ experiences

- Enable teachers to promote self learning/ team work in and outside the classroom for effective transaction of the curriculum

- Develop competencies to monitor the progress of each child in the classroom as well as to manage with remedial in built mechanism.

- Facilitate peer group teaching and encouraging cooperative learning in the classroom.

The NCERT has also taken up the task of developing *In-service Teacher Professional Development Package* (ITPD). The Department of Education in Social Sciences of NCERT has developed *ITPD Package in Social Sciences* based on common themes identified from the syllabi and textbooks of NCERT and various State and UTs (Department of Education and Social Science, NCERT, 2014: 1-3). It seeks to address the need for continuous professional development of in-service social science teachers. Divided into five sections, the module deals with various issues such as understanding of adolescent learners, approaches to the teaching of social sciences, need for conducting training programme, preparing a structure of the training programme, designing the training and evaluation of the training programme. It provides a brief overview to the teaching of various disciplines and transaction of themes pertaining to each discipline. Two specific themes from geography, *i.e.* climate and resource, have been developed as examples. The document also provides guidelines to develop a project keeping in mind the interdisciplinary nature of social sciences. These modules in geography have been developed not only for those who are well versed in geography but also for those who are from other social science/subject background and are given the responsibility to teach geography at secondary level (Department of Education and Social Science, NCERT, 2014: 98). What is more, it has been developed keeping in view diverse educational backgrounds of social science teachers.

This paper also aims to find out the development of teaching manuals of geography in various school boards of India. Data for the study is based on a questionnaire-based survey of different school boards in the year 2013-14 by the author. The survey was conducted to obtain views of officials in charge of geography/social science about teaching manuals. Questionnaires were sent to all the 34 school boards. However, only ten boards responded. Among them, only five board officials responded to questions pertaining of teaching manuals. Those in-charges of social science/ geography curricula were asked about the development of teaching manuals by their respective boards for geography teachers. They were also asked whether manuals were about content of the subject or the teaching process; and the names of specific teaching manuals.

Out of 10 school boards of as many states surveyed, there are evidences of development of teaching manuals in only five states (Table 1). However, as geography is a part of social science, there are no specific teaching manuals for geography in four school boards (*i.e.* Karnataka, Andhra Pradesh, Rajasthan, and Uttaranchal). Separate teaching manuals for geography are developed only in Tamil Nadu School Board. In other words, in these state boards, the convention is to develop teaching manuals for social sciences/environmental science and geography components are included in teaching manuals of these subjects. As for example, in the state of Andhra Pradesh, teaching manuals have been developed for social science as well environmental science for geography teachers who can use them for teaching geography. The approach of the teaching manual is constructive. On the other hand, social science-based teaching manuals of Rajasthan use activity approach to teaching geography. The case of Tamil Nadu is totally different as it has prepared three separate teaching manuals for geography teachers. One of them pertains to map skill training. The other manuals are related to concept enrichment training and elementary training.

Table 1: Teaching manuals developed by SCERTs/School Boards for secondary school geography

School Boards	Teaching manual for geography	Name of the manual	Content	Method
Karnataka	No teaching manual has been developed separately for geography but inclusive with other social science subjects.	----	----	----
Andhra	No teaching manual has been developed separately for geography	Teacher manual for Environmental Studies Teacher Manual for Social Science	Contents of Environmental Studies and Social Sciences	Constructive approach
Rajasthan	As a part of social science	Teacher Training manual Samblaer	6-8 class textbooks 9-10 textbooks	Activity based Activity based

Uttarakhand	As a part of Social Science	*Rastriya Madhyamik Shiksha* (Ramsa)	Yes	Yes
Tamil Nadu	Separate teaching manual for geography	Map skill training Concept enrichment training ABC Training	Mapping Concepts Concepts	Activity Activity ABC cards

Conclusion

Summarizing, despite the critical importance of teaching manuals for secondary school geography teachers, only a few school boards have developed teaching manuals. The focus of these manuals is on content of the subject as well as skills. The manuals have been developed for training of in-service teachers as well as for their self-learning of teachers. However, of five school boards which have developed teaching manuals, only Tamil Nadu school board has developed geography-specific teaching manuals for subject content and technique. Other school boards have not developed teaching manuals exclusively for geography. In these boards geographical contents and skills are covered in manuals developed for social science or environmental science. As a result, geographical elements do not come out as distinctly.

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Book Review

It was after World War II, interest towards regional studies has greatly increased in context to planning and development. Such studies have been undertaken not only in geography, but also in other sciences, particularly in social sciences. In the post World War period, when regional planning acquired importance in capitalist countries and become widely spread in developing countries (socialist countries), the concept of regional development widen and interest in regionalization was revised.

Even though there had been a lot of research work conducted in regionalization, regional planning and development, new entrants to the field seems to ignore the eastern work. In this context the book explains both the traditional and contemporary relevant concepts and themes in a systematic and comprehensive manner. The book has substantially provided in depth material on different aspects of regional development and planning.

The first two chapters in the book illustrate the brief history of planning, its goals and objectives and types of planning with simple examples. The second chapter particularly focuses on concept of region and planning regions. The author further articulates the different concepts and theories of regional planning. He has critically expounded the evolutionary history of regional planning since 1920s and has identified different phases of its evolution as explained by Friedmann and Weaver (1979); Soja (2009) and Haughton and Counsell (2004) in their work.

The book also talks about history of regional planning in India with other issues like integration, regional disparities, problems and approaches. He further elaborates the eight broad objectives of regional development planning by Resources for the Future (RFF), Inc. (1966) for sustainable development of a region.

The approaches to study regional development and planning are well described. These have been grouped into general approaches constituting of procedural models and theories and particularly region based development planning approaches.

The book particularly focuses on theories and models concerned with spatial organization, regional development and techniques of regional analysis. The theories and models related to

regional development have been well structured into three groups, one deal with theories since 1950s to 1960s; 1970s to 1980s and 1990s onwards. The author has deliberately omitted many of the tradition theories particularly since before 1950s. Only few selected techniques of regional analysis have been critically evaluated.

The book will be of immense importance to post graduate students and research scholars of geography. The thematic approach of the book provides substantial material for cognition to researchers. The academicians and planners may also be benefited while thinking of development through planning a region.

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