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CONTENTS

सम्पादकीय

''उत्तर प्रदेश ज्याग्राफीकल जर्नल'' का 26वाँ अंक प्रस्तुत करते हुये अपार हर्ष की अनुभूति हो रही है। विगत वर्ष जर्नल का रजत जयन्ती विशेषांक प्रकाशित किया गया था। मैने लिखा था कि ''जर्नल विश्वविद्यालय अनुदान आयोग द्वारा मान्य था तथा पुनः UGC Care list of Journals में सम्मिलित करने हेतु आवेदन कर दिया है। आशा है, हमें शीघ्र सफलता प्राप्त होगी''। ब्रह्मावर्त ज्याग्राफीकल सोसाइटी आफ इण्डिया के समस्त सदस्यों, भूगोल वेत्ताओं, शुभचिन्तकों तथा शोधार्थियों को सूचित करते हुए अतीव प्रसन्नता हो रही है कि ''उत्तर प्रदेश ज्याग्राफीकल जर्नल'' 01 सितम्बर 2021 से UGC Care list of Journals में सम्मिलित कर लिया गया है।

'उत्तर प्रदेश ज्याग्राफीकल जर्नल' में शोध, पत्र मौलिक शोध परक, स्तरीय, जर्नल प्रारूप के अनुरूप तथा Peer Review Committee द्वारा अनुशंसित ही सम्मिलित किये जाते हैं। समस्त प्राध्यापकों तथा शोध छात्रों से अनुरोध है कि शोध–पत्र को भेजने से पूर्व सोसायटी की वेवसाइट या जर्नल में दिये गये निर्देशों का पूर्णतः पालन करते हुये ही शोध–पत्र प्रेषित करें। अधिकांश शोधार्थी शोध–पत्र लिखने में निर्देशों का पालन नहीं करते हैं। अतः सम्पादक मंडल इस प्रकार के शोध–पत्रों पर विचार नहीं करेगा।

आशा है, भविष्य में भी जर्नल को आपका प्यार तथा सहयोग प्राप्त होता रहेगा।

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MODELS, METHODS AND TECHNIQUES TO STUDY THE RAVINE GEOMORPHOLOGY

Sheo Prakash Agnihotri

ABSTRACT

Basically the 'Ravine Geomorphology' is the worst output of soil erosion and soil degradation in the form of rills, gullies and ravines. In fact, it is a major form of accelerated erosion which is a serious long-term geo-environmental problem generally caused by unnatural concentration of surface run-off at the time of strong rainstorms, by removal of loose and moistened soils caused due to alternate processes of dehydration and hydration, subsurface piping and tunnelling due to infiltration of rain water, augmented by anthropogenic factors such as total devegetation, unscientific ploughing of gully valley sides and interfluves, overgrazing and faulty bunding of gullies, etc. At national and international level soil scientists, engineers, agronomists, scientists of forest departments have studied many gullies and ravines having varying environmental conditions and have examined and suggested various ways of their evolution and means of controlling their further evolution and development. In India, generally geo-scientists involved in the study of ravine geomorphology neither could get required time nor opportunity and facilities for prolonged study of gullied and ravined areas and hence their conclusions have been generally drawn from causal observations. However, a few geo-scientists have studied different aspects of ravine geomorphology, its evolution and development and management there of and have made significant contributions.

Key Words : *Rill, Gully, Ravine, Ravination, Erosion, Infiltration, Anthropogenic factors.*

Introduction

The 'Ravine Geomorphology' merits our attention because of having the imprints of impact of physical and human interference on its natural environment and certain basic expectations of humanity depending on its productive efficiency. In fact, the vast tracts of deforested and degraded land of various regions of all over the country right from the nude and denuded hills of the North-Eastern Hill region in the east to bare Aravallis in the west and sick Himalayas in the north to Nilgiris in Tamil Nadu plains in the south and from the Western Ghats in the west to Eastern Ghats and Coastal plains in the east bear the testimony of the careless appraisals of the environmental factors and the vagaries of human occupancy. With increasing pressure of population on the land below and above the scarp regions and alluvial plains, the forest have been pushed back to the hills and even there the protective vegetation cover is removed for bringing the land under cultivation. The destruction of natural vegetal cover and leafy land has caused the loss of top soil which is virtually irrepairable because the nature takes hundreds of years to build an inch of such soil. Mostly the streams in alluvio-colluvial regions have scoured their channels deep and have presented a severe geomorphological hazard of land degradation through the generation of rills, gullies and ravines which are perhaps, the most dramatic forms of the degraded land. Consequently, the surrounding uplands have become woefully naked. Most of the perennial springs have dried up. Vast portion of the land is regularly turning into waste and degraded land. Chronic droughts in the upland parts and heavy siltation in the river beds in the lowland parts have become a matter of annual reoccurrence.

In this respect of 'Ravine Geomorphology', the factual narration is that the soil is one of man's

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most important natural resources for being the basic medium for food and timber production, foundation for building and roads and the base for the development of human civilization (Singh and Dubey, 1999). In fact, the soil is as necessary for us as the air we breathe or the water we drink. A double loss occurs when good soil is washed down a slope, mixed with infertile material in the process and then dropped on top of fertile soils at lower altitudes. In the absence of protective vegetation cover the monsoons wash away the soils of the exposed terrain, thus leaving the land barren and permanently uncultivable. The exposed arid soil also looses its capacity to retain rain water and consequently of feeding underground water reservoirs. In addition to direct loss of crop producing capacity, soil erosion through various processes increases the destructiveness of floods.

Thus, 'Ravine Geomorphology' is an extreme outcome of soil erosion and soil degradation in which natural geomorphological processes are accelerated so that soil is removed at faster rates and sometimes as much faster than rates at which new soil forms. To demonstrate the enormity of the ravined land problem and also the extent to which gullied and ravined land can be reclaimed under a proper environmental management, a detailed study of 'Ravine Geomorphology' at national and global level must be taken under consideration. This study may enable us to assert the fact that the rapidly developing ravine geomorphology in alluvio-colluvial regions of India is the result of headward erosion and recent downcutting of the streams suggesting the regional uplift of the areas even in recent times. The role of man in the form of deforestation, poor landuse practices and negative human activities cannot be ignored in this reference, rather it is a matter of illustration and analysis which needs care before formulating any remedial measure for it.

In fact, the multi-disciplinary nature of the subject 'Ravine Geomorphology' emphasises the land-man theme in which environmental forces and social activities interplay with aspects of both physical and human geography.

Thus, the development of geomorphology under ravines underlines its importance under a productive unit of ecosystem and behaves as a matter of urgency and relevance to social policy.

DEFINITION OF THE TERM : RAVINE GEOMORPHOLOGY

In the domain of fluvial geomorphology the term 'Ravine Geomorphology' outlines the 'net of rills, gullies and ravines' caused by fluvial linear erosion of loose and unconsolidated geomaterials which ultimately results the morphology of badland terrain.

THE TERM : 'RILL'

Generally 'rill' is a narrow, steep-sided watercourse of small scale. It is an ephemeral feature considerably smaller than a gully. It carries water intermittently, generally during storms and is thought to be 'the intermediate stage between overland flow and the development of permanent gully network' (Whittow, 1984, p.455) which itself forms the headwaters of a stream system.

'The removal of surface material, usually soil, by the action of running water is termed as 'rill erosion' (Whittow, 1984, p.455) or 'simply rilling' (Singh and Dubey, 1999). The process creates numerous tiny channels (rills), a few centimetres in depth, most of which carry waters only during storms. The head of the rill system may not extend all the way upto the watershed divide, thereby leaving a zone of no rills across which the depth of overland flow is insufficient to develop an erosive force equal to the forces of cohesion which hold the soil particles in place.

THE TERM : 'GULLY'

'A small but deep channel formed by fluvial erosion but not permanently occupied by a stream' (Whittow, 1984, p.240) is termed as 'gully'. In fact, as the 'process of rill erosion' continues, numerous interconnected rills are formed. When 'these rills are established into the soils and subsoils, are enlarged and deepened and are finally transformed into long and deeper channels', they are termed as 'gullies' (Singh and Dubey, 2000).

'The process whereby gullies are formed on

a land surface owing to the effects of heavy rainstorms' is termed as 'gullying' or 'gully erosion' (Whittow, 1984, p.240). In gullying process the surface run-off becomes concentrated into shallow channels (rills) which then combine to form deep gullies which dissect the surface and create badlands. In fact, in gully erosion process, the 'rills are very frequently transformed into gullies over the slopy grounds and the foothill zones of the hill slope' (Singh and Dubey, 2000). The process of gullying is often a sign of human interference with the natural processes in a landscape, e.g. removal of vegetal cover or extensive overgrazing and trampling by livestock and is symptomatic of serious soil erosion.

THE TERM : 'RAVINE'

'A deep narrow river valley but without the precipitous sides of a gorge which it resembles in stature and bigger than a 'gully' or 'arroyo' (Whittow, 1984, p.440) is termed as 'ravine'. In fact, 'ravine' is an extensive network of concentrated rills and deeper gullies over the slopy grounds and foothill zones of the hilly terrain which ultimately results into the development of 'ravines' or 'badland topography' (Singh and Agnihotri, 1987).

The term 'rill and gully erosion' is collectively called as 'ravine erosion' or 'ravination'. It 'is a major form of accelerated erosion' (Singh and Agnihotri, 1987) and 'is a serious long-term environmental problem (Sundborg, 1983), created, initiated and accelerated by deforestation, overgrazing and clearing of land for agricultural purposes (Agnihotri, 1993). The loss of rich top soil through rill, gully and ravine erosion and thus transformation of fertile land into wasteland has become a serious geo-environmental hazard in India now a days.

CONCERNS OF RAVINE GEOMORPHOLOGY

Basically the 'Ravine Geomorphology' is concerned relatively with two types of soil erosion viz. geological erosion and accelerated erosion. Geological erosion 'is the rate at which the land is normally eroded without disturbance through human activity' (Sharma, 1980). In fact, it is a comprehensive natural process of detachment and removal of loosened rock materials and soils by exogenetic processes such as running water, ground water, winds, sea waves and glaciers, etc. Accelerated erosion 'is the increased rate of erosive processes, either directly or indirectly by the intervention of man' (Whittow, 1984). Its most obvious effects can be seen in the alteration of a river's regime by careless land use or by the introduction of man's artifacts into the catchment area. Deforestation and overgrazing, for example, can increase surface run-off and lead to soil erosion. Urbanization, with its attendant layers of concrete and tarmac, also increases surface run-off by inhibiting percolation and since the soil is now built over rain water runs swiftly and directly to the rivers there by increasing channel scour and the undercutting of banks.

Very clear to say 'Ravine Geomorphology' particularly is the product of accelerated erosion and denotes ravined land 'containing systems of rills and gullies running more or less parallel to each other and entering a nearby river flowing much lower than the surrounding table lands'(Sharma, 1980).

BASIC TENET OF RAVINE GEOMORPHOLOGY

In fact, the channels of ephemeral flow, denuded and guided essentially by the process of rejuvenated streams and having steep sides and head-scarps with a width and a depth always greater than a gully are the basic tenet of 'ravine geomorphology' (Sharma, 1968). Though geomorphologists draw a distinction between 'gully' and 'ravine' where 'ravine' is said to be a form produced by river action and gully' as the function of catchment area, yet basically both of landforms may be recognized as the 'stages of landform development.' In such landform development stages, the soil is eroded rather removed at rates ten and sometimes several thousand times faster than is the case under the condition of natural vegetation and much faster than rates at which new soil forms.

SOME OTHER VIEWS ON RAVINE GEOMORPHOLOGY

Some different views related to the 'ravine geomorphology' have also been presented by

various scientists but in some other ways viz. V.P. Singh defines gullies and ravines on the basis of their location as ' typical erosional landforms which are found in profusion along the foot zones of the escarpments, river banks and over flattish lower surfaces having thick mantle of loose soil cover' (1984). About their nature Enayat Ahmad rightly says that 'gullies or ravines of varying magnitude spread vertically and horizontally and cause erosion of land and soil at a terrific rate (1968). According to Bennett (1955) 'gullies represent the most spectacular form of accelerated erosion. They begin at that stage of erosion where the topsoil has been removed down to or near the subsoil. Left unattended the gullies spread rapidly and destructively. The process might very well be appraised as the beginning of the death stage of land decline, especially where the people have not taken up modern soil conservation measures in earnest.'

Whatever the views and definitions of the gullies and ravines are, but the real situation is that in different types of soil, on steep slopes and undulating terrain from the sea coast to the mountain foot hills, the associated soils in such geomorphology of ravines are generally poor in nutrients, loose and friable, crumble easily without protective cover of vegetation.

REVIEW OF THE RESEARCH AND LITERATURE ON RAVINE GEOMORPHOLOGY

In fact 'Ravine Geomorphology' as an aspect of fluvial geomorphology has not received much attention which it deserves. Fluvial geomorphologists are generally confined to drainage network analysis. Some scholars thought more in terms of drainage patterns and their evolution. Some have shifted to basin morphometry analysis within the Hortonian structural frame. Studies made in these fields of fluvial geomorphology give the impression that they are helpful in investigating the geomorphological reality in theory unless the forms and processes and their relationships are examined in the field. Ravine geomorphology is actually a 'field geomorphology' about which significant advances have been made particularly in western countries and U.S.A. Bennett (1955) is the pioneer scientist who actively developed this field of interest through U.S. Soil Conservation Service. He conducted many of the early soil surveys and did research for the Federal Bureau of Chemistry and Soil as well as doing conservation research work. Among other important studies on ravine geomorphology, the prominent ones are those of Middleton (1930), Bryan (1941), Antev (1952), Schumm (1956), Scheonwetter (1962), Martin (1963),Tuen (1966), Brice (1966), Denevan (1967), Kirkby (1968), Carson and Tan (1977) and Wischemier (1977), etc. The contribution of ' Soil Erosion and Soil Conservation Encyclopedia Britannica Year Books (1943-1954) and U.S. Technical Bulletins of Department of Agriculture of various states are also valuable in this respect.

INDIAN OVERVIEW

In India, some serious and volumenous attempts have also been made on 'ravine geomorphology,' but not on this particular topic; they are mostly related to rill and gully erosion. These relevant imperative studies on regional and basinal level have appeared in various monographs, journals and proceedings of seminars, symposia, and conferences. The contributions of Mehta, et al (1958, investigation of physical properties of Kota soils in relation to their erodibility), Singh, Mishra and Bulian (1966, control measures of ravine ravages),Bhulyan (1967, survey of ravine lands in Rajasthan), Ahmad (1968, distribution and causes of gully erosion in India and 1973, soil erosion in India), Verma and Patel (1969, erosion studies on Mahi ravines in Gujarat), Seth, et. al. (1969, reclamability, classification and nature of ravines of Chambal command area), Tejwani (1972, classification and reclamation of ravine lands), Singh, et al (1975, rainfall erosivity analysis). Singh and Karmannaver (1975, measurement of gully head extension), Sharma (1968, genesis of ravines of the lower Chambal valley, 1980, ravine erosion in India), Gupta and Prajapati (1983, reclamation and use of ravine lands), Haigh (1984, ravine erosion and reclamation in India, general review of ravine erosion in India) Singh and Agnihotri (1987, rill and gully erosion in Teonthar

tehsil of Rewa District, M.P.), Singh and Dubey, (1988, fluvial erosion and sediment load characteristics of the Ganga system in U.P.), Singh, Dubey and Singh (1991, ravination in the sub-tumid tropical environment of Deoghat area of Allahabad district U.P.), Indra Pal (1999, Tons alluvial plain: a study in ravine geomorphology), Singh and Dubey (2002, gully erosion and management: methods and applications), etc. constitute valuable references on ravine geomorphology and define the discipline in different ways in terms of morphogenesis, classification and causes, etc. Besides above regional studies, the National Commission of Agriculture (1976) and Ministry of Home Affairs (1972) have also made serious investigations on 'ravine geomorphology of India' and declared the zone falling in between the northern foreland of Peninsular India and the Gangetic plain (which generally covers the parts of the Chambal, Betwa, Ken, Tons and Yamuna catchments) as the most seriously affected zone through the morphogenetic process of ravination. Ravines cut in alluvio-colluvial deposits of this zone are quite common and are the most striking topographic features over most of the river catchments of this intervening zone.

METHODS, MODELS, TECHNIQUES AND APPROACHES TO THE STUDY

In entire frame of the study of 'Ravine Geomorphology', the most critical and debated part of the discussion is the morphogenesis and evolution of the gullies and ravines which are regarded as the most striking features of the fluvially eroded terrains and tracts devoid of vegetation. In the light of general theories and models of landform development, different explanations particularly about the genesis of gullies and ravines have been offered so far by foreign and Indian geo-scientists viz. Bennett's model of overgrazing (1955), Brice's climatic model attributing gullies to climatic changes (1966), Bryan's climatic model attributing gully cutting with drought and poor vegetative cover (1941), Antev's model attributing gully filling with higher rainfall and an improved vegetation cover (1952), Martin's (1963) and Schoenwetter's (1962) model of gullying with increased summer - high intensity rainfall, Schumm's badland erosion model due to channelling of water on steep slopes during rapid run-off (1956), peripheral uplift of the Peninsular Shield due to Himalayan orogeny causing a discontinuous pattern of incision (Ahmad, 1968 and 1973), rejuvenation of the northern foreland of Peninsular India and consequent accelerated incision by northward flowing rivers; negative influence of human occupance and deforestation (Sharma, 1979 and 1980), land use patterns (Gupta, 1973, Gupta and Prajapati, 1983), surface run-off mismanagement and ill-considered tillage (Kaul, 1962), the intensity and concentration of rainfall during the monsoon (Singh, et al, 1982), erodibility of the deep alluvial soils (Mehta, et al, 1958, Verma and Patel, 1969, Narain, et al, 1979), scientific explanatory model of Singh and Agnihotri based on continuous field observation and laboratory analysis (1987), etc.

Field evidences and studies made so far in this reference reveal the fact that being comprised of 'non-regular, non-random systems' and being arised from the 'multicomplexity of process and inheritance' (Ruxton, 1968), the system of landform development whether it is ravine or gully or any other feature cannot be analysed and explained with a single theory or model. The complexity of the litho, topo, climo, pedo and floro-functions in the development of landforms initiates the investigator to avoid imposing a rigid conceptual framework upon landform studies and thus, leaves no alternate but to adopt composite theory which envisages detailed objective description of landform through field observation and morphometric details, their classification into genetic/non-genetic categories and their explanation highlighting their development whether they may be the outcome of the balance between continuing uplift and erosion as a case of open system, steady state model of landform development or they may be the product of the interactions between diastrophic activity and climate or they may be due to parallel retreat etc. (Singh, 1985, p. 49). Denevon (1967) had also pointed out the fact with reference to ravination that 'probably neither one factor alone nor another but rather the combination of certain factors and climatic

events and overgrazing by man's livestock brought the land under severe gullying.

CONCLUDING REMARKS

Keeping in view the Sharma's observation (1980) that 'a combination of the two or more theories would make the action doubly effective' the researcher should have no bais of a particular theory in explanation of the gullied and ravined landforms as the geomorphology of ravines is directly affected by ecological factors (lithology, geologic history, climatic conditions, soil characteristics, soil erodibility, vegetal cover and character of streams), geomorphic factors (surface slope, surface length, and surface roughness) , land use and land ownership patterns & practices etc. In fact, the nature of ravine geomorphology is concerned with a multilayer situation involving bedrock, sedentary regolith, transported mantles, horizon differentiation within soil and weathering profiles, character of streams, rainfall, slope and upliftment etc. In this reference author is of the opinion that a researcher in this field should try to enjoy the academic fun of trying out a variety of ideas to discuss the genesis of gullies and ravines but with the quantitative flavour because of the thought that meaningful quantification may produce fruitful and useful results and may strengthen the mixed approach.

In fact, statistics and computer induced results have no doubt enhanced the interpretative and explanatory spectrum of landscape sciences and have tried to fill up the conceptual vacuum created by decline in popularity of associated theories and models. In such studies of ravine geomorphology, both descriptive and analytical statistical techniques should be used to analyse the nature and genesis of gullies and ravines at different locations and magnitudes wherein through descriptive techniques, data collection, table and graph construction together with frequency distribution should be made available for the analysis and through analytical techniques correlation, regression and tests of significance should be taken out for the purpose to strengthen the interpretation.

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Agricultural Modernization and Rural Development: A Case Study of Gumla District, Jharkhand

Nitin Kumar Mishra and Dilip Prasad

ABSTRACT

In the present paper an attempt has been made to examine the impact of agricultural modernization on rural development in Gumla district, Jharkhand. The present study is based on secondary sources of data obtained from District Census Handbook of Gumla (2011), District Statistical Report (2017), Soil Conservation Report of Gumla (2018-19) and personal visit of District Agriculture Office. Block has been taken as a unit of study. The level of agricultural modernization is determined with the help of twelve indicators while fifteen 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 (Arc GIS 10.2 version) through standard deviation formula of high, medium and low. The study reveals that there are integrated as well as reverse relationship between agricultural modernization and rural development in the district.

Keywords: *Agricultural Modernization, Rural development, Modern technology, z-score technique, Standard deviation.*

Introduction

Agriculture plays an important role in any economy. It is directly and indirectly connected with the economic activity, growth, and development of other sectors in an economy and on the whole welfare and development of an economy. Agriculture is one of the production, both food for the rural and the urban population and of cash crops for the export market, to earn foreign currency. In this procedure, demand is stimulated for other products and services, and employment opportunities emerge to absorb the society's work-force. As the cycle develops, increasing agricultural production causes a growing demand for inputs, which ensure the resources essential to maintaining agricultural production (Reddy Jagdish, 2019).Modernisation of agriculture is a process of transforming agriculture from traditional labour-based agriculture to technology-based agriculture (Wu, Z.-I., 2011).

It is one of the fundamental issues in agricultural policies, particularly in countries, where agriculture is less developed. We can see that in many countries agriculture is a sector of economy which keeps a greater distance than the remaining sectors from modern solutions in the areas of: production technology and organisation, implementation of modern technological and IT solutions as well as management methods, but also with regard to the utilisation of the institutional setting. The speed and the scope of the creation and implementation of modernisation of farms ensure their permanent competitive edge. We can also see that low-income countries are burdened with primitive technologies, which is both a reason for, and a consequence of low incomes (Barrett, C.B., Carter, M.R., Timmer, C.P., 2010).

Modernization of Indian agriculture through new technology of production is based on the use of

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fertilizers, high yielding varieties of seeds, pesticides, improve irrigation and other agronomic practices (Kanwar, 1970). Utpal Baruah (1979) only study emphasized that the role of technological factor is more than of environmental factors in determining the agriculture growth. Patil and Patil (2007) considered agriculture 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 agriculture organisation on sustainable livelihood among the tribal and non-tribal farmers and concluded that agricultural modernization is positively but none 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 infra-structure, the acreage structure of land holding and institutional factors but variation in output growth is due to lack of various inputs of technology.

Ramesh and Raju (2009) analyse the changing instability in agriculture production during first phase of green revolution (1968-88) of improved technology and latest phase of green revolution (1989-2007) of adaptation 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 letter fridge witnesses a declining trend of instability. It also reveals that the state of Punjab followed by Haryana, Uttar Pradesh and West Bengal are highly stable while Maharashtra followed by Tamil Nadu, Orissa, Madhya Pradesh, Rajasthan and Gujarat are highly unstable in food grain production. Thus, agricultural modernisation increased food supply of 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 obtained 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) mention that agricultural growth is essential to ensure national food security,alleviate poverty and reduce rural urban disparities. About 70 per cent India's population lives in rural areas and 69 per cent 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 lower 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's third largest food insecure country mainly because of rapid population growth and lack of mechanization (only 40 per cent) 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 agriculture inputs (Naim and Umer, 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, planner, industrialists as well as educationists to set-up different project, institutions, and industries and so on. Hence, agricultural modernization and rural development are the two sides of a coin.

The Study Area

The district of Gumla was carved out of old Ranchi district by the Govt. of Bihar Notification No.7/T-1-204/83 dk0 156 जि0पु0 dated 16.5.1983. It acquired 5,347.25 sq. km. area from its parent district

of Ranchi. It is one of the 5 districts of South Chhotanagpur division while other four districts are Lohardaga, Ranchi, Khunti and Simdega. The district lies between 22°35' to 23°33' north latitude and 84°40' to 85°1' east longitude.Gumla district Contains 1 sub-divisions (Gumla Sadar), 12 Community Development Blocks as well as 3 towns (Gumla, Ghaghra and Toto). Gumla is the principal town of the district. It is headquarter of the district and Gumla Sadar sub-division. Community Development Blocks (12) of Gumla sadar Sub-division, viz., Bishunpur, Ghaghra, Chainpur, Dumri, Raidih, Gumla, Sisai, Verno, Kamdara, Basia, Palkot and Albert Ekka (Jari). It is predominantly a tribal district. It is bounded on the north by the districts of Latehar&Lohardaga, on the east by the districts of Ranchi and Khunti, on the South by the district of Simdega and on the west by the State of Chhattisgarh. The most popular one ascribes to its word 'Gumla' in Mundari language, which relates to the occupation of the local Tribes in rice processing work (dhan-kutna). The second legend 'Gau-mela' relates to cattle fair. Cattle fair was weekly held in Gumla town every Tuesday. In rural areas, Nagpuri and Sadri people still call it 'gomila'.In the study area South Koel and Sankh rivers flows. The soil of the study area is laterite or upland grey-yellow. The chief products of the district are course varieties of rice, millets, pulses and oil seeds. Most of the area are forested or hilly unfit for agricultural produce. People of the study area are enjoy mainly traditional form of irrigational facilities; cultivation is the main pursuit.

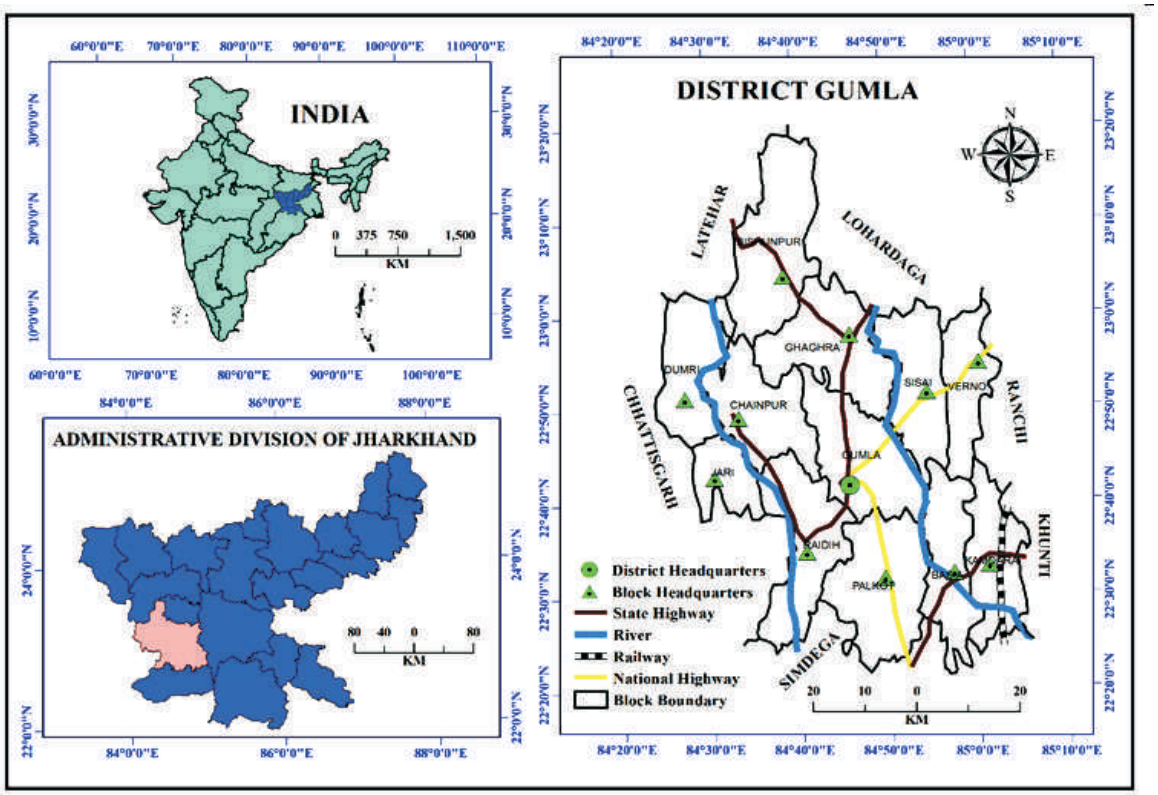

Fig. 01

Objectives

The following are the main objectives of the study:

- to analyse the level of agricultural modernization based on selected indicators of the district,
- to examine the levels of rural development of the region,
- to establish the relationship between agricultural modernization and rural development in the study area.

Database and Methodology

The present study is entirely based on secondary sources of data obtained from District Census Handbook of Gumla (2011), District Statistical Hand Book (2011), Soil Conservation Report of Gumla (2018-19) and personal visit of District Agriculture Office. Block has been taken as a unit of study. Twelve indicators for agricultural modernization and fifteen indicators of 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 (ArcGIS 10.2 version) 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

$\bar{X}$ = Mean value of variable I in all blocks

δ = Standard deviation of variable i in all blocks

Composite score has been calculated through following formula:

$$C.S = \frac{Zij}{N}$$

Where, C. S = Composite Score

Zij = Z-score of all variables i in blocks j

N = Number of variables

Table 01 : List of Selected Indicators of Agricultural Modernization.

Indicators	Description
Y1	Number of Pesticide Sale Centre per 10,000 of Human Population
Y2	Percentage of Gardening Area to the Net Sown Area
Y3	Number of Fertilizers Sale Centre per 10,000 of Human Population
Y4	Number of Ponds per 1000 of Net Sown Area
Y5	Number of Deep Boring per 1000 of Net Sown Area
Y6	Number of Check Dam per 1000 of Net Sown Area
Y7	Percentage of Net Irrigated Area to the Net Sown Area
Y8	Number of Tractors per 1000 of Net Sown Area
Y9	Percentage of Village having Agricultural Credit Societies to the total village
Y10	Number of Livestock per 1000 of Human Population
Y11	Number of Pumping Set per 1000 of Net Sown Area
Y12	Number of Seed Sale Centre per 10,000 of Human Population

Source: District StatisticalHandbook of Gumla District, 2011

Table 02 : List of Selected Indicators of Rural Development.

Indicators	Description
X1	Literacy Rate
X2	Number of Primary School per 10,000 population
X3	Number of Middle School per 10,000 population
X4	Number of Secondary School per 10,000 population
X5	Number of Primary Health Centre per 10,000 population
X6	Number of Primary Health Sub Centre per 10,000 population
X7	Number of Maternity and Child Welfare Centre per 10,000 population
X8	Number of Family Welfare Centre per 10,000 population
X9	Percentage of Drinking Water Facilities (Tube wells / Bore well) in Villages to the total Village
X10	Number of Post Office& Sub-Post office per 10,000 population
X11	Percentage of Villages having Bus service to the total village
X12	Number of Commercial & Co-operative Banks per 10,000 population
X13	Percentage of Villages having Self-Help Group (SHG) to the total village
X14	Percentage of Village having Public distribution system (PDS) shop to the total village
X15	Percentage of Villages having Power Supply for All Uses to the total village

Source: District Census Handbook of Gumla District, 2011

Result 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 indicators have been classified into three categories, viz. high, medium and low to show the levels of agricultural modernization for the year 2011 (table 03).

About 16.67 per cent area of the district has been reported high level of agricultural modernization. There are two blocks namely Verno (0.83) and Palkot (0.76) where agriculture is highly modernized because of highest net irrigated area, use of modern farm inputs, high yielding varieties of seed, consumption of fertilizers, local governmental support like rural market, seed sale centre, pesticide sale centre and livestock farming.

There are eight blocks which fall under moderate levels of agricultural modernization namely Sisai (0.48), Gumla (0.40),Basia (0.35),Ghaghra (0.17), Raidih (-0.06), Chainpur (-0.32), Bishunpur (-0.33) and Kamdara (-0.35) covering about 66.66 per cent area of the district. It is found that modern farm inputs, productivity, number of tractor, seed sale

Table 03 : Levels of Agricultural Modernizationin Gumla District, 2011

Category	Composite Score	No. of Blocks	Percentage of the total Blocks	Cumulative Percentage	Name of the Block
High	Above 0.59	2	16.67	16.67	Verno , Palkot
Medium	0.59 to - 0.59	8	66.66	83.33	Sisai, Gumla,Basia,Ghaghra, Raidih, Chainpur, Bishunpur,Kamdara
Low	Below - 0.59	2	16.67	100.00	Albert Ekka (Jari), Dumri

Source: Computed by Author

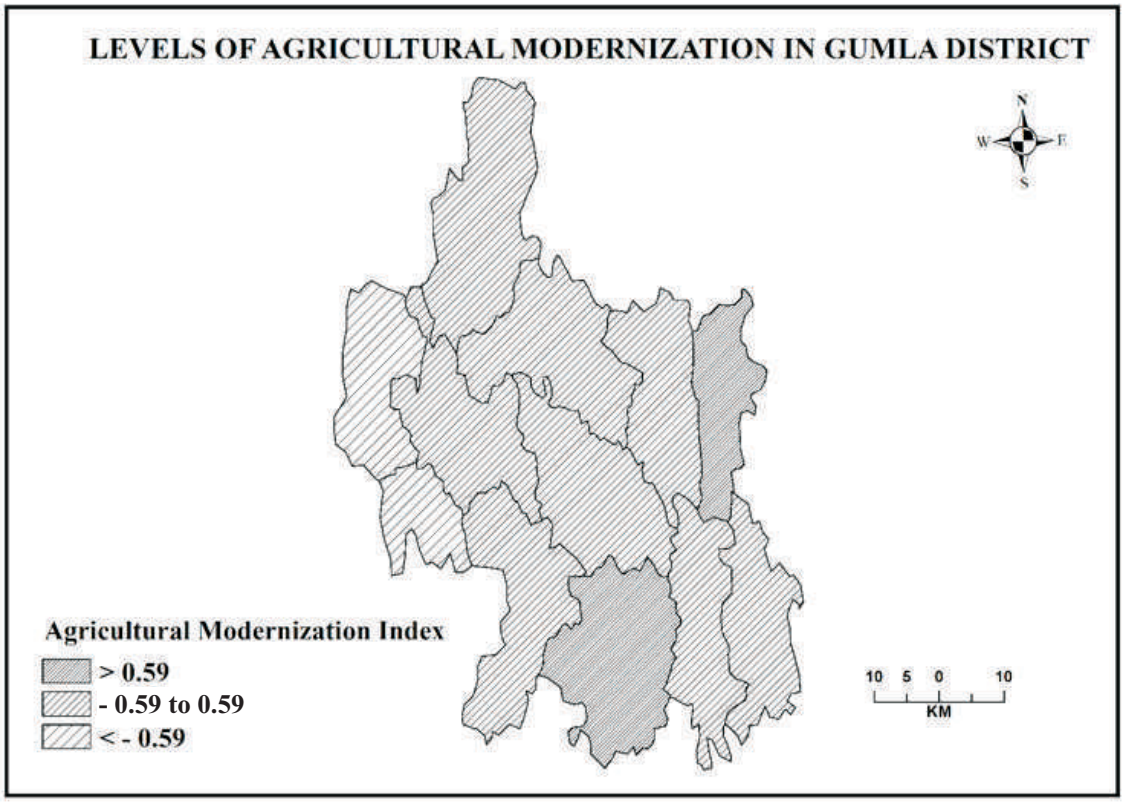

Fig. 02

centre, pesticide sale centre and rural market facility are quite good in these blocks while the use of HYV seed, consumption of fertilizer, livestock farming and area under irrigation are very low.

About 16.67 per cent area of the district comes under low level of agricultural modernization (fig. 03). There are two blocks such as Dumri (-0.73) and Jari (-1.23) where agricultural modernization is least. The reason for such condition can be attributed to many factors like 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 25 per cent of the district comes under high level of rural development (table 04). There are three blocks namely Basia (0.50), Dumri (0.41) and Chainpur (0.37) that shows high levels of rural development. It is due to large number of primary school, health care, dispensary, post office, pucca road and drinking water facilities. Beside this primary school, secondary school, public distribution centre, transportation, electricity and high literacy rate are also attributed to the development of rural area in these blocks (fig. 03).

Table 04 : Levels of Rural Development in Gumla District, 2011

Category	Composite Score	No. of Blocks	Percentage of the total Blocks	Cumulative Percentage	Name of the Block
High	Above 0.30	3	25.00	25.00	Basia, Dumri, Chainpur
Medium	- 0.30 to 0.30	7	58.33	83.33	Raidih, Kamdara, Bishunpur, Palkot, Verno, Sisai, Gumla
Low	Below- 0.30	2	16.67	100.00	Albert Ekka (Jari), Ghaghra

Source: Computed by Author

There are seven blocks such as Raidih (0.26), Kamdara (0.01), Bishunpur (-0.02), Palkot (-0.11), Verno (-0.14), Sisai (-0.18) and Gumla (-0.24) that come under medium levels of rural development, covering about 58.33 per cent area of the district. It is observed that educational institutions, public distribution centre, bus stop, electricity and literacy rate are relatively good in these blocks, but there is a lack in number of health care, dispensary, transport and drinking water.

The remaining two blocks namely Jari (-0.38) and Ghaghra (-0.43) covering about 16.67 per cent of the district are reported with low levels of rural development. It is found that Jari block is in very pathetic condition in terms of rural development. This is due to the very poor condition in all determinants of rural development except primary and secondary school. Similarly, Ghaghra block has also very limited facility of health centre, dispensary, drinking water facility and power supply.

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 04. X-axis of the map represents rural development and Y-axis for agricultural modernization. Analytical result of the study shows that there are integrated relationship between agricultural modernization and rural development in one block namely Verno where high level of agricultural modernization lead to high

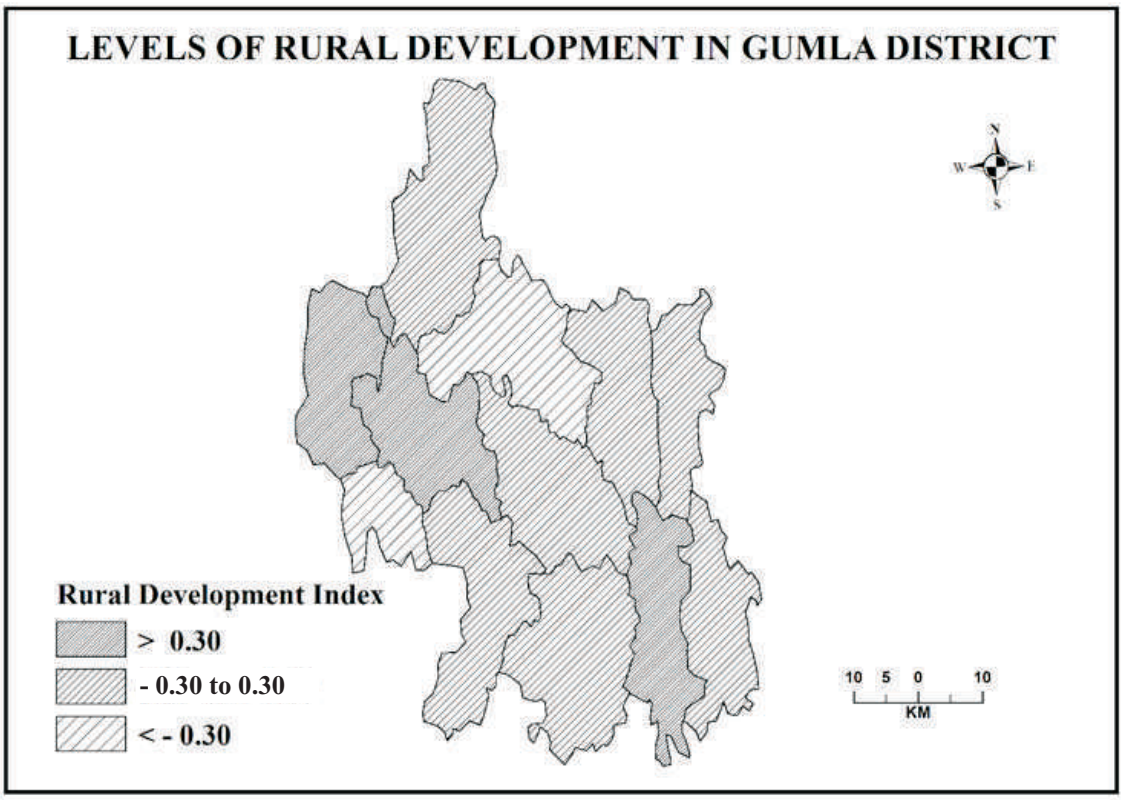

Fig. 03

level of rural development. Similarly, moderate level of agricultural modernization lead to moderate level of rural development has been observed in such as Gumla, Kamdara, Raidih and Sisai blocks. It is found that low level of agricultural modernization leads to low level of rural development in Albert Ekka (Jari) block.

The study is also witness of reverse relationship in Basia block where high agricultural modernization leads to low level of rural development. This is due to lack of educational institutions, health care facility, dispensary, public distribution system,transportation, power supply, drinking water facility. This can be also attributed due to lowest literacy and 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 Ghaghra block due to availability of primary school, secondary school, health care centre, dispensary, post office, power supply and drinking water facility. This is also due to the development of animal husbandry and skill development of villagers by Self-Help Group (SHG).

Conclusion

From the overall analysis it is clear that the Gumla district seize a moderate position in terms of agricultural modernization as well as rural development in the state of Jharkhand, but there is inter-block variation in both the circumstances. Out of twelve blocks two blocks are well developed, eight blocks are moderately developed and remaining two blocks are least developed in terms of agricultural

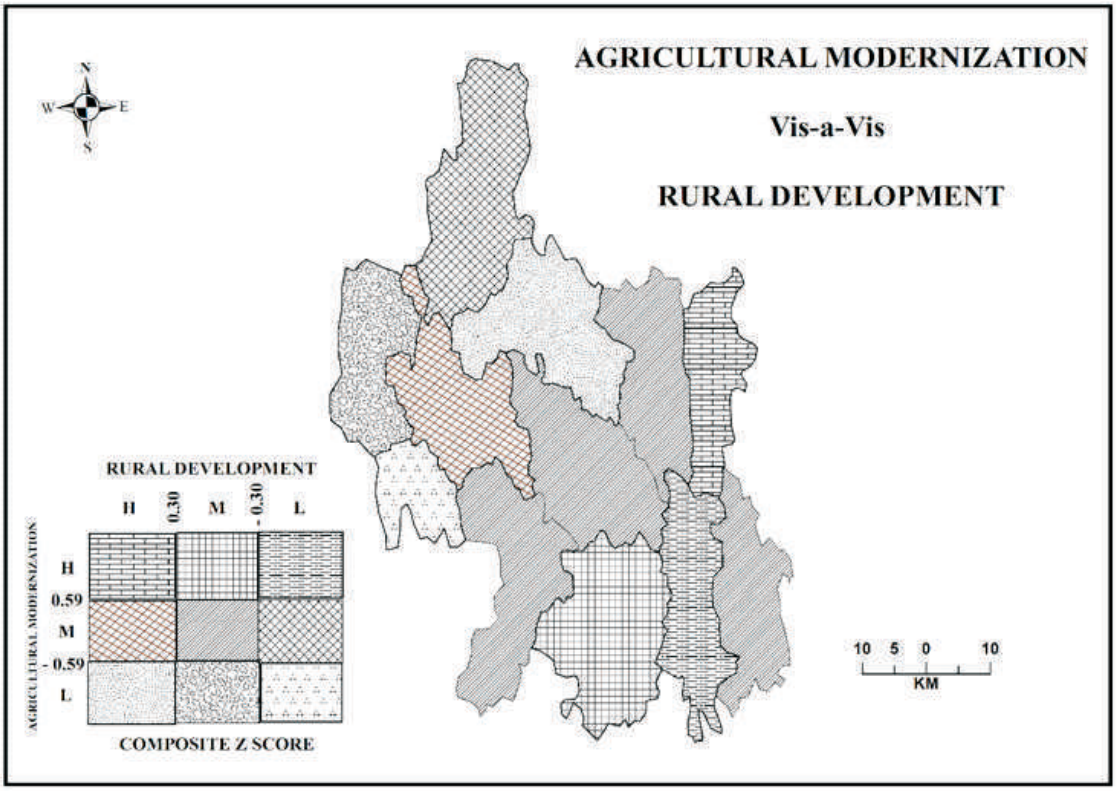

Fig. 04

modernization as well as rural development. Agricultural Modernization vis-à-vis Rural Development indicates that high level of agricultural modernization leads to high level of rural development except Albert Ekka (Jari) block mainly due to lack of educational institutions and low rate of literacy. This 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 level of rural development can be attributed to animal husbandry and skill development of villagers by Self-Help Group (SHG).

Suggestions

- Adoption of modern farm technology like iron plough, advance harrow and cultivator, tractor, pumping set and fertilizers, etc. could be increased for practice of multi-cropping on limited land.
- Providing proper irrigation at schedule time according to the need and demand of crop, so that it could maintain soil fertility and increased yield of crops.
- 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 shop must be increased by the local government especially in the backward blocks.
- Ensuring smooth trade and storage facility for agricultural commodities, so that farmers could

not bother about their produces and price.

- Make sure about the availability of educational institutions, health care centre, dispensary, transportation, electricity, pucca road and portable drinking water for the rural people.
- Ensuring greater coordination and collaboration among the farmers, local governmental agencies, agricultural universities and research institutes and industries.
- 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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Spatial Analysis of Cropping Pattern in Dindori District of Madhya Pradesh, India

Sachin Kumar Maravi and Janki Prasad

ABSTRACT

The paper is an attempt to analyse the cropping pattern in the Dindori district of Madhya Pradesh that lies in the undulating terrain of the Mekal range in central India and is pre-dominated by tribal people. Agriculture is the main source of livelihood among the people of the district. The farmers of the study are a produce food grains for self-consumption rather than selling purposes therefore it reflects the subsistence level of agricultural production. Hence, the selection of crops and areas under different crops depends upon the choice of people and the environmental conditions. At present, the practice of cultivation is changing with the introduction of new means of cultivation. Thus, the study has analysed spatially the cropping pattern and its changes in the district based on collected data for the years 2003-04 and 2019-20.The proportion of cropped area under cereals and oilseed has decreased but it has increased under pulses during sixteen years. The area under single crops like paddy and wheat is also increased but the area under other crops reduced during the same period that shows the trend towards the specialisation of crops. This study will be beneficial in the formulation of agricultural policies and planning in the study area.

Keywords: *Agriculture, Cropping pattern, Spatial analysis, and Tribes.*

Introduction

Agriculture and allied activities are the main occupations in rural areas that play a key role in the rural economy. The concept of cropping pattern refers to the distribution of different crops inland in a particular period. It also provides information about the regional characteristics of the agriculture system. Agriculture is affected by the fertility of soil, land configuration, rainfall, production practices, and the economic status of the farmers, and the cropping pattern is also determined by the natural and cultural characteristics of the region. Andrabi (2018, p.183) has defined a cropping pattern as "the cropping pattern is the percentage share of an area under different crops in a particular region during a particular agricultural year". "Cropping pattern implies the proportion of area under different crops at a point of time. A change in cropping pattern thus implies a change in the proportion of area under different crops" (Ghosh, 2011, p.110).

Review of Relevant Literature

Panigrahy, et al (2004) have analysed cropping pattern changes in Bathinda District, Punjab. They found that cropping intensity increased significantly due to an increase in paddy area while crop diversity decreases due to a decline in the area of minor crops such as pearle millet, gram, and rapeseed/mustard. Ghosh, (2011) has analysed the determinants of the changes in cropping patterns in India from 1970-71 to 2006-07. He has pointed out that institutional and technological changes turned India into a progressive food grain-producing country and also marked that few non-food grain crops such as cotton, sugarcane, oilseed, and vegetables have emerged as popular crops among the farmers in recent years. Seitinthang, (2013) has studied the cropping

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pattern changes in Manipur and found the state has experienced little change in cropping pattern between 2000-01 to 2010-11. The districts of Imphal valley using modern agriculture technologies for extending high yield with one-time farming in a year while districts of hilly areas still practice traditional cultivation system. Andrabi, (2018) has studied the spatial-temporal analysis of cropping pattern and cropping intensity in agriculture of Jammu and Kashmir and found that the cropping pattern is much diverse with a high level of cropping intensity in the state. He also pointed out that wheat is the second important cultivated crop after maize with increasing trends of the cropped area. Khan & Ahmad, (2019) have studied the changing cropping pattern in Kheri District, Uttar Pradesh. The study revealed that the district has a net loss in the cropped area during 2015 and 2019. They observed the crop area under cereals declined while it increased under sugarcane. Market and flash floods are the main factors to affect the acreage of the crops. The study area belongs to the tribal and rural population in Madhya Pradesh and there is no such kind of study found in the Dindori district therefore the review of literature gives insights to do study as to analyse the cropping pattern in the district.

The Study Area

The Dindori district lies in the eastern Madhya Pradesh which is characterised by undulating terrain of hills and plateau. The area is thickly populated by tribal populations. They practice cultivation using traditional methods and techniques. According to Census 2011, the district has a 7,04,524 population and 95.42% population is rural. The 64.69% population of the district belongs to scheduled tribes and the sex ratio of the district is 1002 females per thousand males. The 87.47% population were engaged in agriculture as cultivators and agricultural labourers. Hence, agriculture is the largest source of livelihood for the population in the district.

The Dindori district lies between latitudes 22º27'N to 23º23' N, and 80º30' E to 81º44' E longitudes" (DCH, 2011, p. 3). The district consists of seven community development blocks namely Dindori, Shahpura, Mehandwani, Amarpur, Bajag, Karanjiya, and Samnapur. The 4.95% area of the district is covered with Sal-dominated forest and its 70% area comes under four blocks Karanjiya, Bajag, Samnapur, and Amarpur which affect the agriculture system of the associated areas.

Objectives

- To study the cropping pattern at block and district levels
- To analyse the change in the cropping pattern of the area

Data and Methodology

The study is primarily based on secondary sources of data which is collected from the district statistical department and land record office of Dindori district for the two points of time, i.e., 2003-04 and 2019-20. The proportion of cropped area and its changes are calculated from absolute data. The block-wise distribution maps of cropping patterns for two different agriculture years are prepared on Arc GIS 10.3 software.

Results and Discussion

The distribution of crops in the Dindori districts depicted in table 01, & fig. 01 while changes in the percentage area under different crops are shown in fig. 02. The block-wise distribution of crops is shown in table 02 & 03 and fig. 03 & 04. The block-wise change in cropping pattern is shown in table 04. Paddy, Wheat, Maize, and lentil are prominent crops in the district which cover more than 50% of the cropped area. The study revealed that cropped area under cereals and oilseed has decreased between the periods 2003-04 and 2019-20 but the cropped area under pulses has increased considerably during the same period.

Cropping Pattern

The cropped area and its percentage under different crops in the year 2003-04 and 2019-20 are shown in table 01. In the year 2003-04, the district had 2,71,108 hectares total cropped area and it was distributed as 65.52% under cereals,14.26% under

pulses, and 20.22% under oilseeds. There were 3,13,970 hectares total cropped area in the district during 2019-20 and it was distributed under different crops as 63.44%(cereals), 24.88%(pulses), and 11.68% (oilseeds). The data revealed that the food grains consist of large cropped areas.

Table 01 : Dindori District (M.P.): Area Under Different Crops and Its Change Between 2003-04 and 2019-20

Crops	2003-04		2019-20		Change between 2003-04 & 2019-20	
	Area (ha.)	%	Area (ha.)	%	Area (ha.)	%
Paddy	77,340	28.53	1,12,478	35.82	35138	45.43
Wheat	34,492	12.72	44,626	14.21	10134	29.38
Maize	18,340	6.76	19,477	6.20	1137	6.20
Jowar	88	0.03	9	0.00	-79	-89.77
Other Cereals	47,357	17.47	22,606	7.20	-24751	-52.26
Total Cereals	**1,77,617**	**65.52**	**1,99,196**	**63.44**	**21579**	**12.15**
Gram	6,334	2.34	13,362	4.26	7028	110.96
Pigeon peas	3,128	1.15	4,246	1.35	1118	35.74
Black gram	2,795	1.03	2,729	0.87	-66	-2.36
Lentil	NA	-	39,672	12.64	-	-
Other Pulses	26,410	9.74	16,610	5.29	-9800	-37.11
Total Pulses	**38,667**	**14.26**	**78,111**	**24.88**	**39444**	**102.01**
Total food grains	**2,16,284**	**79.78**	**2,77,307**	**88.32**	**61023**	**28.21**
Soyabean	3,844	1.42	7,778	2.48	3934	102.34
Sesame	250	0.09	137	0.04	-113	-45.20
Ground Nut	26	0.01	15	0.00	-11	-42.31
Other Oilseeds	50,704	18.70	9,942	3.17	-40762	-80.39
Total Oilseeds	**54,824**	**20.22**	**36,663**	**11.68**	**-18161**	**-33.13**
Total Cropped Area	**2,71,108**	**100.00**	**3,13,970**	**100.00**	**42862**	**15.81**

Source: District Statistical Book and Land Record office, Dindori district (M.P.), 2003-04 and 2019-20

Changes in Cropping Pattern

"Cropping pattern analysis is essential to study the change in the area under different crops from year to year. Change is found due to climatic condition, rainfall, irrigation facilities and market to the crop production" (Mulani, et. al, 2020, p.111). Table 01shows that the 42, 862 ha. (15.81%) the cropped area has increased in the district between 2003-04 and 2019-20. This growth of the cropped area is associated with utilising land under crops whatever land fell under grazing lands, fallow land, forest area, etc.The data revealed that the land under forest is reduced -0.76%,

followed by fallow land-2.37% and permanent pastures and other grazing lands -0.17% during the same period(District Statistical Books, 2003-04 & Land Record, Dindori 2019-20). The pattern of utilization of land is changed the due course of time and this change affected the cropping pattern also.

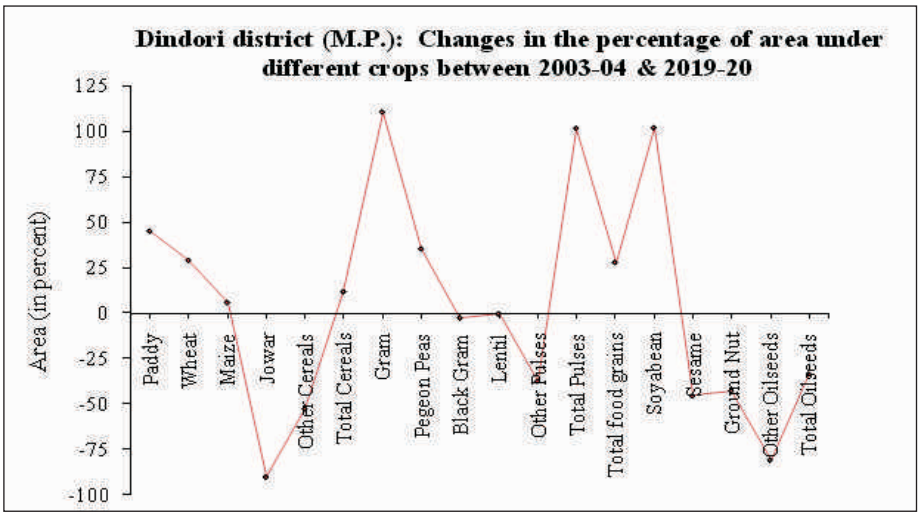

Fig. 01

Source: District Statistical Book and Land Record, Dindori district (M.P.), 2003-04 & 2019-20

"A number of factors are responsible for specific cropping pattern of a region, therefore, cropping pattern is prone to change every year with the variability of various factors affecting the crops" (Khan & Ahmad, 2019, p. 804). "In olden days population was less and necessities were limited. With the huge increase in the human population, their requirements increased and became complex. As a result of the increasing pressure of population, changes are occurring in the land-use and cropping pattern" (Mouzam, et al. 2015)

The total cropped area under cereals especially paddy and wheat crops has increased largely during the period of sixteen years from 2003-04 to 2019-20 and it has grown 45.43% under paddy crops and 29.38% under wheat crop but the proportion to the total cropped area under these two crops changed slightly such as 12.72 % (34,492 ha.) to 14.21% (44,626 ha.) to total cropped area under wheat whereas, it has grown from 77,340 ha. (28.53%) to 1,12,478 ha. (35.82%) under paddy during the given period. The use of traditional cereals (kodon/kutki) is reduced considerably during recent years and rice and wheat became the main source of food among the people in the area that is why farmers are much interested to grow such crops.

The cropped area under maize and jowar has decreased during this given period of sixteen years (2003-04 to 2019-20) which is caused by less consumption and low production. The reduction of its consumption and relatively low market price are the main cause of less production of maize and jowar in the area. The cropped area under pulses (gram, pigeon peas, and lentils) has increased by 39,444ha. i.e.,102% during the same period because of the high market price. The proportion of cropped area under pulses is grown10.62% from 14.26% to 24.88%.There is negative growth marked in the cropped area under oilseeds during 2003-04 to 2019-20 as the area reduced 18,161ha.i.e., -33.13% because farmers use to grow it for self-consumption and the low yield as the lack of irrigation facilities in the district. The proportional change in the cropped area under oilseeds is 20.22% (2003-04) to 11.68%(2019-

20). This change is related to the farmer's focus more on food grains and pulses rather than oilseeds.

Cropping Pattern (2003-04)

Table 02 shows that the block-wise area under different crops in 2003-04. This data clearly shows that the Dindori block has the highest cropped area, i.e., 58,016 ha. and the Amarpur block has the lowest cropped area, i.e., 27,744 ha. The paddy, wheat, maize, and gram were major crops in the district during that period. More than 30% cropped area of Samnapur, Karanjiya, Bajag, and Amarpur blocks come under paddy crop. This shows that the paddy is a prominent food grain crop in the district. Wheat is the second largest food grain in the area and an average of 15% cropped area falls under wheat crop. The Bajag block has its highest cropped area under wheat cultivation, i.e., 16.33% followed by Shahpura (16.05%), Dindori (14.45%), Amarpur (13.18%), Samnapur (12.20%) and Karanjiya block have 8.05% area while cultivators of Mehandwani block least preferred and only 5.83% area is under wheat cultivation as they grow paddy, kodon/kutaki and maize for food crops. Mehandwani block has the highest cropped area under maize crop, i.e., 9.83% cropped area, while Karanjiya block covers the lowest cropped area (3.53%) under the maize and remaining blocks Amarpur, Bajag, Dindori, Shahpura, and Samnapur covered more than 5 per cent area under this crop.

Under the pulses, the highest cropped area is depicted in the Karanjiya block which is 30.09% whereas the lowest area lies in the Mehandwani block (7.27%). The remaining blocks Bajag (19.40%), Samnapur (13.92%), Dindori (11.07%), Shahpura (9.89%) and Amarpurhave 9.31% cropped area under the pulses. The cropped area of oilseed is greater than pulses in all blocks during 2003-04. The Mehandwani block has the highest area under oilseeds that covered 25.59% area followed by Shahpura (23.25%), Dindori (22.44%), Amarpur (20.43%), Karanjiya (16.20%) and Samnapur have (16.20%) and Bajag (14.49%) area under the oilseeds. During this period the cropped area of other crops was much higher as the farmers concentrated on the cultivating of many crops at the same time for fulfillment of their own needs.

Cropping Pattern (2019-20)

Paddy remained the most important crop in all the blocks in the district during 2019-20. More than 30% total cropped area was under paddy cultivation in almost all the blocks except Karanjiya. The highest area under paddy cultivation was recorded in the Samnapur block that was 43.29% of the total cropped area followed by Amarpur (41.57%), Bajag (39.30%), Mehandwani (35.01%), Dindori (34.08%), Shahpura (32.34%)and Karanjiya (29.90%)during 2019-20.Wheat is the second important crop among the cereals. The highest area under wheat cultivation was recorded in Shahpura block, i.e., 20.39% to the total cropped area, and the Karanjiya block is the lowest in terms of wheat crop area, i.e., 5.68% are a during 2019-20. The remaining blocks are in descending order as per the total cropped area under wheat crop areas Dindori (16.70%), Bajag (16.03%), Samnapur (13.29%), Amarpur (13.28%), and Mehandwani (10.84%). The area under the maize crop was lower than the paddy, wheat, and other cereals in all blocks. Mehandwani block has the cover highest area under the maize that was 10.28% area while Karanjiyais the lowest with the 2.83% total cropped area. The proportions under maize crop in rest blocks are as Dindori (7.94%), Shahpura (7.89%) Amarpur (6.29%), Samnapur (3.98%), and Bajag (3.68%).

The one-fourth cropped area of the district lies under pulse crops especially lentil, gram, black and green gram, peas, etc. during 2019-20. The 40.95% cropped area was under pulses in Karanjiya block which is the highest and followed by Bajag (28.61%), Samnapur (25.97%), Amarpur (24.77), Dindori (19.06%), Shahpura (18.42%), and Mehandwani (18.31%).

The lentil is the main pulse in the district which was grown on 12.64% cropped area during 2019-20. The Karanjiya block shows the highest area under lentil, i.e., 24.07% while Shahpura is the lowest with 4.58% cropped area. The area under the lentil crop of remaining blocks is 18.52% (Bajag), 13.51% (Amarpur), 9.74% (Dindori) and 7.36% (Mehandwani). Gram is the second most important pulse crop in the area followed by pigeon peas, black grams, peas, and green grams.

Table 02 : Dindori District (M.P.): Block Wise Cropped Area and Its Percentage Under Different Crops, 2003-04

Crops	CD Block wise percentage and cropped area under different crops, 2003-04													
	Amarpur		Bajag		Dindori		Karanjiya		Mehandwani		Samnapur		Shahpura	
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Paddy	8,798	31.71	10,700	33.46	15,335	26.43	13,122	33.66	6,081	19.97	12,705	42.18	10,599	19.70
Wheat	3,658	13.18	5,223	16.33	8,385	14.45	3,139	8.05	1,777	5.83	3,674	12.20	8,636	16.05
Maize	1,977	7.13	1,656	5.18	4,331	7.47	1,377	3.53	2,995	9.83	1,700	5.64	4,304	8.00
Other Cereals	5,048	18.19	3,563	11.14	10,506	18.11	3,298	8.46	9,597	31.51	2,955	9.81	12,390	23.03
Total Cereals	**19,492**	**70.26**	**21,143**	**66.12**	**38,572**	**66.49**	**20,937**	**53.70**	**20450**	**67.14**	**21,050**	**69.88**	**35,973**	**66.86**
Gram	371	1.34	1,013	3.17	1161	2.00	1,522	3.90	252	0.83	561	1.86	1,454	2.70
Pigeon peas	209	0.75	356	1.11	812	1.40	199	0.51	237	0.78	302	1.00	1,013	1.88
Black gram	267	0.96	344	1.08	426	0.73	375	0.96	390	1.28	219	0.73	774	1.44
Lentil		NA		NA		NA		NA		NA		NA		NA
Other Pulses	1,737	6.26	4490	14.04	4,024	6.94	9,636	24.72	1334	4.38	3,110	10.32	2,079	3.86
Total Pulses	**2,584**	**9.31**	**6,203**	**19.40**	**6,423**	**11.07**	**11,732**	**30.09**	**2213**	**7.27**	**4,192**	**13.92**	**5,320**	**9.89**
Soyabean	2	0.01	35	0.11	108	0.19	3604	9.24	2	0.01	77	0.26	16	0.03
Sesame	29	0.10	9	0.03	40	0.07	1	0.00	50	0.16	8	0.03	113	0.21
Rapeseed/Mustard	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other Oilseeds	5,636	20.31	4,589	14.35	12,863	22.17	2,707	6.94	7,743	25.42	4,796	15.92	12,370	22.99
Total Oilseeds	**5,668**	**20.43**	**4,633**	**14.49**	**13,021**	**22.44**	**6,317**	**16.20**	**7,795**	**25.59**	**4,881**	**16.20**	**12,509**	**23.25**
Total Cropped Area (in hectare)	**27,744**		**31,979**		**58,016**		**38,986**		**30,458**		**30,123**		**53,802**	

Source: District Statistical Book, Dindori district(M.P.), 2003-04

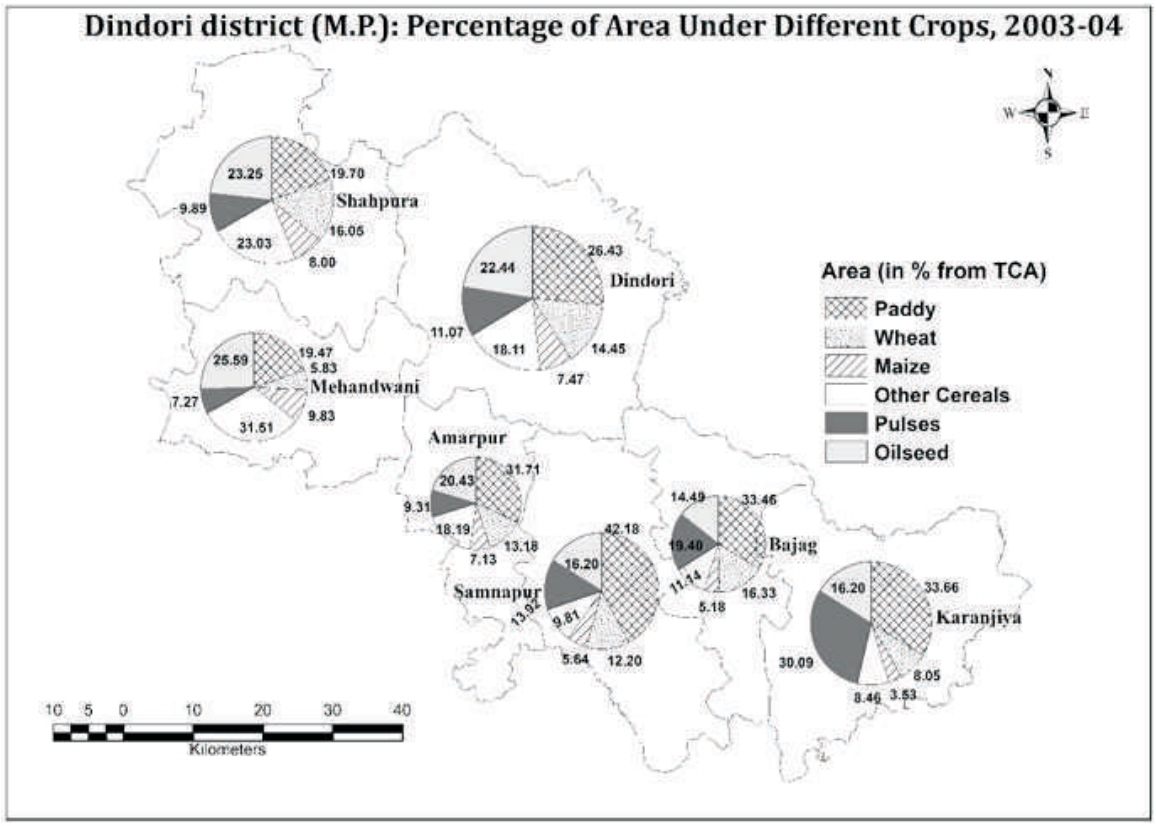

Fig. 02

Source: District Statistical Book, Dindori district (M.P.), 2003-04

The data shows the lowest proportion of cropped area comes under oilseeds, i.e., 11.68% during 2019-20. The major oilseed crop is rapeseed/mustard and it followed by soyabean, lignans, groundnut, sesame, ramtila (niger seed),etc. The highest proportion of cropped area under rapeseed/mustard is found in the Dindori block which is 6.77% whereas, the Karanjiya block has the lowest proportion under this crop, i.e., 1.92%. The remaining blocks are Amarpur (6.25%), Bajag (3.35%), Mehandwani (6.67%), Samnapur (3.65%), and Shahpura (4.78%) under this crop. Soyabean is an important crop under oilseed which is generally grown as a cash crop. The highest area under this crop is visible in the Karanjiya block (13.02%) and the lowest area is visible in the Mehandwani block which covers only 1 hectare under this crop. The lignans are grown on a 2.51% cropped area of the Samnapur block. Sunflower and Niger seed are other oilseed crops in the area.

Cropping Pattern Change Between Two Points of Time (2003-04 and 2019-20)

Table 04 illustrated the block-wise changes in crop area under different crops in between two agriculture years, i.e., 2003-04 and 2019-20. The data revealed that the area under individual crops is increased considerably but the area under other crops reduced during sixteen years. Each block experiences growth in the total cropped area during

Table 03 : Dindori District (M.P.): Block Wise Cropped Area and Its Percentage Under Different Crops, 2019-20

Crops	CD Block wise percentage and cropped area under different crops, 2019-20													
	Amarpur		Bajag		Dindori		Karanjiya		Mehandwani		Samnapur		Shahpura	
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Paddy	13,810	41.57	17,643	39.30	20,408	34.08	1,4031	29.90	12,605	35.01	1,5379	43.29	18602	32.34
Wheat	4,412	13.28	7,198	16.03	9,999	16.70	2,667	5.68	3,902	10.84	4,721	13.29	11,727	20.39
Maize	2,090	6.29	1,650	3.68	4,755	7.94	1,327	2.83	3,702	10.28	1,413	3.98	4,540	7.89
Other Cereals	1,550	4.67	1,455	3.24	4,960	8.28	1,806	3.85	4,453	12.37	1,848	5.20	6,534	11.36
Total Cereals	**21,862**	**65.80**	**27,946**	**62.25**	**40,126**	**67.01**	**19,831**	**42.26**	**24,662**	**68.51**	**23,361**	**65.76**	**41,408**	**71.98**
Gram	873	2.63	2428	5.41	1923	3.21	3,229	6.88	1,173	3.26	1,298	3.65	2,438	4.24
Pigeon peas	390	1.17	635	1.41	943	1.57	434	0.92	226	0.63	620	1.75	998	1.73
Black gram	263	0.79	472	1.05	732	1.22	524	1.12	221	0.61	526	1.48	1,483	2.58
Lentil	4487	13.51	8,313	18.52	5,831	9.74	11,297	24.07	2,650	7.36	4,459	12.55	2,635	4.58
Other Pulses	2215	6.67	996	2.22	1981	3.31	3,732	7.95	2,322	6.45	2,321	6.53	3,043	5.29
Total Pulses	**8228**	**24.77**	**12844**	**28.61**	**11410**	**19.06**	**19,216**	**40.95**	**6592**	**18.31**	**9,224**	**25.97**	**10597**	**18.42**
Soyabean	7	0.02	1255	2.80	281	0.47	6,110	13.02	1	0.00	120	0.34	4	0.01
Sesame	11	0.03	38	0.08	22	0.04	6	0.01	21	0.06	19	0.05	20	0.03
Rapeseed/Mustard	20,76	6.25	1,505	3.35	4,051	6.77	901	1.92	2,401	6.67	1,296	3.65	2,751	4.78
Other Oilseeds	618	1.86	325	0.72	3,357	5.61	335	0.71	2,203	6.12	609	1.71	2,495	4.34
Total Oilseeds	**31,34**	**9.43**	**4,103**	**9.14**	**8,341**	**13.93**	**7,882**	**16.80**	**4,745**	**13.18**	**2,937**	**8.27**	**5,521**	**9.60**
Total Cropped Area (in hectare)	**33,224**		**44,893**		**59,877**		**46,929**		**35,999**		**35,522**		**57,526**	

Source: District Statistical Book and Land Records, Dindori district (M.P.), 2019-20

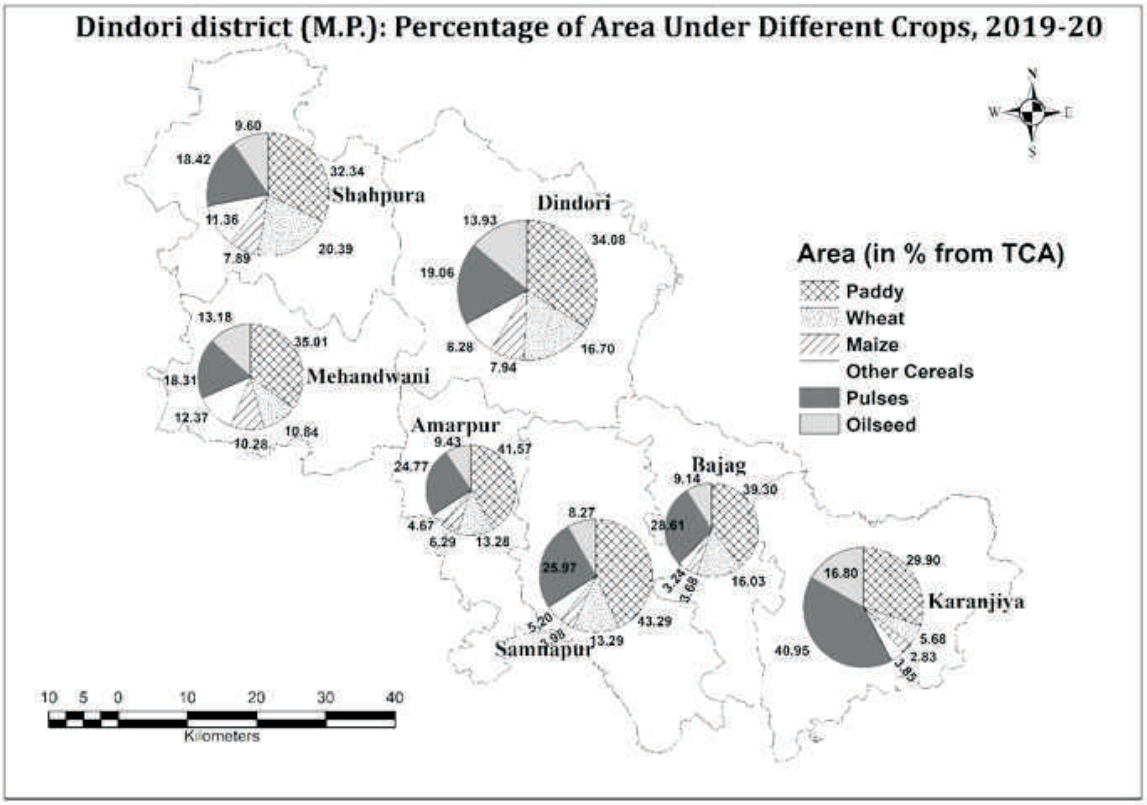

Fig. 03

Source: District Statistical Book, Dindori district (M.P.), 2003-04. (TCA= Total cropped area)

the same period such as Bajag (40.38%), Karanjiya (20.37%), Amarpur (19.75%), Mehandwani (18.19), Samnapur (17.92%), and Shahpura (6.92%) and Dindori (3.21). Dindori and Shahpuraare the district and tehsil headquarters, respectively as well as the development blocks. Both blocks have already developed their land into cultivation hence there is a lack of further expansion of cultivable land that is why the growth of the cropped area was less than the other blocks.

The change in the cropping pattern of the Dindori district is associated with the changing perception of cultivators and their needs along with the weather condition and availability of agriculture infrastructure. The agriculture practice of the area is undergoing to change from subsistence to cash crops and further specialisation. As per the data of 2019-20, the single cropping pattern has emerged in the district and paddy covered the largest proportion of cropping area, i.e., 35.82%.

The highest growth is marked under paddy cropped area as 107.28% in Mehandwani followed by Shahpura (75.51%),Bajag (64.89%), Amarpur (56.97%), Dindori (33.08%),Samnapur(21.05), and Karanjiya (6.93%). It means three blocks experienced less than 50%growth under paddy cropped area. The Karanjiya is tribal dominated block and tribal people are still practicing subsistence farming and using

traditional technology for cultivation to fulfill their needs consequently the cropped area of paddy is slightly changed.

The growth in the cropped area under wheat is much varied among the seven blocks such as Mehandwani block shows the highest growth, i.e., 119% while the Karanjiya block shows negative growth (-15.04%). The rest of the blocks show this growth as Bajag (37.81%), Shahpura (35.79%), Samnapur (28.50%), Amarpur (20.61%), and Dindori (19.25%).The farmers of the Karanjiya are much interested in the cultivation of paddy and pulses rather than other crops hence cropped area under wheat is reduced.

Maize is the third important crop among the cereals in the area but its share is much lower. The cropped area under maize is grown in three blocks namely Mehandwani (23.61%), Dindori (9.79%), Shahpura (5.48%),and Amarpur (5.72%) while Samnapur (-16.88%), Karanjiya (-3.63%), and Bajag (-0.36%) show negative growth. The negative change of cropped area under maize is related to the reduction of its consumption.

The share of cropped area under pulses is also high. The lentil and gram are having the highest cropped area among them. The growth of total cropped area under pulses shows the highest growth rate among other crops. The Amarpur block shows that the highest growth in the cropped area under pulses, i.e., 218.42% followed by Mehandwani (197.88%), Samnapur (120.04%),Bajag (107.06%),and rest three blocks namely Dindori, Karanjiya, and Shahpura have grown cropped area under pulses less than hundred per cent. The rise of prices of pulses was higher than the rest of the crops during two decades that is the main cause in the growth of cropped under pulses simultaneously changing attitudes of farmers towards cash crops.

The 18,161 hectares cropped area was reduced under oil seeds in the district during sixteen years from 2003-04 to 2019-20.All the blocks except Karanjiya show a negative change in the cropped area under oilseeds. The block-wise change in the cropped area under oilseeds is as Shahpura (-55.86), Amarpur (-44.71), Samnapur (-39.83%), Mehandwani (-39.13%), Dindori (-35.94%), and Bajag (-11.44%) whereas, Karanjiya shows positive change (24.77%) area under oilseed. The low yield of oilseeds and changing interest of farmers towards the cultivation of cereals (especially paddy and wheat) and pulses are the main cause of the decrease in the area under the oilseeds in the district.

Conclusion

The cropping pattern of the district shows that the cereal crops are dominated followed by pulses and oilseeds. In 2019-20, three crops namely paddy (35.82%), wheat (14.21%), and lentil (12.64%) occupied 62.67% of the total cropped area in the district and this scenario is visible in individual blocks too. These three food grains are dominated in the diet pattern among the inhabitants of the district. Thus, the cropped area under individual crops has increased from 2003-04 to 2019-20 but at the same time, the cropped area under other crops has fallen. It indicates the introduction of mechanisation and commercialisation in agriculture that led specialisation of crops. The cropped area under pulses has grown rapidly, i.e., 102% because of the hike of market price that is why farmers want to grow for self-consumption as well as for sale. The 12.15 % cropped area is grown under cereals while the area under oilseeds marked negative growth, i.e., -33.13% during sixteen years as its production is associated with self-consumption and low yield.

The block-wise spatial variation in cropping pattern is found in the district in both agriculture years 2003-04 and 2019-20. This spatial variation is the result of topographical configuration, weather conditions, soil properties, and socio-economic conditions of the farmers. The farmers of the area practice subsistence agricultural production in general but it is changing the cash crops in particular. It means the cropping pattern is shifting from a traditional to the modern one. The cropped area under pulses has increased noteworthy in all blocks between 2003-04 & 2019-20. The cropped area under cereals has grown slightly in six blocks but the

Karanjiya block has marked negative growth, i.e., -5.28%. The area under oilseed crops is reduced in six blocks except for Karanjiya. The cropping pattern in the district is shifted from cereals and oilseeds to pulses and from other cereals to individual crops during the sixteen years which is the result of the introduction of HYV seeds especially paddy, mechanisation of agriculture, socio-economic condition of farmers, price rise, production of market-oriented crops, etc. Three main things came out from the available data of the given period of sixteen years such as the emergence of a single cropping pattern, specialisation of crops, and agriculture production is shifting from traditional to cash crops.

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Demographic and Socio-economic Correlates of Violence against Sexual Minorities Across Selected Indian Cities

Suraj Pal and Praveen Kumar Pathak

ABSTRACT

Evidence related to the burden of violence against sexual minorities and its far-reaching implications on their well-being is quite limited. This study attempts to investigate the likelihood of violence against men having sex with men (MSM) across six selected metro cities in India. About 300 participants aged 18 years and above participated in this study and shared their lived experiences as gays or bisexuals. Descriptive statistics, Chi-square test and binary logistic regression models were used for data analysis. More than 50% of MSM ever suffered from verbal or physical violence. The odds of violence among bisexuals was significantly low as compared to gays. Men who reported to be 'out regarding their sexuality in public'were significantly more victimized than their counterparts. Given India's commitment to Sustainable Development Goals (2016-2030), investing in the health and well-being of all citizens without leaving anyone behind should be the mantra for inclusive development.

Keywords: *LGBT+, MSM, Violence, Health geography, India.*

Introduction

The globally accepted framework for the progress of human society under the Sustainable Development Goals (2016-2030) called upon the need to secure good health and well-being for all, 'without leaving no one behind' including the gender or sexual minorities (lesbian, gay, bisexual and transgender-LGBT+). Among various other challenges, the disproportionate burden of violence against the sexual minorities including -verbal, physical, sexual, cyber and relational seems to jeopardise their human capital potential. Incidence of violence against sexual minorities has a strong association with depressive symptoms among young sexual minorities. However, the degree of violence varies among subgroups of sexual minorities(1,2). There is a strong association between violence and feminine characteristics among Men who have Sex with Men(3,4). The non-masculine traits lead towards various forms of discrimination and violence of Kothis (effeminate gays)by members of the family, neighbours, healthcare professionals and even the police who otherwise are there to protect citizens from threatening elements in society(5,6).The root cause of homophobia that leads to violence against gays and bisexuals in India is the twin process of the HIV epidemic and globalization of queer politics(7). Violence against male sexual minorities is also linked to the judicial context in India. The colonial law of Section 377 of the Indian Penal Code (IPC) that made homo-sexuality illegal for years has caused considerable homophobia in Indian society(8,9).

Meyer has indicated association of violence with stigma while discussing minority stress theory(10). This positive association of stigma and violence is evident in case of India because Indian society considers homosexuality a taboo, which leads to the high level of stigmatization of LGBT+ people(11).Thomas, et. al (12) found that social stigma is high among Indian MSM. The stigma is more prevalent among Kothis because of their gender non-conforming activities, which causes

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depressive symptoms among them. Both verbal or non-verbal violence act as a barrier while availing healthcare facilities for members of LGBT+ community(13). Badgett(14) studied that there is a negative correlation between violence and physical-mental wellbeing of LGBT+ people. Srivastava and Singh(2) found that LGBT+ individuals are at high risk of mental illnesses because of direct or indirect stigmatization related to homosexuality. Majority of the sexual minorities do not disclose their sexual identities to outsiders who do not belong to the community to escape from stigma(15). This constant effort to hiding the sexuality of the LGBT+ individuals results in stress and anxiety(16). The high level of suicidal thinking and depressive symptoms among young adults are linked with school time violence(17–19). Violence of school going LGBT+ youngsters is positively associated with mental and physical health deterioration including risk of HIV and STDs(20). Prevalence of HIV is higher among the community members than among the general population causing a concern for needed attention for overall health of LGBT+ people(21).

Rationale of the Study

Violence of any form, act as barrier in the overall development of the affected individual or community. LGBT+ community is one of the vulnerable communities in India, which is facing perennial violence because of their distinct gender/sexual behaviour. Yet segments of people with alternative sexuality find it difficult to report the sexual violence they face because either they are not considered sexual victims or they fear harassment by the system. Majority of such crimes are under reported due to fear of being exposed and cases of violence are limited and often related to atrocity in police custody. Studies reveal how Section 377 of the Indian Penal Code (IPC) was used as a tool by police for physical and mental harassment and extortion of money from LGBT+ individuals(22,23). The alien law imposed during the British rule in India against homosexuals worked as a catalyst to demean the position of sexual minorities in the country(24) which made them vulnerable for violence.

MSM community has been treated negatively by society, ignored by policy makers and under studied by academia until recently(25). This study enquires into the ongoing violence against MSM (sub group of LGBT+ community) who are part of our society. Knowing the situation of the MSM will enable stake holders to provide these Indian citizens a life with rights of equality, dignity, privacy and freedom of expression, which has been compromised even after the Supreme Court of India struck down Section 377 of the IPC partially and homosexuality in no more illegal. The present study aims to investigate the likelihood of verbal and physical violence against MSM based on data from selected cities of India by some selected demographic and socio-economic characteristics. There are many macroscopic studies available for the entire LGBT+ community in India and many studies have depicted the vulnerability of the broad spectrum of the Queer community. A few microscopic studies have focused on subgroups of the community like Hijra (trans gender) and Kothi (effeminate gay) but this paper is dedicated to MSM (here gays and bisexuals) only.

Objective and The Study Area

This cross-sectional study aims to investigate the likelihood of violence against MSM, based on data from selected cities (Ahmedabad, Bengaluru, Delhi, Kolkata, Lucknow and Mumbai) in India by some selected demographic and socio-economic characteristics. A survey was conducted between June 2019 and February 2020 for this study. Around 25 gays (one who is sexually attracted to the same gender only) and 25 bisexual (one who is sexually attracted to the same as well as the opposite gender) men participated in the survey from each metro city. All the 300 participants who participated in the survey were 18 years old or above. Verbal informed consent was taken from the participants after informing them about the objective of the study and answering their queries. The survey included a semi-structured schedule encompassing questions from various dimensions related to gays and bisexuals. This data helps in understanding the condition of Indian gays and bisexuals from the social, economic, health and geographical perspectives.

Methodology

Violence experienced by MSM is taken as an outcome variable in the study. Three broad dimensions of violence; Verbal violence (It includes verbal attacks like abusing or threatening), Physical violence (It includes physical attacks like beating)and Sexual violence(It includes sexual attacks like sexual molestation) against gays and bisexuals are used in this study. Main predictor variables included the sexual identity, age (in completed years), marital status, educational level, religion, caste/category, annual household income, living arrangement, type of family and respected city of the respondent. Descriptive statistics, Chi-square test, and binary logistic regression model have been used in this paper. The result of the binary regression model has presented in the form of odds ratios with a 95% confidence interval. The analysis is carried out using STATA 14.1.

Results and Discussion

Differentials in Violence Against Men Who Have Sex With Men (MSM)

Table 01 represents the percentage distribution of verbal, physical or sexual and any violence faced by gays and bisexuals. Overall, 56% of the respondents experienced verbal violence, 41.7% suffered through physical or sexual violence and 61.3% of the candidates went through any violence. Respondents in the age range, 18-22 faced more verbal violence (78.8%) and physical or sexual violence (57.6%). Nearly 89.5% of Bottoms were verbally victimized, while 29.4% of Tops reported facing verbal violence. Less than one-fourth (22.6%) of Tops suffered physical or sexual violence, while more than two-thirds (69.7%) of Bottoms experienced this.

Table 01: Differentials in the Prevalence of Different forms of Violence Against MSM by Selected Demographic, Socio-economic and Cultural Characteristics Across Six Selected Cities in India.

Background Characteristics	Verbal violence	(P-value)	Physical or sexual violence	(P-value)	Any violence	(P-value)
Age						
18-22	78.8	0.000	57.6	0.008	78.8	0.000
23-27	66.0		44.0		74.0	
28-32	36.8		40.4		45.6	
33-37	28.0		24.0		36.0	
38-42	56.0		32.0		56.0	
43 & above	29.6		22.2		33.3	
Last/only son						
Yes	58.1	0.215	41.9	0.894	62.2	0.619
No	50.0		41.0		59.0	
Sexual Orientation						
Gay	75.3	0.000	55.3	0.000	78.7	0.000
Bisexual	36.7		28.0		44.0	

Sexual Position						
Top	29.4	0.000	22.6	0.000	37.3	0.000
Bottom	89.5		69.7		90.8	
Versatile	57.7		39.4		64.4	
Side	55.6		44.4		55.6	
Out about Sexuality						
Yes	88.0	0.000	60.24	0.000	89.16	0.000
No	43.8		34.56		50.69	
Marital Status						
Never Married	62.0	0.001	46.7	0.006	68.1	0.000
Ever Married	44.4		27.8		44.4	
Currently Married	34.0		24.5		37.7	
Education level						
Primary	75.0	0.004	75.0	0.001	81.3	0.006
Secondary	63.2		57.9		73.7	
Higher Secondary	73.4		53.1		75.0	
Graduation	49.2		36.7		57.0	
PG & above	46.6		28.8		49.3	
Religion						
Hindu	57.0	0.627	41.1	0.066	62.6	0.634
Muslim	55.6		53.7		61.1	
Christian	61.5		30.8		61.5	
Others	42.1		21.1		47.4	
Category						
General	42.4	0.000	31.2	0.000	48.8	0.000
OBC	77.8		69.8		84.1	
Scheduled caste	69.8		41.9		69.8	
Scheduled tribe	70.8		41.7		75.0	
Job collars						
White	37.4	0.000	30.3	0.000	43.4	0.000
Blue	55.2		37.9		58.6	

Pink	93.3		80.0		92.3	
Others	62.8		43.4		68.1	
Annual Income (In ₹)						
5 Lakh & below	76.8	0.000	55.1	0.001	81.9	0.000
6-10 Lakh	49.4		36.7		54.4	
11-15 Lakh	20.0		24.0		32.0	
16-20 Lakh	39.3		28.6		39.3	
21-25 Lakh	16.7		16.7		25.0	
26 Lakh & above	27.8		22.2		33.3	
Living Arrangement						
With Parents	61.2	0.000	44.9	0.024	67.8	0.000
With Wife/Children	33.9		25.0		37.5	
With Male Partner	90.9		63.6		90.9	
Alone	42.1		42.1		42.1	
Type of Family						
Joint	54.0	0.677	44.7	0.530	65.8	0.356
Nuclear	56.7		40.6		59.8	
Residential City						
Ahmedabad	42.0	0.021	38.0	0.026	50.0	0.010
Bengaluru	54.0		32.0		56.0	
Delhi	66.0		58.0		72.0	
Kolkata	72.0		52.0		80.0	
Lucknow	46.0		30.0		52.0	
Mumbai	56.0		40.0		58.0	
Total	**56.0**		**41.7**		**61.3**	

Source: Field survey 2019-2020.

Note: Chi-square test was performed to examine statistically significant differentials in the different forms of violence against MSM.

Around 88% faced verbal violence and 60.24% faced physical or sexual violence among all the individuals who were 'out about their sexuality' (respondents who were open about being gay or bisexual to the surrounding people) (5). About 75% of the respondents with primary education faced verbal as well as physical or sexual violence, which is higher when compared to what the respondents with higher educational qualifications faced. The percentage of violence was lowest among participants who had a post-graduate qualification and above (verbal violence 46.6% and physical or sexual violence 28.8%). Nearly 76.8% and 55.1% of the respondents with an annual income of INR 5 lakh and below experienced verbal violence, 16.7% of the respondents with an annual income between INR 21-25 lakh faced verbal and physical or sexual violence. Verbal violence was more among respondents who lived in a nuclear family (56.7%) while physical or sexual violence was more among participants who lived in a joint family (44.7%). Nearly 72% of the residents of Kolkata and 42% of the residents of Ahmedabad reported to have experienced verbal violence, and this was the highest and lowest respectively among the six cities chosen for the study. Physical or sexual violence was the highest in Delhi (58%) and the lowest in Lucknow (30%).

Determinants of Violence against MSM

Table 02 represents Unadjusted Odds Ratios (UOR) and Adjusted Odds Ratios (AOR) of any violence against men who have sex with men by society in India. The unadjusted odds of violence are more than 16 times higher (CI: 6.92-39.82) among men who play the role of the bottom, three times higher (CI: 1.73-5.38) among men who are versatile and twice higher (CI: 0.76-5.8) among men who recognize themselves as side in comparison to tops. When controlling for other variables, the adjusted odds of violence follow a similar trend with Bottom (AOR: 6.25; CI: 1.57-24.89) and Versatile (AOR: 2.51; CI: 1.04-6.07) being significant. Men who are not out about their sexuality are less likely (UOR: 0.13; CI: 0.06-0.26 and AOR: 0.15; CI: 0.04-0.52) to be victimized in comparison with men who are out.

Table 02 : Binary Logistic Regression Model Showing Unadjusted and Adjusted Odds Ratios of Any Violence Against Men who Have Sex With Men in India.

Background Characteristics	Unadjusted Odds	95%CI	P-value	Adjusted Odds	95%CI	P-value
Age						
[illegible]	1.00			1.00		
23-27	0.77	0.37-1.61	0.481	0.86	0.25-2.94	0.809
28-32	0.23	0.1-0.5	0.000	0.27	0.06-1.24	0.092
33-37	0.15	0.06-0.41	0.000	0.07	0.01-0.69	0.023
38-42	0.34	0.13-0.92	0.033	0.24	0.03-2.02	0.191
43 & above	0.13	0.05-0.36	0.000	0.08	0.01-0.78	0.03
Last/only son						
Yes ®	1.00			1.00		
No	0.87	0.52-1.48	0.619	0.85	0.36-2.00	0.715

Sexual Orientation						
Gay ®	1.00			1.00		
Bisexual	0.21	0.13-0.35	0.000	0.61	0.25-1.49	0.277
Sexual Position						
Top ®	1.00			1.00		
Bottom	16.60	6.92-39.82	0.000	6.25	1.57-24.89	0.009
Versatile	3.05	1.73-5.38	0.000	2.51	1.04-6.07	0.042
Side	2.11	0.76-5.8	0.15	1.25	0.3-5.19	0.756
Out about Sexuality						
Yes ®	1.00			1.00		
No	0.13	0.06-0.26	0.000	0.15	0.04-0.52	0.003
Marital Status						
Never Married ®	1.00			1.00		
Ever Married	0.37	0.14-0.99	0.047	1.89	0.17-21.16	0.606
Currently Married	0.28	0.15-0.53	0.000	4.90	0.11-210.98	0.408
Education level						
Primary ®	1.00			1.00		
Secondary	0.65	0.13-3.26	0.597	0.07	0.00-1.33	0.077
Higher Secondary	0.69	0.17-2.74	0.601	0.07	0.01-0.89	0.04
Graduation	0.31	0.08-1.13	0.075	0.14	0.01-1.71	0.125
PG & above	0.22	0.06-0.85	0.028	0.11	0.01-1.47	0.094
Religion						
Hindu ®	1.00			1.00		
Muslim	0.94	0.51-1.73	0.838	1.17	0.36-3.86	0.791
Christian	0.96	0.3-3.02	0.938	1.24	0.17-8.92	0.833
Others	0.54	0.21-1.38	0.196	0.43	0.11-1.77	0.244
Category						
General ®	1.00			1.00		
OBC	5.56	2.65-11.64	0.000	2.31	0.72-7.39	0.159
Scheduled caste	2.42	1.18-4.95	0.016	0.91	0.3-2.77	0.873
						0.760

Scheduled tribe	3.14	1.19-8.31	0.021	0.79	0.18-3.53	0.760
Job collars						
White ®	1.00			1.00		
Blue	1.84	0.96-3.56	0.067	0.47	0.13-1.72	0.255
Pink	1.74	1.69-1.82	0.050	1.22	1.09-1.33	0.042
Others	2.79	1.59-4.88	0.000	0.97	0.31-3.05	0.962
Annual Income (In ₹)						
5 Lakh& below ®	1.00			1.00		
6-10 Lakh	0.26	0.14-0.49	0.000	0.20	0.07-0.53	0.001
11-15 Lakh	0.1	0.04-0.27	0.000	0.08	0.02-0.33	0.001
16-20 Lakh	0.14	0.06-0.34	0.000	0.10	0.02-0.45	0.003
21-25 Lakh	0.07	0.02-0.29	0.000	0.08	0.01-0.68	0.022
26 Lakh& above	0.11	0.04-0.32	0.000	0.13	0.03-0.66	0.014
Living Arrangement						
With Parents ®	1.00			1.00		
With Wife/Children	0.29	0.15-0.53	0.000	0.37	0.01-13.00	0.587
With Male Partner	4.76	0.6-37.92	0.141	3.63	0.18-73.44	0.401
Alone	0.35	0.13-0.9	0.029	0.60	0.08-4.32	0.613
Type of Family						
Joint ®	1.00			1.00		
Nuclear	0.77	0.45-1.33	0.357	0.17	0.07-0.45	0.000
Residential City						
Ahmedabad ®	1.00			1.00		
Bengaluru	1.27	0.58-2.8	0.548	1.43	0.44-4.67	0.551
Delhi	2.57	1.12-5.9	0.026	4.69	1.30-16.91	0.018
Kolkata	4.00	1.65-9.72	0.002	2.99	0.76-11.69	0.116
Lucknow	1.08	0.49-2.37	0.841	0.90	0.29-2.77	0.857
Mumbai	1.38	0.63-3.04	0.423	2.24	0.64-7.88	0.210

Note: ® represents the reference category of independent variables.

Gays and bisexuals with educational levels post-graduationand above are significantly less likely (UOR: 0.22; CI: 0.06-0.85) to be victimized than respondents with a primary level of education when other variables are not controlled. Education has a role to play when it comes to escape from violence against MSM individuals. Low level of education makes individuals vulnerable for hate crimes because the perpetrator knows that victim has limited reach for help and has low level of legal awareness. Literatures also show that higher level of education is highly protective against the risk of victimization(26,27). Respondents who belong to the OBC category are significantly likely to face 5.5 times more violence than the general category when other variables are not controlled with a confidence interval of 2.65-11.64, followed by Scheduled Tribe (UOR: 3.14; CI: 1.19-8.31) and Scheduled Caste (UOR: 2.42; CI: 1.18-4.95). When compared to men with an income of INR 5 lakhs and below, men having annual income between INR 11-15 lakhs are significantly least (UOR: 0.1; CI: 0.04-0.27) victimized in unadjusted odds ratios. In adjusted odds ratios, men with an annual income between INR 11-15 lakhs (AOR: 0.08; CI: 0.02-0.33) and INR 21-25 lakhs (AOR: 0.08; CI: 0.01-0.68) faced the least violence compared to men with an annual income INR 5 lakhs and below.

Further, data suggest that respondents who lived with male partners faced relatively more violence than those who lived with their parents(UOR: 4.76; CI: 0.6-37.92 and AOR: 3.63; CI: 0.18-73.44). The respondents who live with male sexual partners are easily identifiable than the respondents who live with parents, who are mostly close about their sexuality and they also have their family to protect them from odd incidences (if there is any), that is why MSM who live with male sexual partners are at higher risk to face violence. Study participants living with wife/children faced the least violence as compared to their counterparts living with parents(UOR: 0.29; CI: 0.15-0.53and AOR: 0.37; CI: 0.01-13). Men who lived in a nuclear family were less likely (UOR: 0.77; CI: 0.45-1.33 and AOR: 0.17; CI: 0.07-0.45) to be victimized compared to men who lived in a joint family. Without other variables controlled, respondents from Kolkata faced the highest (UOR: 4.00; CI: 1.65-9.72) violence, while with other variables controlled, respondents from Delhi experienced the highest risk of violence compared to Ahmedabad (AOR: 4.69; CI: 1.3-16.91).

Conclusion

The present study made a novel attempt to examine the socio-economic, demographic and geographical patterning of violence against Men who have Sex with Men across the six selected cities in India. Men in early age were susceptible to face violence than older men. This finding is similar to what David, et. al (28) have observed in their study. Vulnerability to violence against younger MSM also increased owing to relatively increased stereotypical perceptions against the LGBT+ community by the mass media channels (i.e. cinema, social media, print media, etc.).

Data indicated remarkable differentials in the prevalence of violence based on sexual orientation and sexual position. Gays and Bottoms are more victimized in comparison to Bisexuals and Tops respectively. The reason behind this is; most of the Gays and particularly Bottoms identify themselves as submissive people. Many of these individuals are feminine by their physical and/or mental characteristics, which make them prone to different forms of violence in comparison to individuals with sexual orientation Bisexual and sexual position Top. Different studies find that femininity has positive association with violence against male sexual minorities(5).This finding is consistent with the previous research studies done by Pelullo, et. al (29). Given the highly prejudiced and stigmatised position of the sexual minorities, the disclosure of sexual identity in the public sphere increased the risk of violence against the MSM. Men who are 'out regarding their sexuality in public'were significantly more victimized than their counterparts who were'not out'. Importantly, educational attainment among MSM was observed to play a protecting role from violence. With an increase in educational qualification, there was a decrease in the risk of violence among MSM.

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Growth and Patterns of COVID-19 Pandemic Outbreak in India (2020-2021): A Geographical Analysis

Soumitra Gaine and Kumar Amit

ABSTRACT

At present, Coronavirus or COVID-19 outbreak in India along with other countries of the World has brought a great crisis to the human kind. This highly contagious virus is growing rapidly in India also from one end to another end. Some states have less transmission but in the rest of the states, the Coronavirus epidemic grows at a high rate. However, unlike mass corona infections in the United States and European countries, India has been infected at a much slower rate. This pandemic in first phase has started to rise since the last week of May, 2020 and continued to October, 2020 and in the second phase, the epidemic reached alarming stage and daily number of infected people exceeded four lakhs in May, 2021.

Keywords: *COVID-19, Coronavirus, Mutants, Pandemic.*

Introduction

The term 'Coronavirus' has been derived from the Latin word 'CORONA', meaning "crown" or "wreath" (Wikipedia, 2020). Coronavirus is a group of related RNA virus that causes severe common cold to severe diseases such as severe acute respiratory syndrome (SARS) and the Middle East Respiratory Syndrome (MERS) and COVID-19 (Prasad, et al., 2020).

Covid-19 or coronavirus disease-2019 is a very infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (Salehi, et al., 2020). Where SARS-COV-1 epidemic has been threaten global public health and spread world wide in 2003 (Drosten, et al., 2003). Scientist identified that SARS-CoV-2 virus particles are spherical and have mushroom-shaped proteins called spikes which bind and fuses to human cells, allowing the virus to gain entry (Prasad, et al., 2020). On 12th January 2020, the World Health Organization (WHO) has been officially recognized Covid-19 and its development (Corman, et al., 2020). This virus spread rapidly to the community with close contact between infected people. The common symptom of Covid-19 is fever, cough, loss of appetite, fatigue, shortness of breath muscles aches and pain (Nussbaumer-Streit, et al., 2020).

Objectives

1. To analyze the spatial distribution of COVID-19 outbreak in India from February to July 2021.
2. To study the trends of growth of COVID-19 outbreak in all over the country.

Methodology

The present study has been carried out in three parts; firstly, survey of related literature of COVID-19 virus and its pandemic outbreak so far world as well as in India. Secondly, collections of secondary data from various sources like Government publication, Ministry of Health and Family Welfare. Government of India (GOI, 2020), Indian Council of Medical Research (ICMR), Worldometer online platform (Worldometer, 2020), etc. Third computing of collected data and mapping of collateral information by using ArcGIS at Inter-state level.

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Results and Discussion

Covid-19 Pandemic Outbreak in Worldwide

In December 2019, coronavirus has been identified in Wuhan City, Hubei Province, China and it escalated into a global health emergency very soon (Yang, et al., 2020). WHO recognizes coronavirus-2 as a pandemic on 11 March 2020. On 9th July, 2021, World Health Organization(WHO) reported about 18 crores confirmed cases and forty lakhs deaths where active cases are 11,837,131 (Worldometer, 2021) (Fig 01). In the middle of March 2020, China has been able to control the Covid-19 pandemic outbreak (Gross, et al., 2020).

Worldwide Covid-19 Cases

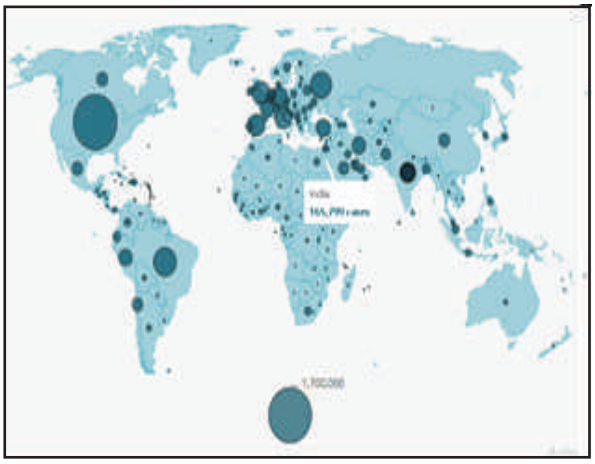

Fig. 01

Source: (BBC, 2020)

Covid-19 Pandemic Outbreak in India

The first Covid-19 patient (30th January 2020) found in Kerala in India. On 24 March 2020, Ministry of Health and Family Welfare has confirmed 519 covid-19 cases all over the country.

Trends of Growth of COVID-19 Patients in India

From March to the end of September 2020, the trends of the Covid-19 outbreak of India has been assigned at 3 stages.

Stage of Slight Growth (February to June, 2020)

In India, the number of total active cases has increased very slowly in February and March. At the beginning of Covid-19, infected people are limited to the state of Kerala (3), but later these epidemics have been spreaded in Telangana (1), Delhi (1), and Uttar Pradesh (6) (Fig. 02).

Trends of Covid-19 infected people in India

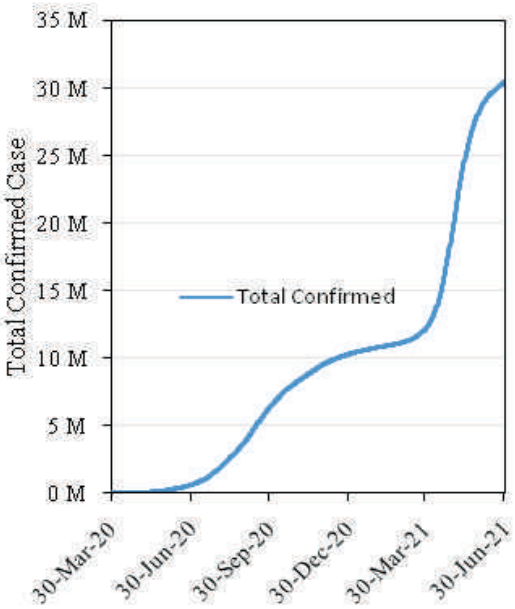

Fig. 02

Source: Covid19 India, 2021

So far, Covid-19 pandemic has been reached to its peak in many European countries; India has stayed its medium stage at the same time (Fig 0 3). Covid-19 pandemic has been increased in Maharashtra, Delhi, Uttarakhand and Punjab due to influx of infected people from European countries and China. Prime Minister Sri. Narendra Modi Ji ordered nation wide lockdown for 21 days to prevent Covid-19 pandemic in India on 24 March 2020 (GOI, 2020). Lack of adequate knowledge about new Covid-19 virus and WHO's guidelines, many infected people have been mixing in the society. As a result, COVID-

19 turns into the Covid-19 pandemic. Though, the rate of growth of COVID infections in India had significantly slowed, from a rate of doubling every three days before the lockdown to one of doubling every eight days on 18 April (Gupta, 2020).

Covid-19 Pandemic (January, 2020)

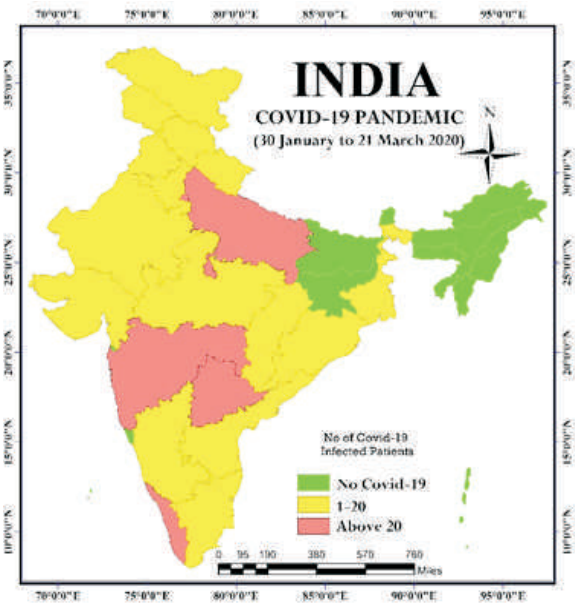

Fig. 03

From 21st April, the infection reaches the epidemic stage (Fig. 04). Nationwide lockdown has been extended till 30th April, 2020. The government of India classified the whole country into three separate zones as 'Red zone', indicating the presence of infection hotspots which further subdivided into three zones, i.e., A, B, and C, *'Orange zone'* indicating some infection, and *'Green zone'* with no infections. (BBC, 2020). The number of victims in Maharashtra has crossed 60 thousand. Besides this, this, Tamilnadu, Gujarat, and West Bengal have the fastest active growing cases.

National Disaster Management Authority (NDMA) and the Ministry of Home Affairs (MHA) extended the lockdown with additional relaxations for a period for two weeks beyond 18 May 2020 and hope that it will extend in upcoming days until the pandemic subside ("Coronavirus lockdown extended till 31 May, says NDMA," 2020).

Stages of Moderate Growth (July to August, 2020)

In July 2020, daily growth of Covid-19 infected patients doubled within one month. According to data from the Union Ministry of Health, India reached a record one-day jump for 60,000 cases of COVID-19 in late July. For daily infections, the number of COVID cases increases in Kerala (12,456 people per day) after Maharashtra (9,489) (Covid19India, 2021). Maharashtra has the highest mortality rate due to covid-19. In August, day wise mortality has increased compared to the daily positive case. Approximately, 30,000 patients died over this period.

Stages of High Growth (from September 2020)

In the last week of August 2020, COVID-19 set a new record with 80,000 new infections reported in 24 hours. Mumbai reported one and five thousand new cases and thirty deaths followed by the Pune and Nagpur. Maharashtra, Tamilnadu, Madhya Pradesh and Gujarat has highest number of covid cases in India. Kerala announced hundred days action plan to prevent covid-19 waves (Coronavirus India lockdown Day 168 updates | September 9, 2020 - The Hindu, 2020). In September, India tops daily new covid cases globally with added 1 million covid cases in a record time of 11 days (Fig 05). The daily new cases crossed one lakh in 21st September 2020. Maharashtra, Karnataka, Uttar Pradesh, Tamilnadu and Andhra Pradesh accounts for 60% of the total active patients. Covid test crossed the one lakh mark in Delhi (Fig 06). First dedicated covid-19 hospitals with 551 beds and 56 ventilators for the patients inaugurated by health minister in Kerala.

Department of Home Ministry declared the first phase of census operation relating to the household due to covid-19 Oxford vaccines initiate phase 2 trial for covid-19 begin in India(Prasad, et al., 2020). Phase II testing of the Oxford vaccine (i.e., covishield) started in India.

Covid-19 Variants and Covid Wave in India

When a virus circulating throughout the

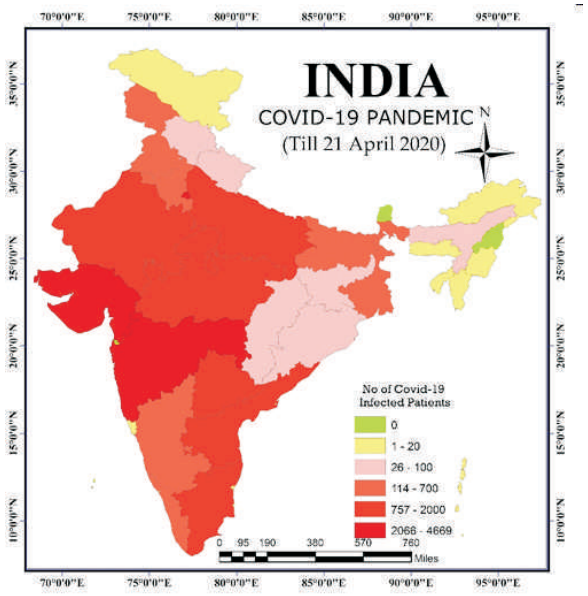

Fig. 04

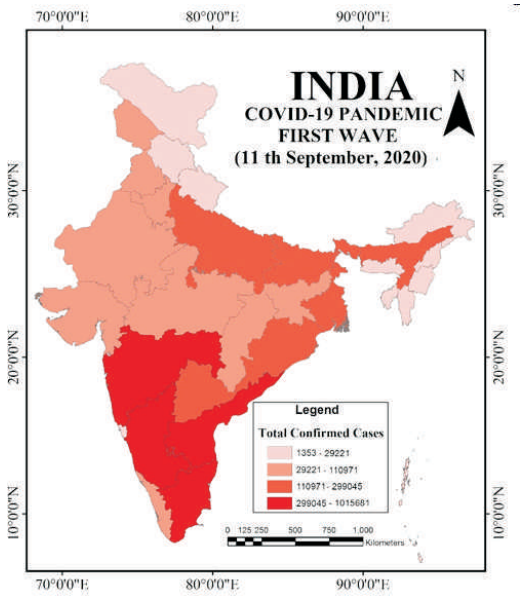

Fig. 05

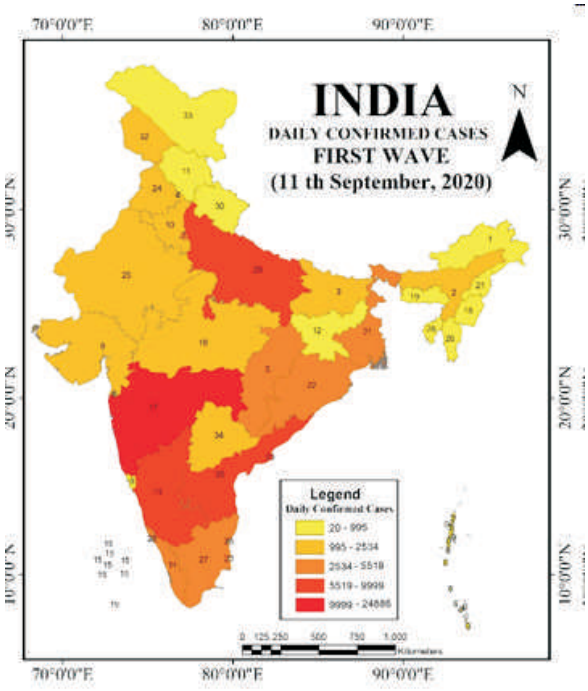

Fig. 06

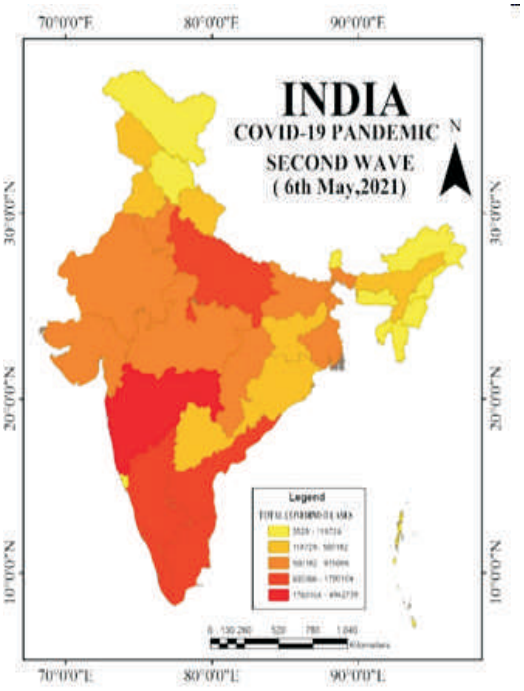

Fig. 07

people and infected them time to time, its variability gets increases to mutation (Chatterji, 2007). A novel strain of coronavirus or SARS-CoV-2 accumulate mutations, changes its generic code in late 2019 and has triggered an ongoing pandemic since March 2020 (Hossain, et al., 2021). Between January 2020 and October 2020, approximately 20 mutation compared to the first strain are sequenced (Babb, et al., 2021). Delta Plus variant was first discovered in India on October, 2020 and has spread internationally more than alfa variants on May, 2021(Beilin, et al., 2014) (Fig 07).

Table 01: Variants of SAR-CoV-2

WHO Level	First Outbreak	Designated Variants	Transmissibility	Mortality
Alpha	UK	18th Dec 2020	+82%	+59%
Beta	South Africa	14th Jan,2021	+52%	-
Gamma	Brazil	15th Jan,2021	+161%	+50%
Alpha E480k	UK	5th Feb,2021	+82%	+59%
Epsilon	USA	17th Mar,2021	+20%	Under Investigation
Delta Plus	India	6th May,2021	+64%	Under Investigation
Kappa	India	(Sample Collected) Oct,2020	Under Investigation	Under Investigation
Eta	Nigeria	(Sample Collected 11th Dec,2021	Under Investigation	Under Investigation

Source: Variants of SARS-CoV-2 - Wikipedia, 2021

WHO recognized that both (alpha variant and beta variant) are more transmissible than that of virus found in Wuhan, China (Gallagher, 2020) (Table 01). Covid -19 mutation alteration has given a threat to the pandemic situation globally. Scientists show that global pandemic reached it peaks between 2020-2021 due to changes Spike protein amino acid to D614G of SAR CoV-2 (Korber, et al., 2020). Jack west identified a case of reinfected 25 years old persons in UK with severe cough, fatigue but at the same time nuclei acid amplification test (NAAT) became negative (West, et al., 2021).

In 2020, experts are apprehended that the upcoming 'second wave' is more contagious than the first wave in the middle of 2021 (de Brouwer, et al., 2020). In Europe a second wave of covid-19 pandemic has put the society in danger. The death rate and economic losses on the second wave have increased dramatically compared to the past wave. In India, several Mutants of SARS COV-2 virus is spreading like 'Tsunami'. At the end of April 2021, the daily number of new laboratories confirmed covid-19 cases exceeded one lakh but recovery rate become 90 per cent at the same day side by side (Fig 08). In second wave death rate is lower but positivity rate is much higher due to effective transmission capability of mutant virus compared to the first wave (Jain, et al., 2020).

The Second wave started from middle of March 2021 and the highest number of daily confirmed cases (4,14,280 per day) has been identified on 6th May 2021(Kar, et al., 2021). Maharashtra, Tamilnadu, Kerala, Karnataka, West Bengal, Uttar Pradesh and Delhi are the major affected States (Fig 10). During the first wave, Central Government imposed National wide lockdown on all

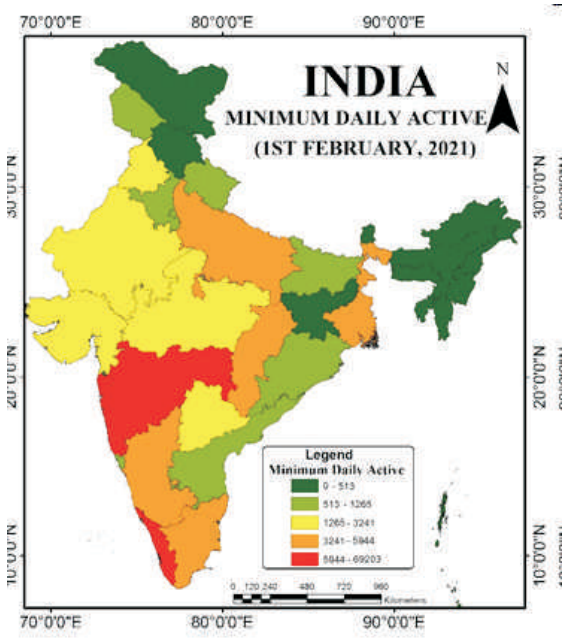

Fig. 08

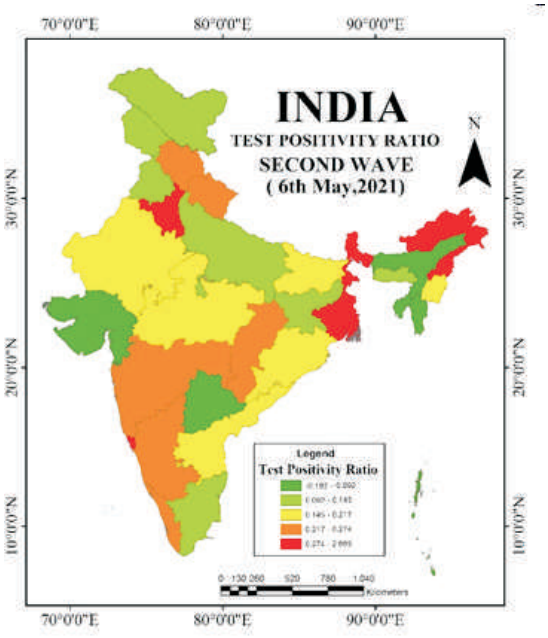

Fig. 09

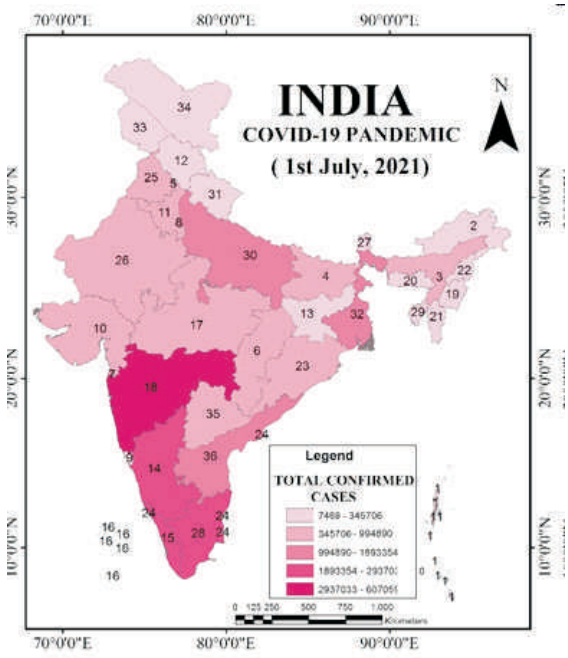

Fig. 10

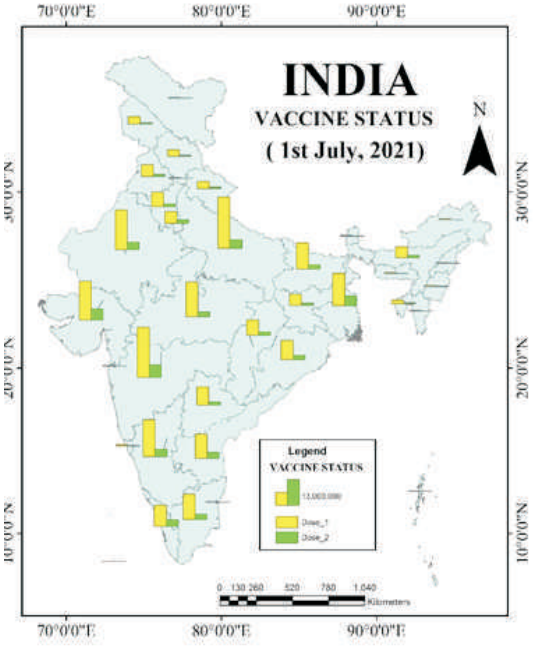

Fig. 11

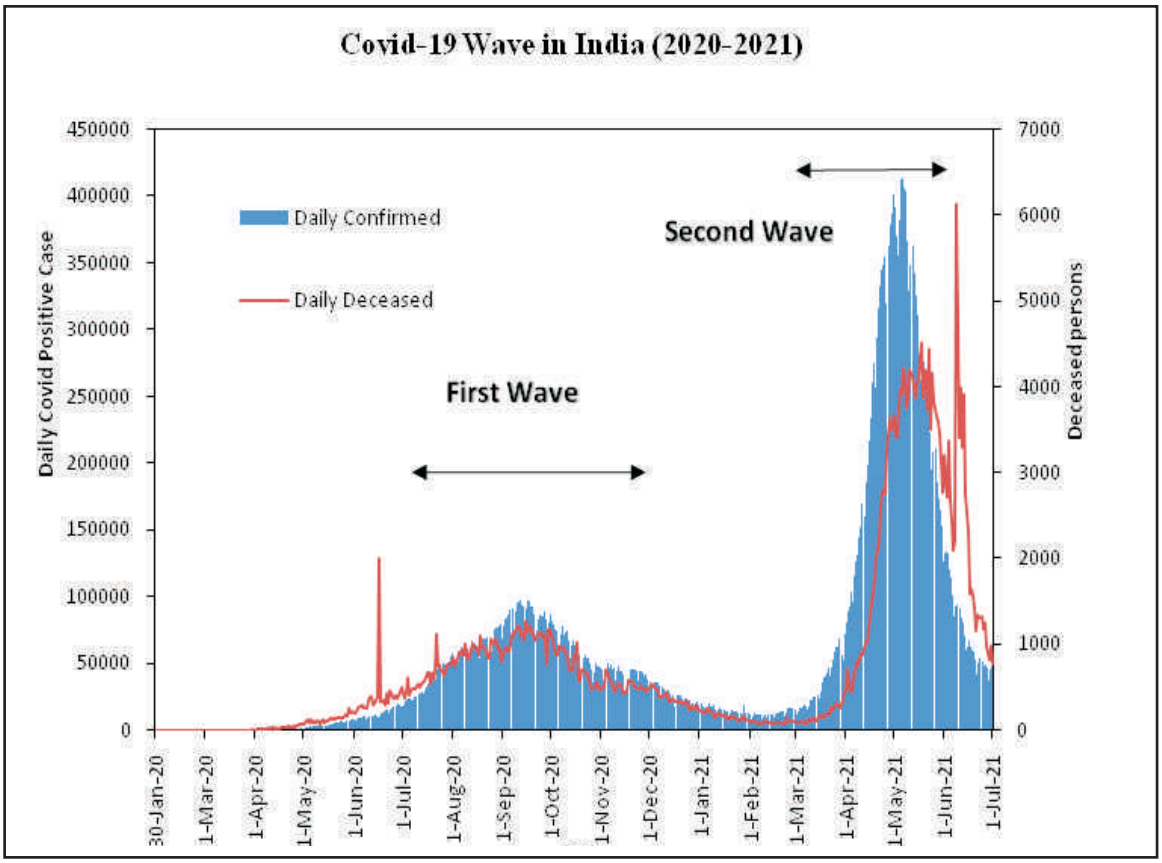

Fig 12

Source : Compiled by the Author from Covidindia.org

states but at the beginning of the second wave state government has limitations to implementation of vaccination (Fig 11).

Shutdown planning and policies and election procedure, gathering, the infecting cases reached its peak (Fig 12).

India has recorded more than 3.5 crores laboratory tested covid-19 positive cases and more than 4 lakhs patients have been died but the death rate is comparatively low among the new covid infected people. The terms of death per hundred positive cases stands at 1.3 per cent (Covid19 India, 2021). Daily number of death is less compared (R=0.7252) with new active cases in India since January 2020 (Fig 13).

The death rate is higher during the first wave of covid-19 pandemic than the second wave because of less testing, lack of public awareness, limitation vaccination, etc. According to the United Nations (UN) World Population Report 2021, India has a young population with median age of 28 years and about 66 per cent of the people living in rural areas having an adequate infrastructure of natural isolation which has been playing an active role to control Covid-19 pandemic (Euronews, 2020).

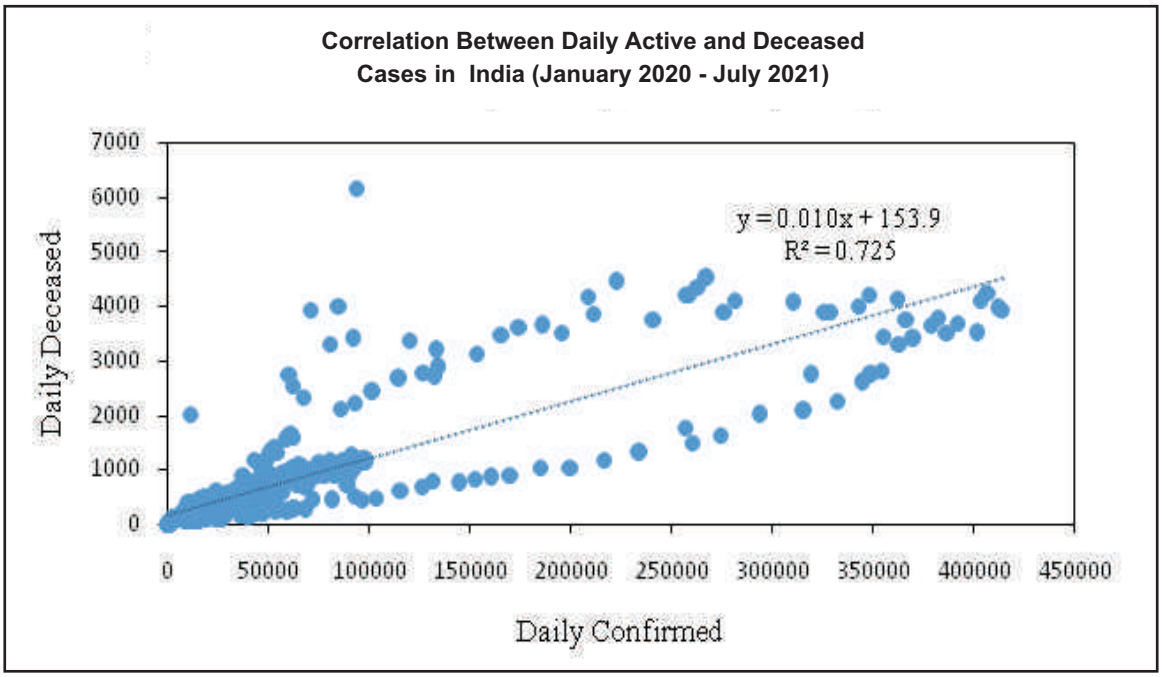

Fig. 13

Source: Calculated by Author

Impact of Covid-19 Pandemic in India

Apart from India, Covid-19 pandemic has both short-term and long-term effects on the economy, public health mortality worldwide (Baker et al., 2020). Experts predicted India's GDP growth will remain negative in financial year 2021 (Mishra, 2020). Production in the industry will be disrupted. Mortality will be increased due to starvation in the developing countries (Sumner et al.). Education for all project is badly affected in this pandemic situation.

Due to lockdown for social distancing improve air quality. locking down cities significantly improved the air quality, the implied health benefits would be an order of magnitude larger than in countries with lower initial pollution levels (He et al., 2020). Lockdown significantly decreases CO2 level in metropolitan cities in India (Mitra, 2020).

Conclusion

The epidemic is contagious and will create a dire situation in high population dense countries like India. Though The Oxford COVID-19 Government Response Tracker (OxCGRT) has reported that the Indian Government has responded more stringently than other countries in tackling the pandemic. Experts analyzed that the epidemic will reach its peak stage in India by the end of July 2021(Wikipedia contributors, 2020) . However, the trends of recovery rate are still consistent with growing new active Covid-19 outbreak. These trends are giving us a hope to abolish of the Covid-19 Epidemic.

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Educational Development Index and Quality of Primary Education in India: A District-Level Analysis

Abhay Krishna Singh

ABSTRACT

The present study proposes to investigate the quality of primary education being imparted in India. To assess an overall view and present a clear picture of the state of affairs of elementary education at the district level in India, the study is carried out. The study is a secondary information-based endeavour solely based on the information released by The National University of Education Planning and Administration (NUEPA). The data released by the Data Information System of Education which works under the aegis of NUEPA, New Delhi, related to the year 2010-11, formed the basis of the present analysis. The exhaustive information deals with the elementary education system of India spread across 644 districts. A quantitative approach with the help of statistical tools, the study investigates into the quality of education as well inequality among the states and Union Territories in the primary schools at the district level. The findings are on expected lines where southern states fared well on all the indicators assessing the quality of education.

Keywords: *Parity, Quality of Education, Educational Development Index, Proxy, Gini.*

Introduction

Education constitutes the backbone of any developed society. Primary education is a mirror of the educational system of a society. The quality of education received at an elementary level plays a significant role in shaping the personality of an individual.

Education is seen as essential for improving productivity and for bringing about desirable changes in society (Mohanty, 2002). Education is a powerful tool for reducing poverty, improving health and nutritional standards, and achieving human-led growth (World Bank, 2004). It is one of the strongest pillars of a lively democracy. No country can prosper without prioritising education. It is rightly considered the panacea of all the evils and solutions to all the problems across the world. Primary education provides a platform for the whole edifice of education. Within the purview of overall education, primary education is recognised as a basic human right, vital both to the development of individuals and societies (UNESCO, 2008). The 86th CAA introduced Article 21A which states 'The State shall provide Free and Compulsory Education to all Children of age six to fourteen years in such a manner as the State may, by law, determine.' To address the genuine concern for the children below the age of six years article 45 of the Directive Principles of the State Policy was accordingly amended reads now 'The State would endeavour to provide early childhood care and education to all children till they attain the age of six years, however, the provision remains non – binding. Further, Article 51A (K) introduced to make it a duty of every citizen who is a parent or guardian to provide opportunities for education to their children or wards.

Elementary education provides for a sound and strong foundation for a vibrant and dynamic quality-based educational system of a country. The conceptualisation of Universal Elementary Education through Sarva Shiksha Abhiyan (SSA) is one of the path-breaking and flagship programmes to revamp and overhaul the primary education system in India.

There is completely no dearth of research

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and literature on the universalisation of Elementary Education in India. Most of the previous works highlighted the chronological progress of elementary education in the country along with shortcomings. The inequality at the district level across all the states and Union Territories (UTs) in the quality of education being disseminated at government primary schools, has not been addressed adequately. A study handling large secondary information collected by the DISE and released by NUEPA in 2010-2011 is attempted to get an idea of the status of quality education assessed through the parameters of quality of Students, Teachers, and Physical Infrastructure. The effort is intended to provide new perspectives in the study of education at the elementary level.

There could be many potential and probable reasons behind UEE not achieving its celebrated goals and intrastate variations. Among the reasons, the lack of infrastructural facilities in the schools is believed to be significant. The infrastructural facilities don't confine themselves to the physical infrastructure comprising the School Building, Road Connectivity, Electricity, Blackboards, Benches, Desks, availability of Safe Drinking water, separate lavatory facilities for girls and boys, etc, but it subsumes in itself the availability of qualified teachers and the recommended teacher taught ratio.

The present study limits itself to three rudimentary yet essential aspects; quality of students, quality of teachers, and quality of Infrastructure. Each of these dimensions includes several indicators to assess the overall quality of primary education at the district level, across the country.

The Rationale of the Study

In a country like India where the literacy rate is still very poor in comparison to other developed nations, the importance of primary education rises manifold. Many efforts are being consistently taken up by the government since the independence of the country, unfortunately, we still are far from realising the true potentials. Thanks to the Universal Elementary Education policy, free for all till class VI, the enrolment rate has shown an upward trend. However, India continues to struggle to plug the loopholes and shortcomings in providing free yet a robust Primary education system to its citizens. Institutions and Schools at the elementary level need a major overhaul and revamp. Decision-makers and other education analysts strive to recognise the volume of difference in terms of infrastructure, teacher, and performance of students cutting across the barriers of Caste, class, cities, towns, and villages. Along with the focus on the quality of education and status at the elementary level, the need to address the widespread disparity at the district level also needs to be addressed.

Studies based on the computation of the Education Development Index (EDI) factoring in 24 indicators clubbed under the four parameters, viz, Access, Infrastructure, Teachers, and the Outcome, have been able to assess the performances of the individual states and rate them accordingly. the present study based on the analysis of secondary data tries to unearth a subtle and significant dimension that relates to the prevailing intrastate or district level inequality with regards to elementary education across the 644 districts of the country. The Educational Development Index along with Principal Component Analysis highlights many shades for interpretation, yet the regional disparities and inequalities within the states remain unaddressed keeping in mind this consideration author has skirted the calculation of EDI and instead computed 'Educational Ginni' to highlight the inequality in terms of quality of teachers, quality of students, and physical infrastructure available at the schools within the states.

To capture the overall quality and status of the Elementary Education, Educational Development Index is a better indicator. To assess the inequality and disparity among the institutions of elementary education, computation of Educational Ginni taking into consideration the quality of the teachers, students, and the available physical infrastructure, suffices. The justification for selecting three

parameters and opting out two namely the Access and the outcome lies in the fact that unlike computation of EDI for assessing the overall standard of the elementary education, the present effort confines to look into the prevailing inequalities within the state amongst the parameters mentioned above.

The data on physical infrastructure, Characteristics of the Students, Quality of the teachers, Teacher Pupil ratio, Enrolment ratio, dropouts, etc are provided by the schools to the respective districts, which in turn transmitted up in the ladder to the State and subsequently to the centre. The National University of Education Planning and Administration (NUEPA) earlier known as NIEPA (National Institute of Education Planning and Administration), on the behalf of the centre publishes such data. The study has implications for better policy formulation for primary school education in the country.

With this backdrop, the study intends to assess and evaluate the quality of Infrastructure, Teachers, and Students for all the districts. The basic objective of the study is to draw evidence related to the pan- India structural differences among the districts and the yawning disparity among them.

Methodology and Sources of Data

The National University of Education Planning and Administration (NUEPA) provide data on various aspects of school education at the state as well as district level which includes enrollment-based indicators, school-based indicators, teachers-related indicators, and infrastructure (facility) based indicators. NUEPA provides elementary education data district wise namely DISE, an Educational Management Information System (EMIS) in the country. Elementary Education in India is based on the data received from all the States & Union Territories of the country. The data provides different dimensions namely types of schools' infrastructure, facilities, receipts of Schools Development and other Grants as well as its utilization, enrolment of different sections of society, teachers in terms of their age, academic and professional qualifications, experience, and type of in-service training obtained by them and many other parameters on which little information was available so far for all districts across the country. For analysis, three different domains are identified. The quality of elementary education (i.e., grade I to V) can be assessed by taking into consideration the characteristics of students, the characteristics of teachers, and the characteristics of the school. To pursue the objectives laid down for the study all the above-mentioned indicators have been statistically dealt with for the year 2010-11, at the district level.

Four indicators were chosen for the 'characteristics of students' are Net Enrolment, Gender Parity Index (GPI), Transition Rate, and Survival Rate, respectively. Likewise, in the case of characteristics of teachers, four indicators have been identified these are Percent of Graduate Teachers, Per cent of in-service trained teachers, pupil-teacher ratio (PTR), per cent female teacher. Taking it further for analysis of 'characteristics of school' six different indicators have been identified, these indicators are per cent of Pucca school, drinking water facility in the school, girls-toilet within the school premises, the school having Mid-day Meal (MDM) facility, per cent school electrified and per cent of schools connected with all-weather roads. Since there is wide variation in the values of indicators mentioned hence; the value of indicators is at the district level, which will give a detailed district level scenario for all the indicators we have selected.

To calculate the indices all the values of each major category of indicators at the district level are summed up to get the respective state-level value for the particular indicator and subsequently divided by the number of sub-indicators in the respective domain to get the indexed value. The values once arrived vary from 0-100, become the basis of interpretation and analysis of the result.

It needs a mention here that the following formulas have been used to compute the index values of the various indicators.

1. Net Enrolment Ratio (NER)

$$\frac{\text{Enrolment I-V/6-11 age group}}{\text{The population of age 6-11 years}} \times 100$$

2. Gender Parity Index (GPI)

$$\frac{\text{Girl's enrolment in Primary Grades in year 't'}}{\text{Boy's enrolment in Primary Grades in year 't'}}$$

3. Transition Rate

$$TR = \frac{E_{g+1}^{t+1}}{E_g^t}$$

where, E_{g+1}^{t+1}= new entrants into grade V/VI in year 't+1' and,
E_g^t = enrolment in grade IV/V in year't'

4. Retention Rate (RR)

$$\frac{\text{Enrolment in Grade IV/V in year 't' – Repeaters in Grade IV/V in year 't'}}{\text{Enrolment in Grade I in year 't – 3'/'t – 4'}} \times 100$$

5. Pupil-Teacher Ratio (PTR)

$$\frac{\text{Total enrolment in schools of the primary category}}{\text{Total teachers in the primary school's category}}$$

6. Per cent school with girls Toilet

$$\frac{\text{Primary schools having girls' toilet}}{\text{Total primary school}} \times 100$$

7. Per cent Graduate Teachers

$$\frac{\text{Graduate, Postgraduate, and M. Phil teacher working}}{\text{Total teacher}} \times 100$$

8. Per cent female teacher

$$\frac{\text{Total Female Teacher}}{\text{Total Teacher}} \times 100$$

9. Per cent Pucca School

$$\frac{\text{Total pucca school}}{\text{Total School}} \times 100$$

10. Per cent Electrified School

$$\frac{\text{Total electrified school}}{\text{Total school}} \times 100$$

11. Per cent all-weather Roads to School

$$\frac{\text{Total all-weather road school}}{\text{Total school}} \times 100$$

12. Education Gini (E)

$$E = \left(\frac{1}{\mu}\right)\left(\frac{N}{N-1}\right)\left(\sum_{i=2}^{n}\sum_{j=1}^{i=1} p_i\,|y_i - y_j|\,p_j\right)$$

where,
Educational Gini is the Gini index
μ is the mean of the variable
N is the total number of observations
Yi and Yj are years of schooling attainment of individuals.

Choice of Indicators and Unit of Analysis

(I) Student Related Indicators: Four indicators shortlisted under this category; these indicators complement each other. The Net Enrolment Rate (NER), Transition Rate (TR), Gender Parity Index (GPI), and Survival Rate (SR) are indicators that complement each other and reflect the quality of students.

(II) Teacher Related Indicator: Educational qualification of the teacher is a strong indicator to portray the quality of teachers. The percentage of teachers having graduated and above degrees has been considered. PTR is another important indicator that influences classroom transpiration.

(III) Infrastructure-related Indicators: Unlike the other two dimensions, it has six indicators. Five of these indicators are related to the physical infrastructure of the school like the pucca school building, drinking water facility in the school, girls' toilet in the school, and school with electricity connection, and schools with all-weather roads. To reduce drop-out, a Mid-day meal (MDM) served in the school is important to increase enrolment rate and reduce dropouts.

(IV) Educational Gini: To measure inequality and regional disparity across all the districts in terms of the quality of education at the primary level computation of educational Gini becomes necessary.

Table 01 : Quality of Primary Education (Index Values of Students Quality, Teachers Quality, and Quality of the Infrastructure and Gini Co-efficient)

SL. No.	STATES and UTs	Index Value for quality of Infrastructure	Index Value for Quality of Students	Index Value for Quality of Teachers	Gini Value
01	ALL INDIA	75.92	47.75	34.75	
02	A & N ISLANDS	71.10	32.85	43.72	0.51
03	ANDHRA PRADESH	77.98	46.13	36.70	0.60
04	AR. PRADESH	46.00	57.53	30.48	0.68
05	ASSAM	66.50	56.07	31.55	0.66
06	BIHAR	64.63	51.54	30.79	0.68
07	CHANDIGARH	93.56	44.85	40.86	0.50
08	CHHATTISGARH	69.76	50.64	37.07	0.57
09	D & N HAVELI	77.12	56.99	34.99	0.55
10	DAMAN & DIU	95.55	45.92	34.83	0.51
11	DELHI	89.21	45.96	44.58	0.51
12	GOA	94.54	37.04	42.24	0.44
13	GUJARAT	90.93	45.24	28.30	0.61
14	HARYANA	89.49	40.67	31.96	0.58

15	H. PRADESH	73.96	47.29	32.76	0.47
16	J & K	62.35	35.87	35.17	0.64
17	JHARKHAND	71.95	43.90	22.04	0.64
18	KARNATAKA	92.38	41.74	34.67	0.58
19	KERALA	90.03	42.00	39.67	0.45
20	LAKSHADWEEP	68.18	43.41	27.62	0.42
21	MADHYA PRA DESH	73.24	43.81	38.80	0.58
22	MAHARASHTRA	84.73	47.56	31.70	0.52
23	MANIPUR	59.49	68.29	34.78	0.59
24	MEGHALAYA	50.00	69.01	29.88	0.67
25	MIZORAM	51.32	64.44	25.02	0.56
26	NAGALAND	62.89	46.73	28.83	0.64
27	ORISSA	66.58	47.34	32.30	0.47
28	PUDUCHERRY	87.81	49.71	44.24	0.44
29	PUNJAB	108.20	43.43	56.21	0.58
30	RAJASTHAN	74.51	42.77	31.52	0.70
31	SIKKIM	74.02	48.07	29.94	0.54
32	TAMIL NADU	88.98	49.24	43.38	0.49
33	TRIPURA	58.09	55.36	23.35	0.57
34	UTTAR PRADESH	76.66	40.04	29.39	0.65
35	UTTARAKHAND	77.97	46.00	41.65	0.56
36	WEST BENGAL	70.02	43.81	35.27	0.44

Source: Calculated by the Author Based on Secondary Data.

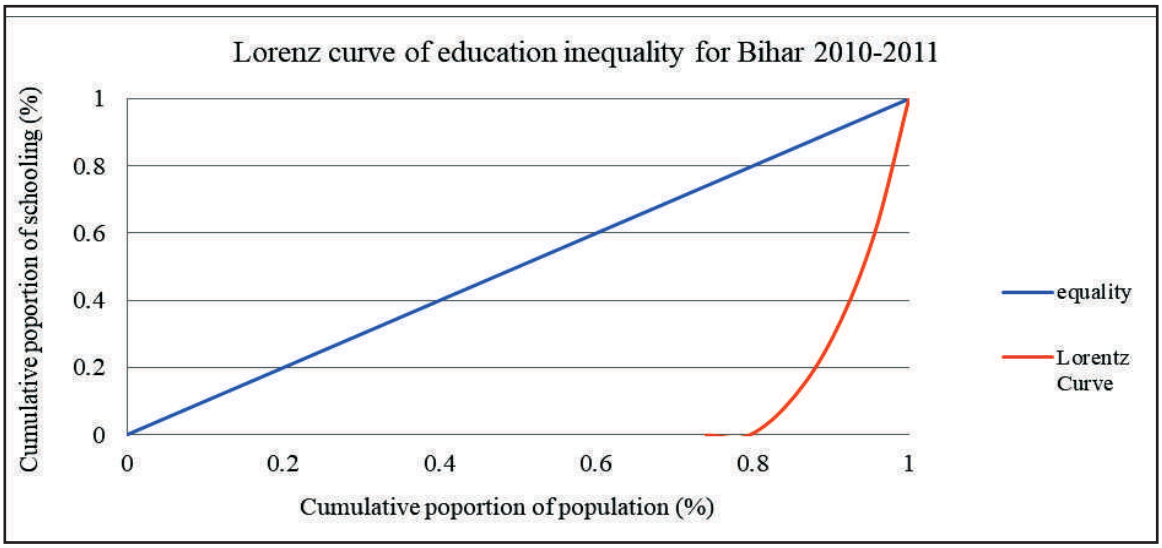

Fig. 05

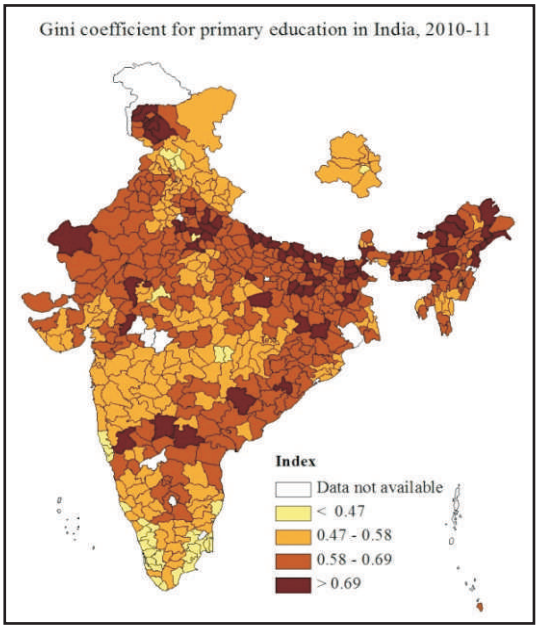

Fig. 01

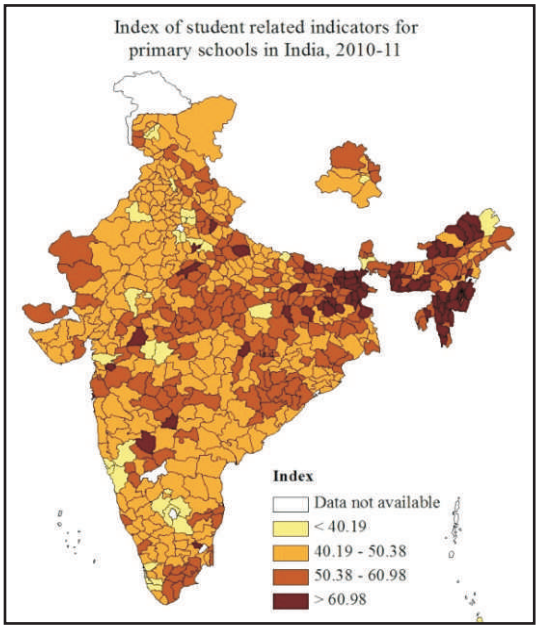

Fig. 02

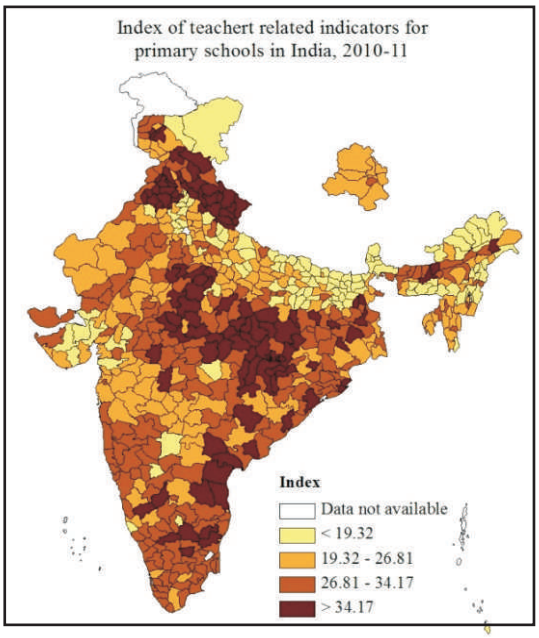

Fig. 03

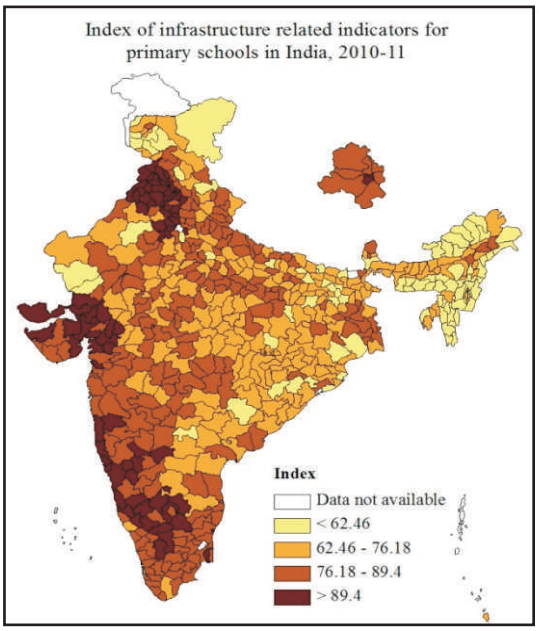

Fig. 04

Maps of India 2010-11 for Education Gini, Student, Teachers, Infrastructural Indicators in Primary Schools.

Prepared by the author based on the computation of Gini Values.

The above figure shows the Lorenz curve of inequality in primary education in the state of Bihar for the years 2010-2011. The Lorenz curve for the state of Bihar highlights widespread inequality.

Similarly, the Lorenz curve drawn for the period of the year 2010-2011 for the state of Kerala has a completely different story to tell. Figure No.3 shows comparatively less inequality in terms of the quality of primary education in the state.

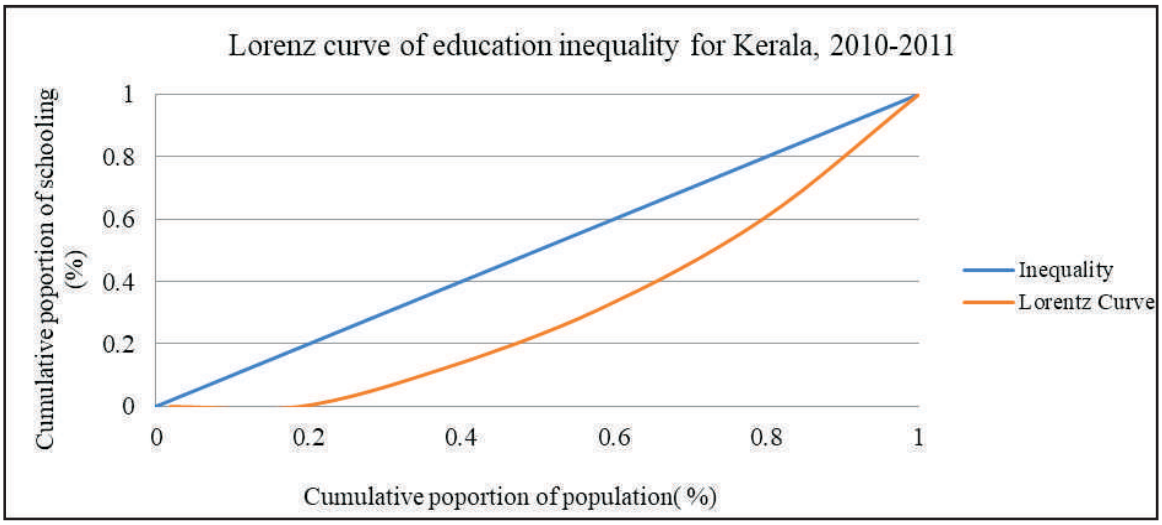

Fig. 06

Prepared by the author based on the computation of Gini Values Elaboration on the Findings:

To analyse the 'Quality of Students' at the district level, variables like Net Enrolment Rate, Transition Rate, Gender Parity Index and Survival Rate are computed. In terms of Net Enrolment Rate, the lowest value computed is of Dibang valley of Arunachal Pradesh which is followed by Darjeeling district in West Bengal. On the other hand, the highest Net Enrolment rate is in the districts of Mizoram.

Schools and Institutions imparting Elementary Education situated in remote geographical locations tend to be in a disadvantageous position for obvious reasons. However, Mizoram a state much higher in overall literacy rate is like a beacon in terms of high awareness level towards education. The same is not true for the Dibang district in Arunachal Pradesh, a remote district with a sparse population.

Transition rate is the rate of the students moving from lower class to upper class. In the present endeavour, those moving from the primary level to the upper primary level are considered. As far as this indicator is concerned the South Garo Hills of Meghalaya, a predominantly tribal district has the lowest transition rate while the highest is in Mumbai, Maharashtra; followed by the Longleng district of Nagaland. **The Gender Parity** Index, which is a ratio between the girl and boy student, shows the Sirohi district of Rajasthan has the lowest Gender Parity closely followed by Mohali in the state of Punjab. Among the high Gender Parity Index Bishnipur district of Manipur and Jayantia Hills district of Meghalaya leads the tally indicator for the student analysis is **'Survival Rate'** and the observations are; the lowest is observed in the district of Dibang Valley in Arunachal Pradesh followed by the Upper Subansari of Arunachal Pradesh and among the highest

recorded are the districts of Mumbai Urban in Maharashtra and Koraput in Orissa.

All the four values of each state indicator were summed up and divided by the number of indicators in the respective domain to calculate the indexed value. The index values range from 0 to 100, It is observed that students' indicators for the primary education for districts like Kurung, Kumey, Anjaw of Arunachal Pradesh and districts of Latehar, Saraikela- Kharaswan, and Simdega in Jharkhand, are extremely low. The three districts of Arunachal Pradesh mentioned earlier had the lowest students' related index value in the whole country out of 644 districts. On the other hand, a very high Index value for the quality of students is found to be in the districts of Senapati in Manipur, Mumbai Sub Urban, East Kamang in Arunachal Pradesh, and Perambalur district of Tamil Nadu.

It may be noted here that despite scoring very low on the student quality index value by some districts of Arunachal Pradesh and Jharkhand, the overall position of these two states was not at the bottom. The other districts of the said states fared well on this index value parameter.

Table No.01 contains the Gini coefficient for each state independently calculated by the author using the standard formulae mentioned in the methodology section.

In terms of the students' quality, which includes four separate indicators for the year 2010-2011, the Index Value of All India (National Average) stagnating at 47.75, which is not encouraging by any standard. A huge country like India can ill afford such a poor index value. Among the states, the North-Eastern states like Meghalaya (69.01), Manipur (68.29), and Mizoram (64.44) have fared well in comparison to other states. The high level of literacy rate along with the high incidence of socio-economic development may have some bearing. Among the non-performing states / UTs the tally is led by Andaman and Nicobar Islands, closely followed by the state of Uttar Pradesh. Haryana and West Bengal are very close with West Bengal marginally above the former. However, index values hovering near 40 are pathetic in themselves.

The mean for the quality of students was found to be 50.20 per cent, whereas the standard deviation for the quality of students was 10.32 per cent. The low standard deviation indicates that with regards to this indicator, the index value is more concentrated near the mean value and there aren't significant variations among the states and Union Territories of the country.

For assessing the quality of Teachers, the study is carried out by incorporating the indicators like Pupil-Teacher Ratio (PTR), Per Cent Female Teachers, Per Cent Graduate Teachers, and Per Cent Teachers receiving in-service training.

When the Pupil-Teacher Ratio it is observed that the Bhojpur district of Bihar had the lowest (PTR) followed by the Rampur district of Uttar Pradesh. Some of the lowest recorded districts are Nawada, Banka, Purnia, Bihar, on the contrary, the Lahul & Spiti district of Himachal has the highest PTR followed by Leh and Kargil in Jammu & Kashmir.

The next Indicator selected for the study of the per cent female teacher, it is observed that the lowest per cent of female teachers is in Mumbai suburban followed by Lakshadweep, Yanam in Puducherry and Kollam in Kerala, and the highest per cent female teacher is recorded in Dhubri Assam, Baghpat in Uttar Pradesh and Giridih in Jharkhand.

For the indicator, Per Cent Graduate Teacher it is seen that the lowest number of graduate teachers are in the district of South Garo Hill in Meghalaya followed by East Garo Hill Meghalaya and North Cachar in Assam. High index values are for the districts is found in the districts of Barnala, Jalandhar, Patiala, Sangrur in Punjab, and New Delhi in Delhi. Another indicator used in indexing the quality of teachers is in-service training of the teachers and it was found that South Sikkim in Sikkim, Papum Pare, Diband Valley, West Kamang in Arunachal Pradesh were having the lowest in-service training for teachers whereas the highest in-service training for the teacher is in the state of Karnataka in the districts of Kodagu, Chitradurga, Chikkamangalore, Chamarajanagara

other districts top of the list are Kerala's Wayanad, and Assam's Tinsukia.

The final index value shows districts like Longleng in Nagaland, Tamenglong in Manipur West Khasi Hills in Meghalaya, Madhubani in Bihar recorded the lowest index value whereas districts such as Garhwal in Uttarakhand, Jalandhar, Barnala, Patiala, Sangrur in Punjab, and Chamoli in Uttarakhand have high index value.

The state-wise picture is more explicit, where the national average index value for this indicator is 34.75. the best index value is for Puducherry (44.24), which in itself is an undesirable figure. The lowest among the states are Jharkhand, Tripura, and Uttar Pradesh with the first two having less than 23 and the U.P. having less than 30 index values.

The mean for the quality of teachers was computed was found to be 26.75 per cent, and the standard deviation for quality of teachers is 7.50 percent. very low standard deviation makes it clear that in terms of Quality of Teacher indicator, so vital in an overall assessment of the quality of Primary or elementary education in India is concentrated around the mean value (national average) and no significant intra data set variation is observed.

Quality of School Infrastructure:

This is an important parameter related to the quality of infrastructure in the primary education imparting schools among the 644 districts spread across the country. this parameter has six indicators namely Percentage of Pucca Schools, Percentage of Schools having Girls Toilet, Percentage of Schools with Drinking Water Facilities, Percentage of Schools with MDM (Mid-Day Meal) Servings, Percentage of Schools with Electricity Connection, and Percentage of Schools Connected with All-Weather Roads.

A wide range of disparities is observed amongst the indicator related to the structure of the building of the school. The district of Kanpur Dehat in Uttar Pradesh recorded the lowest per cent pucca school followed by Mainpuri in Uttar Pradesh, Arwal in Bihar, Bishnupur in Manipur. The list is topped by the districts of Karnataka i.e., Chamarajanagara, Uttara Kannada, Tumkur Maiduguri, Central Delhi in Delhi, and Raichur in Orissa. For Per cent of School with Girls Toilet, Kistwar district of Jammu and Kashmir has the lowest while upper Subansari district of Arunachal Pradesh followed closely along with Ukhrul in Manipur and Kupwara in Jammu Kashmir. The highest percentage is recorded in schools of Barnala, Sangrur, Jalandhar, Bathinda, Mansa, Taran Taran districts of Punjab.

The safe drinking water facility includes the piped water, water from the bore well (underground water), and covered wells. Tawang district of Arunachal Pradesh has the lowest per cent of schools having drinking water facilities. Tawang district is followed by the N.C.Hills district of Assam, Darjeeling in West Bengal, and Jayantia Hills in Meghalaya, while the districts having high per cent of such schools are Barnala, Sangrur, Jalandhar, Bathinda, Mansa, and Taran Taran districts of Punjab, Hisar in Haryana, Bhopal in Madhya Pradesh, Kisangani in Bihar.

Another important indicator and among the essential components to measure the infrastructural facilities at Primary Schools is the per cent of Schools with MDM Servings. It can be deciphered from the data that the district of Mandi in Himachal Pradesh has the lowest MDM followed by Faridabad and Gurgaon in Haryana, Basti in Uttar Pradesh. Among the better performing districts in Yaman in Puducherry, Lakshadweep, Anjaw in Arunachal Pradesh, Vaishali in Bihar, South Tripura in Tripura are important.

Sheohar, Nawada, Araria, Satimarhi, Vaishali districts of Bihar, Godda district of Jharkhand, and South Tripura district of Tripura are among the lowest per cent of primary schools having electricity connection. Schools in the districts of Barnala, Sangrur, Bathinda, Jalandhar, Muktsar, Mansa, Taran Taran, Amritsar in Punjab Rohtak, and Hisar in Haryana, Yanam in Pudducherry have the most electrified primary schools in the country.

The last indicator computed for quality of infrastructure is the Per cent of School with All-weather Roads, the district of West Siang in Mizoram has the lowest per cent of such schools, Siang district

is closely followed by the districts of Hanuman Garh in Rajasthan, Tungsang in Nagaland, Kurung Kumey in Arunachal Pradesh. The district with the highest per cent of schools with all-weather roads is in Barnala Sangrur, Bathinda, Jalandhar, and Mansa in Punjab, Dhubri, Goalpara in Assam.

For infrastructural facilities Index, the outcome reveals that the districts like Kurung Kumey, West Siang in Arunachal Pradesh, Lawngtlai, Lunglei in Mizoram, Doda, Ramban in Jammu and Kashmir, West Khasi Hills, Jayantia Hills in Meghalaya, Munger in Bihar recorded the lowest Index values. Among the districts having high index values are Barnala, Jalandhar, Bathinda, Taran Taran, Mansa, and Amritsar, in Punjab, Uttara Kannada, Tumkur, Madhugiri, and Chamarajanagara in Karnataka Panipat in Harayana, Central Delhi In Delhi.

As far as the state scenario is considered for this particular index value, it is clear that in general all the states and UTs have fared well. the national average is above 75. The state of Punjab tops the table with having values of more than 100. This value is possible since most of the schools have more than one connecting road and computing this information generally results in such exorbitant value. Daman Diu, Goa, and Gujarat respectively hold the second, third, and fourth positions.

The mean for the quality of infrastructure was 75.74 per cent and the standard deviation for quality of infrastructure was found to be 14.31 per cent. Similar to other indicators and their index values, low standard deviation indicates less concentration and less variation. Most of the states and UTs have values statistically more near to the mean or national value in terms of the infrastructural facilities at the primary schools in the country.

Education Gini:

The educational Gini calculated is presented in table no. 1, fourth column. It clearly shows the levels of inequality among the states and the Union Territories in India. The higher the Gini Value greater is the inequality. The highest Gini value i.e., 0.70 is in Rajasthan followed by Bihar. The lowest Gini value is in West Bengal. With a closer look, one can find out that the states having greater inequalities in terms of quality of primary education also fared low on the individual indicators for assessing the quality of education. The widespread inequality within the states and interstate has a plethora of probable factors. The significance of the finding lies in the fact that it succinctly brought severe chinks and loopholes in elementary education in the country. The study assessing the quality of education at the foundation of the whole educational system measured through three essential parameters exposes a deplorable situation prevailing across the states. Further, the intrastate inequality highlights the regional disparities within the states that otherwise rank high in the overall quality index. Regional disparity within a state has dynamics that require an incisive and holistic approach to genuinely address the problem.

Observation and Suggestions:

The paper looks into the various aspects of elementary education at the district level by preparing the indexed values for three essential components of primary education related to the infrastructure, Students, and the Teachers. Values of sub-indicators under separate parameters are statistically clubbed together to get respective index values. The exercise is done to rank the districts based on the quality of education at the primary level.

The outcome reflected in table no. 1, indicates the highest and lowest index values for the selected parameters to assess the quality of education across the 644 districts of the country. The top three states that fared well or have Index Value more than the national average in terms of the quality of students are from the North East. It's a pointer that the demographically large Indian States like Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh, etc, are among the laggards, for none of the districts of these states have values higher than the national average. High enrolment rates and favourable Gender Parity Index (GPI) among the districts ofNorth–Eastern states, open a new vista of possibilities to uplift the standard of Primary Education in particular and overall education in general. It has been observed

that states with better district-level index values tend to find a place among the top performers.

The Study successfully presents a vivid picture of the overall quality of education at the district level, across the states and Union Territories. It is noted that as far as the Infrastructural Facilities are concerned there are around 25 districts with values equal to the national average i.e. 75.75, about 292 districts below the national average, and 320 districts were above the national average. In the inquiry to find out the quality of students, it is observed that about 35 districts are in the line with the national average which is 50.2, around 302 districts below the national average, 300 districts had index value more than that of the national average. Another important domain namely the Teachers' quality index value shows that only 33 districts have values at par, 288 districts below, and the remaining 312 districts have values above the national average. The district-wise analysis elaborated and highlighted the wide disparity prevailing among the geographic regions in general and the states in particular. The overall picture is a mixed bag. The states having high index values present silver linings, whereas the populous states in the northern and the eastern part of the country are the cause of concern.

The state of West Bengal concerning some of the sub-indicators has displayed high index values in comparison with states of its size. As per the third parameter, the districts of Punjab and southern states did well. The North Eastern States in general and Arunachal Pradesh, in particular, are among the low-performing states. The present study with its limitations brings forth a pan-India picture in terms of important parameters essential to assess the quality of education at the primary level. The intrastate picture is highlighted through the Education Gini value. The state of Rajasthan has the highest level of inequality and disparity whereas West Bengal has a relatively better regional balance among the primary schools and institutions. All the NE states have a very high level of disparity implying disadvantages for geographical remote areas. The inaccessibility and general lack of penetration of public policies in the nook and corner of the state have a strong bearing on such findings. The populous states of North and Central India have moderate Education Gini values that suggest widespread inequalities and prevailing ubiquitous deplorable conditions of primary education across the state. Such conditions are reflections of large-scale system failure and warrant serious remedial measures.

Smaller states like Puducherry and Lakshadweep UT with high quality of education and low regional disparities set examples before the others.

Importantly, the Gini values for non-performing states are also high indicating widespread intrastate and inter-district inequalities. A lot needs to be done to uplift the condition of Primary education in the country. A strong foundation supports a strong structure. The whole of the Indian education system needs a revamp and more so in the case of the Primary/elementary education system. The goals of the Universalisation of Elementary education are incomplete without adding a dimension of universal yet quality education. The study with all its limitations hopes to add to the vigour in putting extra effort to better the educational indicators in the lagging areas.

The analysis has two significant implications which need immediate consideration. The better index values for few districts in the NE Indian states in terms of students' quality bring a glimmer of hope. High enrolment rates along with favourable GPI are indicative of a decent level of awareness for education in society. The sense of alienation and psychological distance from mainland India can be mitigated once the education right from the primary level is taken good care of. The bad quality of teachers and subsequent substandard teaching have the potential of spiralling negative impact with snowballing effect. It is observed that quite a few districts have above national average values in terms of teachers, such districts can be taken as resource-rich regions, and surplus (whatsoever) be transferred to resource deficit districts to minimise the inequalities. The all-India level quality of education at the primary level reflected as the national average is deplorable. States with index values below the national average present

a very gloomy situation and a matter of grave concern. The need of the hour today is concerted efforts from all the stakeholders and if required the private players should also be roped in, to immediately address the plight of primary education in India.

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Some Socio-Economic Implications of Covid-19 in Garhwal Himalaya Inter-District Geographical Analysis

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ABSTRACT

The impact of pandemic in terms of facilities show significant variation with reference to the population densities, community structure, social set up, rural-urban structure of countries, states and regions. At the same time observation of covid protocols has been critical. The strength and reliability of local health system has played a significant role. Present paper has taken up preliminary investigation during lock down in the regional background of high mountains environment of Western Uttarakhand State. There are significant inter district rural-urban variation with reference to activity pattern during home confinement. Seventy percent rural population of Garhwal Himalaya distributed into small size of a scattered settlement served a natural shock absorber in the spread of pandemic in this region.

Keywords : *Pandemic, Migration, Rural-Urban.*

Introduction

This study deals with the affects of covid-19 after the pronouncement of nationwide lockdown in the country. Total physical disconnect of people with the neighbour's resulted in total confinement within the residential premises. Even within the family if a member suffered undefined sickness or it was isolation because there was panic due to insecurity, selfishness, and fearfulness within the family. This study has been conducted in the regional background of Garhwal Himalaya, i.e.; Western Uttarakhand on the district level information. Garhwal Himalaya region has high mountain geographical environment with the altitudinal range of 300 to 7,817 meters. The mountain region of Garhwal is divided into Great Himalaya (Uttarkashi and Chamoli district), Inner Lesser Himalaya (Rudraprayag and Tehri Garhwal), Outer Lesser Himalaya (Pauri Garhwal and Dehradun), while Haridwar district present foothill plain and gangatic plain. According to census 2011, Garhwal has total population of 58.6 lakh and 30.8% of it is associated with urban areas. Only Dehradun and Haridwar districts have share of urban population above 35% while Tehri Garhwal, Rudraprayag and Uttarkashi have urban population below 12%.

The table shows the total cases, recoveries, deaths as of september 2021 in Garhwal Himalaya and the total population of different districts according to 2011 census.

Covid-19 has infected countries and regions without any discrimination. No government was prepared to handle this unexpected, unconceived, unpredicted, undefined highly infectious virus communicating through personal contacts. It has been spreading with a terrific force and become a major threat for humanity and shattered the society. Government had no option but to impose sudden lockdown. In this period, people used various home remedies to boost their immunity and under take each steps to secure their life. Present investigation is limited to inter-districts and Rural Urban responses of respondents on the adjustment mechanism during this period.

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Table 01 : Impact of Covid-19 in Garhwal Himalaya.

Districts	Total Cases	Recoveries	Deaths	Total population	Per cent Cases
Uttarkashi	12,463	12,032	74	3,30,086	3.8
Chamoli	12,138	11,826	62	3,91,605	3.1
Rudraprayag	8,736	8,457	106	2,42,285	3.6
Tehri Garhwal	15,818	14,816	107	6,18,931	2.6
Pauri Garhwal	17,539	16,512	313	6,87,271	2.6
Dehradun	1,11,931	1,07,654	3,511	1,696,694	6.6
Haridwar	91,389	50,008	1,004	1,890,422	4.8
Total	**2,70,014**	**2,21,305**	**5,177**	**5,857,294**	**4.6**

Source: health.uk.gov.in & Census 2011

Data Base and Methodology

Present Study is based on Primary and Secondary sources. Primary data has been collected through the well structured questionnaire through Google form as per the restrictions imposed during the pandemic and followed the standard operating procedure (SOP's) of Government. We collected 1,017 samples from the different districts of Garhwal Himalaya through Post Graduate students of Geography Department during June 2021.

Objectives of The Study

1. To analyse the impact of covid-19 on the rural and urban population of Garhwal Himalaya.
2. To analyse the adjustment pattern of individual's activity during home confinement.
3. To analyse the inter district / rural - urban pattern of migration due to covid-19 during this period.

Result and Discussion

Covid 19 has created unexpected challenges before the government of nations as it appeared suddenly with terrific force. India being a most populous country left with no option but to impose lockdown throughout the country with no prior indications. People were forced to stay at home while the migrants working all over the country are encountered with far greater challenges, some returned to their native areas with adverse effects of covid-19. This sudden change in the way of life brought multi-dimensional affects on the behaviour of people. For some people, the economic aspect was far challenging while for the others, psychological adjustment during this period was critical. People were forced to adopt engagement pattern to make the life comfortable. Present paper deals with the varied pattern of patients and survival during this critical period of uncertainty and chaos. Results of respondents from Garhwal region are being presented in brief. Problem of rural and urban areas are quite different with regard to the management of covid-19 stress. In rural areas, lockdown did not impact their occupation and the fear of infection was

much less.

Population Affected by Covid-19

This period of pandemic affected different age groups but the most affected were the young male population who came under the impact of Covid 19. Responses from different districts were recorded and analysed. Affected young population from the rural areas accounts for 61% total responses. The highest participation was reported from the district Pauri Garhwal 53% followed by Dehradun 47% whereas districts Haridwar and Rudraprayag show the figures of 34-41% Respectively. Chamoli district has 44% young affected population and the participation from Tehri Garhwal was reported as 45%. The lowest was reported from the district Uttarkashi 33%. Female and older population were also affected (Fig. 01).

The highest share of respondents toward older population can be seen from Rudraprayag 21% followed by the district Dehradun 20% whereas the districts Haridwar and Uttarkashi show 16-17% participation. The district Chamoli had 13% responses and Tehri only (9%) while the lowest was reported from Pauri Garhwal 4%. Female Population highest share was reported from Haridwar 18% followed by the district Uttarkashi 17% whereas the districts Chamoli and Dehradun show similar figure of 13% . Tehri and Rudraprayag also show the equal participation 11%. The least responses toward female population were reported from Pauri Garhwal district 12%. In Urban areas of Uttarkashi district affected young population was 100% followed by the district Pauri Garhwal 58% whereas district Tehri and Haridwar show the similar figure of 47%. Similarly districts Dehradun and Rudraprayag also show the similar figures 50% whereas in Chamoli the affected young people were 46%.

Older and the Female population was least affected. The highest responses for the older population was reported from Dehradun district 17% followed by Haridwar 16%, Chamoli 15% while in the districts Tehri, Rudraprayag and Pauri older population was less affected with figures 7-8-3%. Lowest was reported from Pauri Garhwal 3%. The highest affected female population region was Rudraprayag 17% followed by Tehri Garhwal 13% whereas districts Chamoli and Dehradun contributed 8% responses. Similarly districts Haridwar and Pauri Garhwal reported equal figures, i.e; 11%. The lowest affected region remained Uttarkashi district.

Activity Pattern at Home During Lockdown

In the rural areas of Garhwal, respondents continue to maintain their 67% engagement in miscellaneous activities as per their earlier routine because it was necessary to run the agrarian eco-system of these areas. Most of the requirements were fulfilled in their neighbourhood. Different districts of Garhwal present varied participation in miscellaneous activities. Pauri Garhwal district with 66% participation where the impact of rural out migration and underdevelopment is high. Rudraprayag and Chamoli district having almost similar geographical environment show significant variation in this activity Chamoli district has 49% participation against 56% of Rudraprayag district which clearly shows the variation in basic employment pattern. It shows that these figures are inversely related to urbanisation and non agricultural occupation. Lowest participation is reported in work from home and the figures appeared to be possibly related with the level of urbanization. Dehradun and Haridwar district maintain identical 13% participation in these activities while Tehri 5% and Pauri (48%) present the lowest level. Higher participation is recorded from Uttarkashi 17% in this activity required further investigation. Domestic work could be regarded as a common feature for all areas but it is surprising to know that Pauri Garhwal district carry the lowest percentage of 6% against 38% of Tehri Garhwal district there is a close correspondence between Chamoli 27% and Rudraprayag district 25%. These variations in correspondence to the status of their agricultural economy Pauri Garhwal

district with high level of migration finds least domestic work. In absence of social contacts and physical confinement to their home, electronic devices have served a great deal in the means of entertainment and maintain social contacts. Highest participation is reported from Uttarkashi 33% while Haridwar, Dehradun, Pauri Garhwal district have almost identical 20-22%. Higher figures of Uttarkashi district may be the outcome of the inaccessibility in its higher upper region.

Miscellaneous activities in the urban areas of Garhwal Himalaya accounts for 47% of respondents. Uttarkashi district find its 100% participation in this activity district like Chamoli and Tehri Garhwal have 50-55% engagement in these activities followed by Haridwar 65%. Respondents from Dehradun and Pauri Garhwal contributed the lowest participation (42-45%). The respondents from Rudraprayag district was seen in the domestic work with highest participation of 33% whereas Dehradun, Tehri Garhwal and Chamoli have almost similar participation of 8-10%. On the other hand, Pauri Garhwal and Haridwar district show relative higher participation of 15-16%. In the urban areas work from home related stress can be seen from each district except Uttarkashi. District Chamoli (23%) shows the highest participation whereas the district like Tehri, Dehradun and Rudraprayag show the house related stress between 15-18%. The lowest participation of Haridwar owes to its sound agricultural economy. Due to lockdown most of the people were at home and spent time in using mobile and Ramayana, Mahabharat serial on TV. Higher participation can be seen from the district Rudraprayag 50% followed by the Dehradun 33%. The respondents from Pauri Garhwal show the participation of 26% while other district like Chamoli, Tehri Garhwal, Haridwar show lesser (15-19%) participation.

Task Accomplished by Return Migrants

Return migrants in the rural areas accounts for 58% of People from different districts were forced to shift into the new work for their survival during this period of pandemic. In the rural areas very few respondents reported the change of work done to lack of opportunity.

Respondents from district Chamoli have highest 11% participation to settle themselves into the new work, the remaining districts Rudraprayag, Tehri, Dehradun and Haridwar show only 5-9% participation. Returned migrants in Dehradun district attributed highest 53% share in social work. Participation in social work can also be seen from Chamoli (43%) and it is followed by Uttarkashi, Rudraprayag and Haridwar districts (32-33%) in close correspondence. Returned migrants in Rudraprayag district contributed to 26% in house repair work followed by Tehri and Haridwar (22%) while Dehradun and Pauri district, show similar 13% figures whereas in Uttarkashi and Chamoli district show moderate participation. Returned migrants in urban areas accounts for 48%. In urban areas the highest participation toward settling themselves into new work can be seen from the district Uttarkashi. People from all the districts of Garhwal tried something new to survive in this critical period. District Rudraprayag, Dehradun and Chamoli show the similar figures of 8% whereas Tehri Garhwal show the participation of 18% respondents while in district Pauri 9% participation can be seen. The lowest participation toward finding new work was reported from Haridwar 5%. people from the urban areas also tried to engage themselves in social as well as in house repair work. The participation from different districts can be seen. The highest responses toward social work was reported from Pauri Garhwal 34% followed by other districts and Lowest from the district Tehri and Uttarkashi whereas in house repair work highest participation can be seen from Tehri Garhwal 46% followed by the other districts and lowest responses were reported from the district Uttarkashi .

Migration of Family Member During Pandemic

Huge number of people migrated in this period. Workless living in rented accommodation migrated to their native places. About 68%

respondets reported continued to their original place and hadn't migrated. District Chamoli has (83%) participation followed by the district Tehri (81%) and Rudraprayag (74%). District Dehradun show 71% participation of respondents whereas from Haridwar and Pauri Garhwal it was recorded as 65-58%. The lowest was recorded from the district Uttarkashi 50%. One reason behind these huge figures can be the satisfaction of their place. Potential Migration was reported highest from the district Uttarkashi 16% followed by the district Haridwar 8%, Dehradun 6% whereas the districts Chamoli and Tehri Garhwal reported equal participation of 4% and district Pauri only (2%). The lowest participation of respondents was reported from Rudraprayag 1%. Returned Migrants in rural areas had highest share of 33% was reported from Pauri Garhwal followed by the district Uttarkashi (17%), Haridwar (16%), Rudraprayag (15%) and Tehri Garhwal show (10%) participation and Chamoli reported only 4%. (Fig. 04).

The lowest was reported from the district Dehradun. Respondents for out migration was reported highest from the district Dehradun 23% followed by the district Uttarkashi 17%, Haridwar 11%, Rudraprayag 10% whereas districts Chamoli and Pauri Garhwal reported 7-9% participation . The lowest figures reported from the district Tehri Garhwal (5%) (Fig. 04). Similar responses were also recorded from the urban areas where 57% respondets continued at home. The highest figures were recorded from the district Uttarkashi (100%) followed by the districts Dehradun (79%), Tehri Garhwal (73%) , Haridwar (63%), Pauri Garhwal (57%) and Rudraprayag (50%) districts. Potential Migration from district Tehri Garhwal (18%) was followed by the district Rudraprayag (17%) and Chamoli 12% whereas districts Pauri and Haridwar reported only 6-5%.The highest returned migrants in the Urban areas were reported from the district Chamoli (31%) followed by the district Pauri Garhwal (23%) whereas the district Rudraprayag, Haridwar and Dehradun show equal participation of 21%. The participants also responded with out-migration and the highest were reported from Chamoli 19% followed by Rudraprayag, Pauri Garhwal, Haridwar and Tehri Garhwal between 9 – 12% migration.

CONCLUSION

The vulnerability of covid-19 appears to show universal pattern without reference to the geographic environment or the development status of an area. In the first wave of pandemic, the young population has been the victim of pandemic in all over world. India and Garhwal region has the greater impact of covid on Young and Inter District variations are insignificant. Pauri Garhwal and Dehradun district show highest (53-47%) while Uttarkashi and Haridwar represent lowest figures. Similarly old people and female were least affected. Economic impact of covid-19 on the population of Garhwal Himalaya was comparatively less as majority of respondents had secured income. Garhwal Himalaya is also noted for rural out migration and different districts maintained their share of in migrants as per their trend of out migration. Pauri Garhwal district show 33% of such migration in rural population while the Urban population show only 18-23%. This period of pandemic had brought a lot of changes in the life of people from Garhwal Himalaya and across the country. It is apparent that people living in the urban areas were left with no option but confined to their house premises but the people who were living in the rural areas were busy with the normal routine of agrarian schedule and felt less stress during this period. This study also shows that in the urban areas 27% people have started adjusting themselves in work from home, but in the rural areas only 7.5 % people did so. This clearly shows that if the pandemic had gone worst on the people living in urban areas have to face a lot of problems to adjust with their servings. The study also shows that female and old population were affected to a lesser degree compared to the young male population. Study also shows that 74.9 percent people were confined to the place during the pandemic in Garhwal Himalaya. The Analysis of data received from 1017 respondents

reveal that spatial behaviour of various components of study show positive and negative relationship with the distribution of basic resources (agricultural economy), phase of secondary and tertiary activities, pattern of out migration and urbanisation.

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MORPHOMETRIC ANALYSIS OF THE PRAVARA RIVER BASIN THROUGH SRTM AND TOPOSHEET DATA

Nanda Machhindra Vibhute

ABSTRACT

In the present study use DEM generated from Toposheet (20m) and SRTM (90m) data to compare the quality between them. Arc GIS software is used for thematic mapping and layer generation. Morphometric analysis and student 't' test has done through Microsoft excel. Bivariate statistical method is used for solving the student 't' test. The coarse resolution SRTM data do not reflect minor variations in the relief, whereas toposheet generated DEMs show more details. Finer resolution data would have captured the true landscape process in the study area. Higher fractal values and significant at 95 per cent confident level shows that variations are significant. Higher variability in Fractal Dimension suggest that, there are different landform units in watershed area, SRTM data will not do justice to all the units, hence a higher resolution toposheet data is more desirable.

Key Words : *DEM, Resolution, SRTM, Toposheet.*

Introduction

A landform is a natural physical feature on the earth's surface having a shape at a given scale, characteristic and formed by natural processes. It is the basis for all the earth surface processes and important for planning of geology, hydrology, agriculture, ecology, climatology, geomorphology and others. (Andy Jarvis, 2004) Automatic extraction of topographic parameters based on digital elevation models (DEM) and GIS are increasingly being used in the geomorphological and hydrologic research covering a wide range of scales, from global to local (Florinsky, 1998, Toutin 2001, Gerstenecker, et al, 2005, Demirkesen 2008, Klingseisen, et al, 2008). Several primary terrain feature derived from a DEM are an essential condition for the structure of channel networks. These include the curvature, slope and flow net determination. Slope is generally computed from the drop in elevation between a cell and the lowest along with its eight adjoining cells. (Khan, et al, 2014.)

Natural River patterns develop in response to the increasing effects of the upper catchment area, topographic slope and the permeability of the surface materials (Montgomery, D.R., 1988, Horton, R.E., 1945) many of researchers are used Digital elevation model for morphometric analysis as well as terrain analysis. During the last two decades the availability of DEM/DTM data has been continuously growing, data accuracy has improved, and additional algorithms have been developed and implemented through the industry standard and stand-alone GIS software programmers (Florinsky, 1998, Kamp, et al, 2005). SRTM DEM contains more information as compared to the DEM derived from the 1:50,000 topographic map, it cannot directly used for the extracting of channel network than it was used as an outside features. This was done to overcome the problems arising out of the mismatch between drainage lines derived from the SRTM DEM and the channel network on the topographic map. (Jarvis, et al, 2004) Most DEM have the generalization of land surface. Built into them if this generalization is within the spatial range of the processes that are operating in the landscape of interest there is no problem. If the generalization is greater than the resolution of the landscape processes any result obtained from DEM to be treated with caution (Pain, 2005).

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In the present study, DEM from topographical contours of 20m interval and SRTM image of 90 m resolution were used for deriving the morphometric parameters and for the landform characterization of a region, forming a part of the Western Deccan Traps, India. The emphasis of this investigation is placed on the comparison of the terrain derivatives from contour DEM and SRTM DEM to assess the utility of both in the landform studied of varying scales.

Aims and objectives

The main objective of the present study is to compare the changes in morphometric and basin parameters with respect to the DEM extracted from toposheet and SRTM data. That comparision also proved by statistical method which is fractal dimension.

The Study Area

The area which is selected for the study is the Pravara River Basin. This is located in the state of Maharashtra, Ahmednagar district, and tehsil of Akole, Sangmner, Rahuri, Shrirampur, Nevasa, and Shevgoan. The location map shown in the figure (01).

Pravara river is the tributary of the Godavari River. The Pravara river rises in the eastern slope of the Sahayadris between Kulang and Ratangad, the height of 1,468 meter ASL. The total catchment of the basin area is about 2,653 sq.km. About 12 miles after rising it falls down in rocky parts up to 200ft. deep, and then widening for thirteen kilometer through deep narrow gorge, which is wider valley at the east and bellow the central plateau at which village Rajur is located. Total length of the Pravara River is 193.12 Km. (120miles).

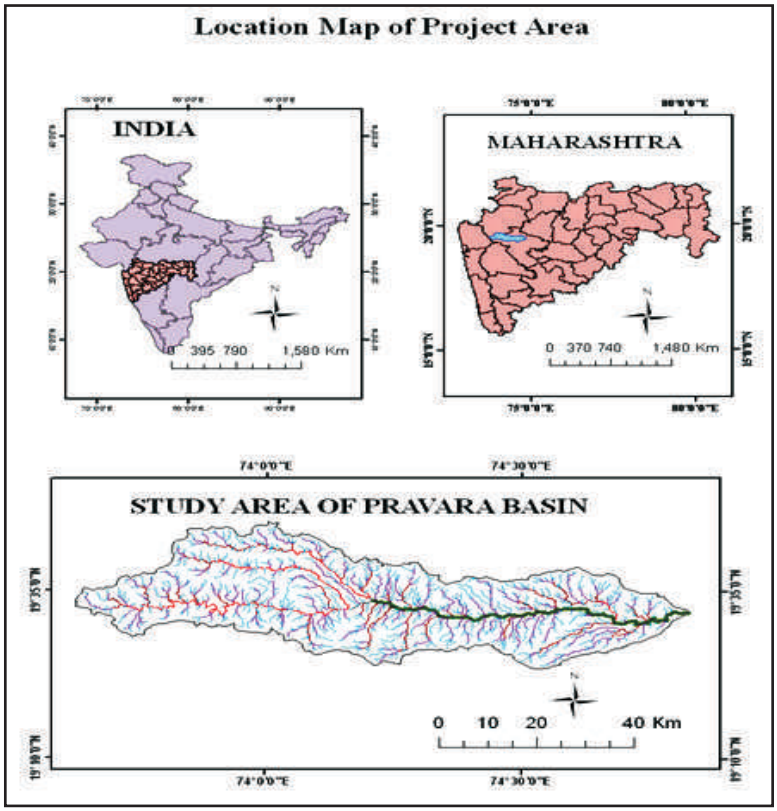

Fig. 01

Methodology

To carry out the objectives in this project work the following methodology has been adopted.

- ❖ Obtaining the topographical map 1:50000 scale of the study area from Survey of India (SOI) (Toposheet surveyed in 1968-70) and also downloading of SRTM 90m (Satellite data taken in 2008) resolution data.
- ❖ Digitization of the Toposheet with necessary layers of contour, river & spot heights. Extraction of the interested area from SRTM Data.
- ❖ Morphometric & basin parametric analysis by the ARC GIS 9.3 software.
- ❖ Graphical comparison of the data and calculation of Fractal Dimensions for both the data.
- ❖ Statistical tests apply to see the accuracy of the data.

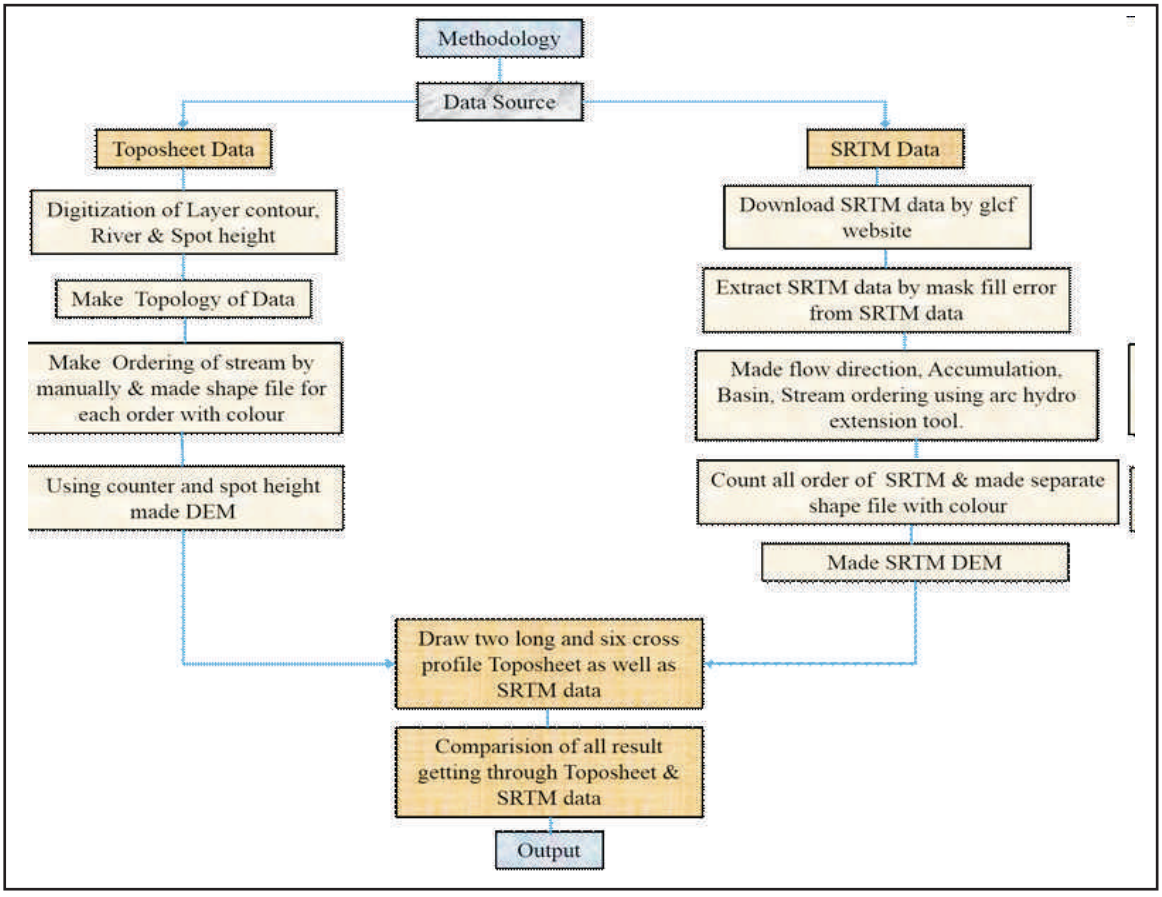

Fig. 02

In the period of 1960 to 70 there was not available the data like SRTM, Cartosat and other satellite data, therefor I used Toposheet data at 20m contour interval and SRTM data at 90m resolution because before 2010 there was not accessible any free satellite data for grater resolution than SRTM 90m.

Digital Elevation Model

Geo-spatial information describing the elevation of the land surface above a common datum

plane is defined as DEM. Digital terrain models represent segments of spatial data bases related to terrain features and landforms, and offer the most common method for extracting vital topographic information (Desmet and Govers 1995, Kamp, et al. 2005, Singh, et al, 2007). The DEM exacted from SRTM poses the problem of less information contains whereas area is flat. This was experienced by using SRTM (Shuttle Radar Topography Mission) DEM of the study area as an external drift to generate the final digital elevation model for the region.(Journel, A.G 1978)In this study DEM models were generate for both Toposheet & SRTM data. It represent visual difference of both data types.

Morphometric Parameters of The Basin Area

Morphometric parameters are measured from drainage map generated from Toposheet and SRTM Data. These drainage map are shown in figure 03.

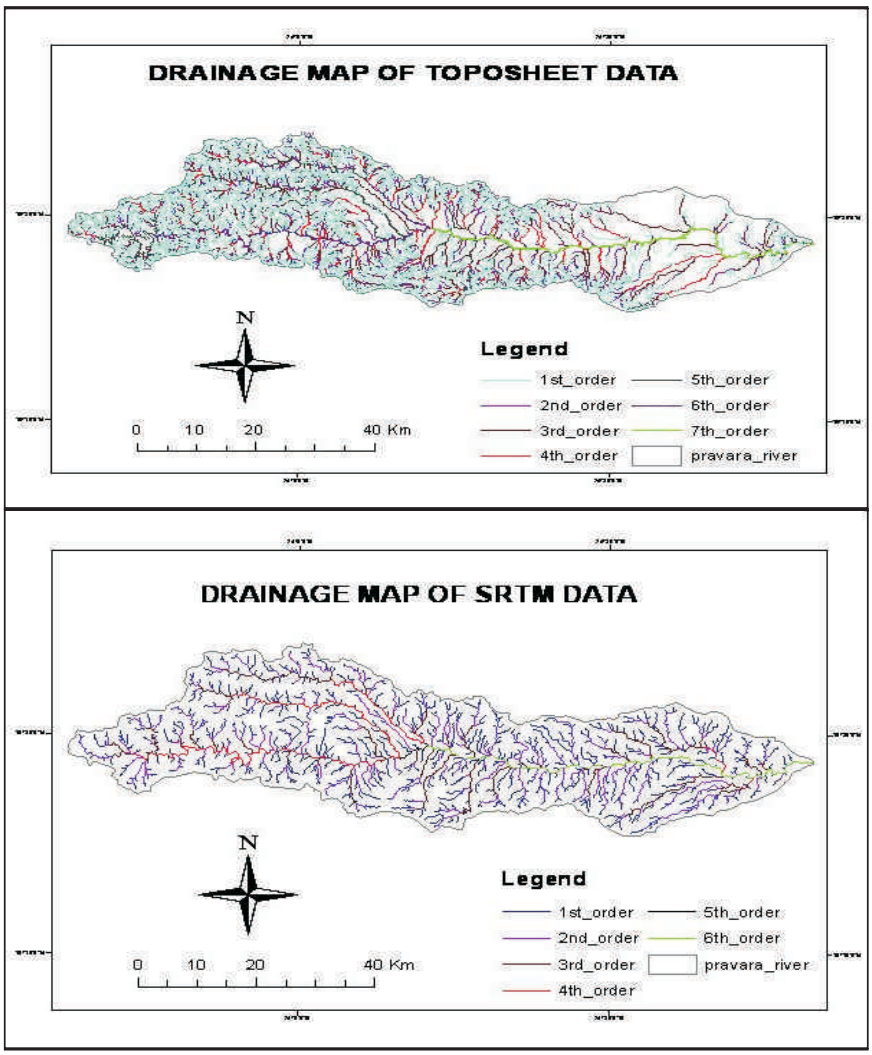

Fig. 03

Table 01 : Drainage Basin and Network Morphometry.

Parameters	Toposheet data	SRTM data
Linear Aspect		
Stream Order	7	6
Total Stream Length	3476167.4011010 m.	1099439.839 m.
Length of Main Stream	193.12 km	178.09 km
Stream Length Ratio	5.61	5.13
Bifurcation Ratio	4.605	5.807
Aerial Aspect		
Drainage Density	1.31 km/km^2	0.41 km/km^2
Stream Frequency	2.59km/ km^2	0.99 km/Km^2
Relief Aspect		
Relative Relief	1160m	1033 m
Relief Ratio	0.006	0.0053
Slope	0.0035	0.0031

Source: Morphometric Analysis done by DEM generated from Toposheet (1968-70) and SRTM (2008) Data.

Linear aspect

Computation of the linear aspects such as stream number, stream order for various orders, stream lengths for various stream orders, bifurcation ratio, and length ratio are described below. All these parameters are shown in table 01).

Stream Number (Nu)

It is the total number of streams gradually decreases as the stream order increases. Using Arc GIS, the number of streams of each order and the total numbers of streams were computed.

Stream Order

The disparity in order and size of the tributary basins are largely due to physiographic and structural conditions of the region. By applying of this ordering procedure using GIS shows that the drainage network of the study area is in the Toposheet data get the 7th order of the stream and 6th orders by the SRTM data. It means some streams are not shown in the SRTM data.

Stream Length (Lu)

Length of the stream is different for the different order of the stream as well as toposheet and SRTM data also. Total stream length of all the orders of the streams indicated by toposheet data is 3476167.4 m. (3,476.16 km.) and 1099439.83m. (1,099.43 km) by SRTM. 198.12 km is the length of the main stream in the toposheet data and 178.14 km. for the SRTM data.

Length Ratio (RL)

The length ratio (RL) is defined as the ratio of mean stream length (Lu) of segment of order (u), to mean stream segment length (Lu-1) of the next lower order u-1.leangth ratio for the toposheet data is 5.62, and for the SRTM data is 5.13.The RL has an important relationship with the surface flow discharge and erosional stage of the basin (Sreedevi, et al, 2005).

Bifurcation Ratio (Rb)

The term 'bifurcation ratio' (Rb) was introduced by Horton (1932) to express the ratio of the number of streams of any given order to the number in the next lower order. According to Strahler (1964), the ratio of number of streams of a given order (Nu) to the number of segments of the higher order (Nu+1) is termed as the Rb. Bifurcation ratio calculated for the toposheet data is 4.605 and 5.807for the SRTM data. Bifurcation ratio of the toposheet data is between 3 to 5 and it indicates geological and structural control in the basin of the study area (Sreedevi, et al, 2005). But bifurcation ratio of the SRTM data is more than the 5 it indicates that there is geological and structural control in the basin area and it shows the mature topography of the basin area (Sreedevi, et al, 2005).

Fractal Dimension Analysis

Linear Fractal dimension for the rivers & sample gullies were calculated by employing Divider Relation (Laverty 1987). The value of D ranges between 1 (almost straight) to 2 (nearly filling the plane). Statistically self-similar line reveals a constant value of D over a range of scales (Mandelbrot ,1967). The D value of the curve is estimated by measuring the length of curve using various step size increases. D can be calculated by the following equations :

$$LOG\ L = k + b \log d$$

$$D = 1 - b$$

Where 'L' is the length of curve, 'd' is the step size, b is the slope of the regression and K is the constant. From the above equations D is the function of the regression slope B. Steeper the negative slope (b is negative values), the higher is the Fractal Dimension. This technique was applied to the longitudinal and cross two profiles (profile shown in following figure 04 which are drown on the DEM map of Toposheet and SRTM data in which results are presented in the table 02.

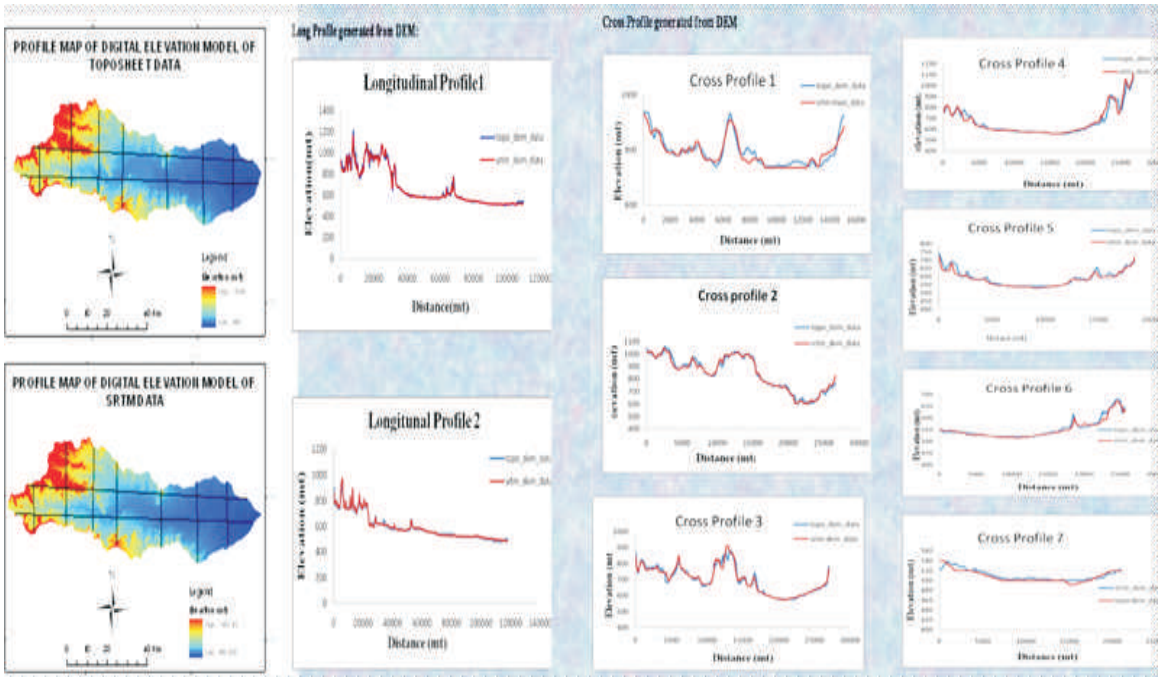

Fig. 04

Table 02 : Fractal Dimension Value for Both Toposheet & SRTM Data. Comparison Between Fractal Dimensional Value of Toposheet and SRTM Data.

Profile number	Fractal dimension value for Toposheet data	Fractal dimension value for SRTM data
Cross Profile 1	1.04	1.032
Cross Profile 2	1.148	1.113
Cross Profile 3	1.119	1.013
Cross Profile 4	1.096	1.082
Cross Profile 5	1.043	1.035
Cross Profile 6	1.031	1.031
Cross Profile 7	1.055	1.002

Source : Cross Profile Drawn by Toposheet (1968-70) & SRTM DEM (2008.)

Above table show the fractal dimension for both Toposheet and SRTM data. These value are getting from the Cross profile which are drown on the DEM map of Toposheet as well as SRTM data. This DEM maps give the variation in elevation in both the data. Above values are clearly show that the difference between the fractal dimension values.

The fractal dimension values of Toposheet data are higher than the SRTM data. Only the sixth value of the Fractal Dimension is same for both the data, because of in the actual field of the basin area there is not that much variation in the landform and surface elevation also not variation both DEM maps.

Significant Test

Fractal dimension value are gives variation but there is not support that's why there should need to apply the some statistics technique to prove the significant difference in both SRTM and Toposheet data. For this testing chose the “Student 't' test” (Statistical technique).by this testing get the values are:

Table 03 : Calculated and Table Value of 't' Test.

Value of ‘t’	2.25
Table value	1.94

Source : Fractal Dimension Value Taken From Cross Profile for Both Toposheet and SRTM DEM (Value Used From Table 02).

Value of the 't' is more than the table value at the level of 0.05. It means, at the 95% confidence level we can say that, significant difference in the data reflectance in the Toposheet and SRTM data.

Major Findings

- Toposheet data is useful for the study of the drainage as well as Morphometric study of the basin area. This holds true for the present area
- Toposheet data gives the ordering up to 7th stream order while SRTM data gives the ordering up to the 6th order.
- Bifurcation ratio from SRTM data is greater than that of toposheet data indicating highly structural & geological control.
- Length of the main stream in the toposheet data is 193 km. and this length given by the SRTM data is 178 km. Total length of the toposheet data is 3476167.4 m. it is much more then SRTM data. It is 1099439.8 m.
- Toposheet shows more Drainage density & Stream frequency.
- According to basin parameter, Toposheet shows minor details and gives greater results compare to SRTM data

- Fractal dimension values calculated from super impose profile of DEM are greater in Toposheet data.
- The result from student 't' is more significant for Toposheet than SRTM data, at 95% significant level.

Conclusion

Present research paper compare Toposheet 20m contour interval and SRTM 90m resolution data. The result revels that Toposheet data gives better results than SRTM. Morphometric analysis shows clear difference in resolution of both data in this analysis also shows toposheet gives high clarity than SRTM. DEM extracted from Toposheet and SRTM which are used for formation of drainage map and drawing the cross sections which are used for fractal dimension analysis. Value of fractal dimension also shows toposheet data is gives greater result than SRTM data. Students 't' test is also significant at 95 per cent level which proves that toposheet data is better than SRTM data.

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Role of Panchayati Raj: Structure, Functions and its Different Schemes in Uttarakhand

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ABSTRACT

Country's each village had a Panchayat that is having responsibilities to solve the local problems in that particular village. The 73rd Constitutional Amendment Act 1992, envisages a 3-tier Panchayati Raj System comprising Zilla Parishad or District Panchayat at district level, Block Panchayat at intermediate level and Gram Panchayat at the village level. For facilitating the states are believed to decentralize 29 functions to Panchayats and also make funds available for doing these functions. The government in all matters of rural development, it is the root of Panchayati Raj Systems. It encouraged full development in rural areas Panchayati Raj institutions are envisioned to function as gross root governing institutes not only as executing agency, as approximately 3/4th Uttarakhand population belongs to the rural areas so it is necessary to increase people participation in the rural development process. The centre of delivering different central government and the state government schemes is Panchayati Raj Institutions. In recent years they have been giving greater role in implementing and monitoring these schemes.

Keywords : *Rural Development, Gram Panchayats, Functions, Structure, Different Schemes.*

Introduction

Development is not a mechanical or technological change. The people development needs that people must be aware of their surrounding so as to understand their problem, identifying the opportunities available for a better life. The government in all matters of rural development, it is the root of Panchayati Raj Systems. In India, the local government's long tradition is as old greater than 4000years. Till the Britishraj's advent, in the medieval and ancient, there has been various political changes as well as disturbances in this institution. In India, the Panchayati raj history can be categorized in following periods from analytical viewpoint:

Vedic Era, Epic Era, Ancient Period, Medieval Period, British Period and Post-Independence Period

Country's each village had a 'Pancha Panchchasvanusthitah' Panchayat that is having responsibilities to solve the local problems in that particular village.

In Vedic Era, the word Panchayat Raj has reference to the Gram Sanghasor Ruler Communities' existence. The Panchayati Raj institution is as old as that of civilization of India.

In Epic era, the "Ramayana" study shows that there were 2 parts of administration was – "Pur" as well as "Janpad" or "city and village" "Gram, Maha Gram" as well as "Ghos" are maintained in the Ramayana.

In Ancient period, Kautilaya's Arthashastra' provides village administration's system's comprehensive account that exists at that time. In Chandra Gupta Maurya's era, they adopted policies related to the decentralization of power. The Governance's smallest unit is considered as the village. In Gupta period, the councils of village observed to be involved with regular bodies. In

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Central India, they were referred as 'Panchamandals' as well as' Gramrajanapadas' in Bihar.(Jain,1997)

In Medieval and Mughal period village bodies were the pivot of administration. In smallest unit, which is a village, is the place wherein Chaukidar and Lamb order Patwari looked after the management as well as necessary powers are possessed by villages so as in their territory they are regarded as self-governance. The Mughal local administration system existed over countries.(Singh, 1996).

Initially, the British visited India as traders as well as their primary focus was with the business as well as they don't have any interest in development and governance. In 1726, Bombay and Calcutta Municipal bodies were established. Further, Calcutta City Corporation established in 1863. In 1882, remarkable contributions were made in the local government's development by Lord Ripon. Also, provincial governments got some powers after Government of India Act, 1935. In all province, local bodies were given more function after the second World War, also, country's Independence that is till August 1947, there were no changes in the local self-government institution's position. Post-Independence period, the village panchayat considered as Indian National Movement's part. Gandhiji had given the idea of 'Gram Swaraj'. Acharya Vinoba Bhave organized the 'Gram DaanMoment'. But provision for Panchayats were not included in the Indian constitution's first draft. Among the country's pioneer state, one was Rajasthan. In 1953, Panchayati Raj system was introduced by Rajasthan with the Rajasthan Panchayat act 1953 enactment. Further, central government under the Shri Balwant Ray Mehta's chairmanship appointed an expert committee.(Ghosh, 1999)

Mehta committee, Rajasthan adopted 3 tier structures by legislation, known as "Rajasthan Panchayat Samiti and Zilla Parishad act, 1959."In 1977, Ashok Mehta studied the Panchayati Raj institutions' role in rural development as well as appropriate recommendations were provided by him. For tier structure, at the lower-level Mandal Panchayat is formed and at the district level a sharp body is formed for assuming the district government's role. In 1982, Dr C.H. Hanumantha Rao recommended that planning's decentralization must happen. Further, G.V.K Rao committee 1985 advice on Panchayati Raj institution's organization and poverty alleviation programes. Because of the several committees' recommendation, Panchayati Raj Institution is provided with constitutional status by the central government as well as 73rd and 74th constitution amendment act 1993 was passed for providing Panchayati Raj system's uniformity in India. (Ashadharah,1999, Baluchamy, 2004)

On 24th April 1993, 73rd Constitutional Amendment Act was approved as well as it has been cleared that on these amendments' lines legislative measures must be taken by the state government. Similarity 74th Constitutional Amendment was developed w.r.t. urban local bodies as well as District Planning committee was constituted at the local level for planning functions' decentralization. Constitution Article 243-G is added with a new schedule 11 prescribing 29 sector related to the rural development that the state government might transfer to Panchayati Raj Institution. The extent of devaluation of power and function leaves to the will of the state legislatures. The provision of the panchayat act came into force on 24th December 1996 extend panchayats to the schedule V area of 9 states. The 73rd constitutional amendment act 1992,envisages a 3-tier Panchayati Raj system comprising district panchayat or Zila Parishad at district levels, block panchayat at intermediate levels and Gram Panchayats at the village levels. (The Constitutional Amendment Act 1992).

Gram Panchayat

A "Gram"as defined under the act is divided into a minimum of 5 constituencies and one member

is chosen from each constituency. The elected members' bodies are known as gram panchayat. Gram panchayats' size varies broadly from one state to another. Gram Panchayat are constituted considering their income population and area. At the village level in the panchayat the office of the chairperson for schedule caste, schedule tribes are reserved in proportion of their population of the state.

Block Panchayat

This is the second tire of the administration at the block level. A block has several villages within. The block panchayat, according to the committee is an area large enough for functions which the villages panchayat can not perform and yet small enough to attract the interest and services of the residents. Reservation is given for women, scheduled caste and scheduled tribes. Government appointees the block development officer. He works as the block leader. Block panchayat at the tehsil level is considered as a local government body. This is link between the Gram Panchayat and Zila Parishad.

Zilla Parishad

The Zilla Parishad is at the Panchayat Raj system's top which is a 3-tier system in India. The Zila Parishad is an essential link to coordinates and check the work done by the block panchayat. There exists a provision for the scheduled tribes caste and scheduled caste's woman members' special representation which provides they are not adequate in normal courses. Reservation for women of general category has also be done. The chairman of the Zila Parishad is elected from among its member and state government transferred him to zila parishad. The terms of zila parishad is generally 5-year only. (Mathew, 2000)

Objectives

The study purpose is to analyse the gram panchayat's role in implementing the various government development schemes of rural development. The following are the aims of the study -

- To study the gram panchayat role in rural development.
- To know various schemes made by Government of Uttarakhand for developing its rural areas.
- To identify the obstacles faced by the Gram Panchayats to implement various schemes.

Functions of Panchayati Raj Institutions:

For facilitating this state are sponsored to decentralize panchayat's function (29 Subjects as instructed) as well as also making availability of funds for performing these according to recommendations of state finance commission. XI schedule's Article 243 G includes below panchayat activities-

1. Animal husbandry, dairying and poultry **2.** Minor irrigation, water management **3.** Land improvement, land reforms implementation **4.** Agriculture involving agriculture extension **5.** Public distribution system **6.** Welfare of the weaker sections and scheduled caste and scheduled tribes **7.** Social welfare **8.** Woman and child development **9.** Family welfare **10.** Health and sanitation including hospital primary health **11.** Market and fairs12.Cultural activities **13.** Libraries **14.** Adults and non-formal education **15.** Technical training and vocational education **16.** Education including primary and secondary schools **17.** Poverty elevation performance **18.** Non-conventional energy sources **19.** Rural electrification **20.** Roads culverts, bridges, ferries, waterways **21.** Fuel and fodder **22.** Drinking water **23.** Rural housing **24.** Khadi, village and cottage industries **25.** Small scale industries include food processing industries **26.** Minor forest product **27.** Social forestry and farm forestry **28.** Fisheries **29.** Maintenance of the community assets. (Mani, 1996).

Geographical Features of the Study Area

Uttarakhand located in the northern part of India, its location near the Himalayas is considered to be of religious significant. On 9th November 2000, it was carved out of the Uttar Pradesh, becoming India's 27 state. Dehradun is the Uttarakhand's capital.

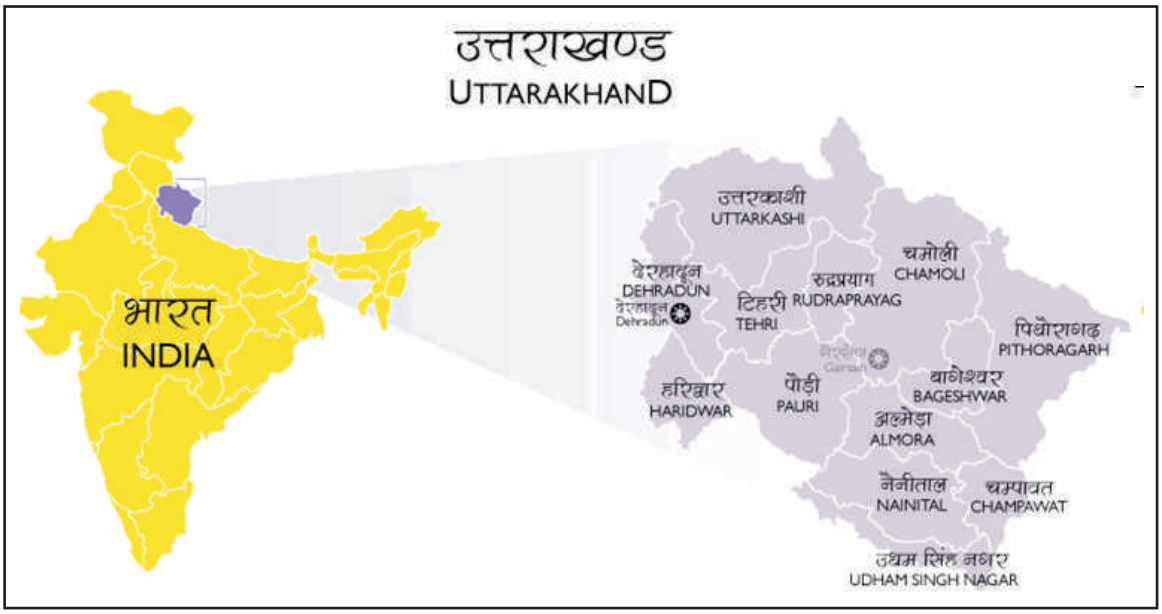

Fig. 01 Location Map of Uttarakhand

Table 01: Demographic Indicators of Uttarakhand

Total Population	1,00,86,292
Male Population	51,37,773
Female Population	49,48,519
Population Growth Rate	19.17%
Rural Population	70.25 Lakhs
Urban Population	30.91 Lakhs
Population Density	189 per sq. km
Literacy Rate	79.63%
Sex Ratio	963 females/1000 male
Male Literacy	88.33%
Female Literacy	70.70%

Sources: Census of India, 2011

Introduction of Different Rural Development Schemes

The introduction of policy of reservation for women in Panchayats was an important measure for improving the condition of women in Uttarakhand. 1996 it took out two months in the identification and fixation of creation for the seats reservation for women in the Panchayats' 3 tier system.The centre of delivering centre sponsored schemes and various programmes are Panchayati Raj institutions. There exists uniqueness in such schemes which aims in developing Panchayati Raj Institutions, capacities for planning priorities as well as significant development projects delivered locally.

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGA)

Since independence, India's major challenges includes offering remunerative employments to rural worker. Most of the unskilled workers of India experiences employment seasonality. This programme was launched in 200 districts in 2006 and covered to all rural districts from April 2008 has passed Mahatma Gandhi Rural Employment Act 2005.

Rural households' adult members can apply for registration either in orally or writing to the local

Gram Panchayats. Every registration unit is allowed for Unemployment's 100 days per year. The state government pays the beneficiary when within 15 days, employment is not offered. The work will be provided with in village's 5 km areas. The main objective of this programme is to create durable assets the livelihood assurance of the rural poor. (Dubey, 2007, Ministry of Rural Development Report 2006-2007)

National Rural Livelihood Mission NRLM (Ajeevika)

Ajeevika is considered as the mission of fight against rural property, introduced in June 2011. This replaces Swarna-Jayanti Gram Swarojgar Yojana (SGSY); Improving the existing livelihood option of poor, building marketable skills as well as nurturing the entrepreneurs and self-employed. Ajeevika skill development programmes use a system of poor's the participatory identification instead of the BPL list. Further more, NRLM Aajeevika's rolling out is approved by 26 states. (Deshmukh, 2008).

Pradhan Mantri Gram Sadak Yojana

On 25th December 2020, "Pradhan Mantri Gram Sadak Yojana" was started as a scheme completely funded by centre govt. for providing country's rural areas with all-weather road connectivity. Each road work is a "core network" part through roads' minimal network for providing access to the economic and social services. (Dewan, 2012).

Rajiv Gandhi Gram VidyutikaranYojana

In 2005, RGGVY was introduced for providing ruler household electrification. It primary includes transmission grids extension to un electrified villages, giving free connections to every BPL (below poverty line) household and distribution infrastructure's set up. To state government, Government of India provides 90 per cent of grant as well as REC (Rural Electrification Corporation) provides10 per cent as loan. Further, for the programme REC is considered as a nodal agency. (Ministry of Power, 2012).

Aam Aadmi Bima Yojana or Janshree Bima Yojana

On 10th August 2000, "Janashree Bima Yojana" was introduced. Rural group life insurance scheme and social security group insurance scheme was replaced by this scheme. 45 occupational groups like beedi workers, handloom artesian weavers, hilly area women, rickshaw puller, etc. have been covered under this scheme. Under this scheme, Person of18-59years age as well as these identified 45 occupational groups' members are eligible. In 2013, the government has merged the existing Janshree Bima Yojana with newly announced Aam Aadmi Bima Yojana extending similar benefit to landless agriculturist. (Agrawal, 2004).

Indira Aawas Yojana

This is Ministry of Rural Development's flag ship scheme for providing houses to BPL families in the rural regions. In 1985-1986, it was introduced as a RLEGP's sub scheme. From this year 1993-1984, the IAY scope was increased to protect BPL now scheduled castes/scheduled tribe's families in rural areas. Under IAY from the year 1999-2000, a BPL family was given a grant of 1,30,000 from new construction of house and Rs. 12,000 from construction of latrine in plan areas as well as in hill/difficult areas. The finding of IAY is shared between the state and centre in 25:75 ratio and the north eastern state case the ratio is 10:90 respectively. The village panchayat with gram Sabha helps then identify the beneficiaries and discuss the progress of the scheme in their monthly meetings. (Ministry of Rural Development, 2011)

Swachh Bharat Abhiyan

The sanitation campaign was introduced by the MORD in 1999 which aims for eradicating open defection by 2017. Community's and the panchayat's active participation are included in low subsidies. Swachh Bharat Mission has been launched on 2nd October, 2014 on Mahatma Gandhi's 150th birth anniversary with a vision of clean India by 2019. The main objective is improving the labels of cleanliness in rural regions through liquid as well as solid waste. Through the management activity as well as

developing gram panchayats that are sanitised, clean and defection free. The amount provided to BPL acknowledged APL household intend to Rs.12,000 for individual household latrines' one unit's construction as well as provides for water ability for strong for toilets cleaning and hand washing. (Shahid, 2014).

Pradhan Mantri Jan Dhan Yojana

On August 28, 2014, this scheme was introduced, with the objective for financial inclusion of the poor and rural population giving them financial independence. It has aim of covering all households in the country with banking facilities and having a bank account for each household. Under the schemes account holder will be provided zero balance bank account. There is no fee to open the account Jan Dhan account holders get an accident insurance covered of Rs. 1 lakh.

Pradhan Mantri Suraksha BimaYojana

On 9th May 2015, the scheme was introduced. The initiative will protect renewable sources annually for one year. The scheme will be sold by general national insurance providers and other insurance companies for the purpose of entering the scheme and related to banks. The coverage shall be for the duration of one year from 1June-31May. The insurance is Rs. 12 for any annual accidental death and total disability compensation is Rs. 2 lakh, with Rs.1 lakh for partially disabled. (Razi, 2014).

National Social Assistance Programme

Ministry of Rural Development introduced this scheme. This was started in August 1995.Presently NSAP comprise of the following 5 schemes-

- **Annapurna Scheme:-** Senior citizens are given food grains' 10kg/month for free, through eligible have remained uncovered under national old age pension scheme.
- **National Family Benefit Scheme (NFBS):-** A BPL households is eligible for a particular money amount on primary adult's death that aged 18-64years. The assistance amount is Rs. 20,000.
- **Indira Gandhi National Disability Pension Scheme (INDPS):-** BPL pensions aged 18-59 years with multiple as well as severe disabilities are eligible for Rs.800 pension per month.
- **Indira Gandhi National Widow Pension Scheme (NWPS):-** BPL widows of 40-59years age are eligible for Rs.800 pension per month.
- **National Old Age Pension Scheme (NOAPS):-** BPL persons of 60years or above age are eligible for Rs.800 pension per month. (National Old Age Pension Scheme, 2009)

Deen Dayal Uttarakhand Grameen Awas Yojana:- By considering the availability of limited funds under Indira Awas Yojana as well as for rural houses shelterless BPL families' excess demand. Also, "Deen Dayal Uttarakhand Gramin Awas Yojna" was initiated by State Government for bridging this great gap. This scheme's beneficiaries are free bonded labour, the schedule caste/schedule tribes' families which are affected by natural disaster like food, earthquake and families of defence person who are killed in war, etc. Uttarakhand's all 13 districts implemented this programme.

Rashtriya Bio-Gas Scheme:- This is 100 per cent centrally sponsored programme. It has been started in 1981-1982 for setting up of bio-gas plants. In Uttarakhand Rs.15,000 has been provided for installing bio-gas plants of 1 cubic m size in plane and hilly areas Rs. 20,000 grants for establishing 2-6 cubic m size bio-gas plant. (Khandalwal, 2007).

Border Area Development Programme (BADP):- Border areas development is border management's part. In the western region, the sensitive border areas' balanced development's two key objectives through sense of security's promotion and infrastructure facilities' adequate provision among the local population. In Uttarakhand (District-Chamoli, Uttarkashi, Pithoragarh, Champawat, Udham Singh Nagar) State Government has determined for extending such programme to border districts' other blocks according to the1960 status from their own resource.

Gaura Devi Kanya Dhan Yojana:- The scheme's aim was to offer economic support to the intermediate passed girls from BPL families to ensure that they can go for further education. The girls from rural areas whose parent's annual income are Rs. 15,976 and from urban areas whose parent's annual income of Rs. 21,206 are eligible to get benefit. The benefit of scheme is provided to two girls of one family.

Rastriya Krishi BimaYojana:- It was started in year 1990- 2000 to protect the farmers from the harm in crops which take place due to natural calamity like drought, floods, fire, pest, etc. It is provided to both the debtor farmers and indebted farmers. The coverage of NCIP (National Crop Insurance Programme) in introduced from 2013-2014. (Planning Commission Report 2014-15, 2019-20)

Veer Chandra Singh Garhwali Self Employment Scheme:- It was launched in 2002 - 2003 by the Government of Uttarakhand for Promoting Tourism in the state. Its aim to helps the residents of Uttarakhand in setting up tourism related entrepreneur activities. Beneficiaries are encouraged to purchase Taxi / bus, restaurant / motels, vehicle repair shops, garage, yoga centre, etc. This helps them to earn money and provide improved facilities to travellers. (Self-Employment Oriented Programmes, 2005)

Antyodaya Anna Yojana (AAY):- For making more effective public distribution system as well as focused on the poorest section of the population in December 2000 the Antyodaya Anna Yojana was introduced for 1crore poor families. Under the poor family's scheme from amongst the BPL families are offered food grains at a highly subsidized rate of Rs.3/kg for rice and Rs.2/kg wheat. (Mishra, 2008)

Findings:- The concept of the Institutions of Panchayati Raj is not new in India. In 1920 Gandhiji recommended the revival of Panchayat as self-governing bodies in the village. During the1980, it was strongly felt that it would be difficult to boost rural development without adequately involving the people at the grass root level in formulation and implementation of programs for their own development. in the year 1992, 73rd and 74th Constitutional Amendment Act was passed. The reservation for deprived class and women is mandated in Panchayats.The inclusion of women at the grass root level has created new opportunities for them in Indian politics. (Ministry of Power, 2013)

They tend to focus on social welfare projects, but they have to face many social, functional constraints in participating in Panchayat such as lack of family support, low skill, illiterate, male dominate society in village, etc.The primary objective of rural development is the empowerment of quality of ruler mass, and weaker section of the society. Many schemes of Central and state governments have been launched from time to time through Gram Panchayat such as MGNREGA social assistance programmes, Indira Aawas Yojana, NRLM and other development schemes particularly for upliftment of scheduled tribes, scheduled caste and women.

Gram Panchayats are given responsibility of listing of beneficiaries of different schemes along with the implementation of the schemes. Uttarakhand is a hilly area such States whose 80% population lives in villages. Many schemes are being implemented through Gram Panchayats to improve the living standard of the people. MGNREGA, IAY, Janshree Bima Yojana, social assistance programmes, Veer Chandra Singh Garhwali self-employment scheme, Antyodaya Anna Yojana (AAY) Swachh Bharat Abhiyan and Pradhan Mantri Jan Dhan Yojana etc are working well all districts in Uttarakhand.

NRLM, Rashtriya Krishi Bima Yojana, Rashtriya bio-gas scheme, Deen Dayal Uttarakhand Gram Awas Yojana, BADP, Gaura Devi Kanya Dhan Yojana, RGGVY, PMGSY, PMSBY the number of beneficiaries is less some blame that less target are set for these schemes but some times due to negligence, lake of interest on the part of Gram Pradhan and officials and low awareness among the people make it difficult for the people to get the full benefits of the schemes. MGNREGA has been enacted in 2006 to provide legal guarantee to every rural to secure the 100 days of wages employment, MGNREGA is creating positive benefits for women, young male workers thus helping their

empowerment. Indira Aawas Yojana (IAY) and other housing schemes provide financial assistance for construction of house but Uttarakhand maximum area hilly so due to high cost of building materials, there is also a need to increase the financial assistance.

The public distribution system like (AAY) have succeeded in securing the target minimum food requirement to the beneficiaries. It is also found that the majority of the various programmes have helped them to improve their economic conditions to some extent. It is observed that rural people are not familiar with all schemes of their welfare they are only familiar with some schemes like Indira Aawas Yojana, Pension Schemes and Antyodaya Schemes, etc. Low awareness, among the potential beneficiaries' partly because of the illiteracy, ignorance and partly because of Gram Pradhan and related official keep the people in the dark about the schemes. There are some suggestions for the effective working of Gram Panchayat for rural development. There is a need to evolves comprehensive and integrated social security package that include life cum disability cover, health cover and pension benefits and other. It has been observed that the success or failure of the various schemes depend on people associated with the schemes above all. It is also that responsibility of the people to co-operate with the Panchayats in implementing the various schemes of their development. Effective and meaning functioning of the Panchayat depend on the active participation and involvement of the people both male and female.

Conclusion

From the study, rural development is considered as a multi sectorial activity which includes agriculture development, infrastructure development, such as construction of roads, communication, schools, Hospital, water supply, improve nutrition, literacy and adult education, etc. The primary objective of rural development is the improvement of the quality of rural mass, particularly of the poorer and weaker sections of the society. Many schemes of state and Central Government were launched from many to time with the objectives of reducing unemployment and poverty in rural area. The Panchayati Raj Institutions is meant to give an opportunity to local people to participate in the development activities.

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Sustainable Rural Environment and Resources in Kunda Tehsil of Pratapgarh District, Uttar Pradesh

Pranay Kant Biswas and Shiva Shukla

ABSTRACT

In developing countries like India, a huge population base with its continuous multiplying effects put tremendous pressure upon existing limited crop land to produce more food. Hence the emphasis has to be on technological innovation and use of modern agro-inputs to enhance the productivity of fixed croplands. The effect of technological application in agriculture is well recognized and the essential part of modern agricultural practices. In the present paper, attempt has been made using both traditional and modern agricultural techniques to analyse the root cause of crop sustainability resources in Kunda Tehsil of Pratapgarh, District, U.P. where, about 70% population is engaged in agriculture. On the basis of data, Agricultural resources have been calculated integration with overlaying method (GIS) and have been applied to estimate the level of agricultural development. The District is well known for its excellent production of food grains and is locally called as "Belt of Dhan" of Uttar Pradesh. Several factors like water logging, salinity, terrain factors,etc and variations in application of modern agro inputs have led to remarkable spatial disparity in agricultural resources.

Keywords: *Level of agricultural resources, Mismanagement, Poverty, Conflict and Hunger, Agro inputs.*

Introduction

India has witnessed tremendous changes in agriculture and allied sector since independence and at the same time, it has registered balanced agricultural development and spatial variations in productivity. There are certain states and even certain pockets that have enjoyed the full benefits of **"Green Revolution"** and the development schemes because of their politico - administrative, Physico - Cultural and **"Socio Economic"** pursuits. Though the production of food grains increased about 15 million tons each year to reach an all time high over 680 MT. During the period 2014-18, it is still urgently needed to produce more grains to bring a balance between unparallel growth of population and food supply. In this context, we have made suggestions on both fronts - the balanced population growth and growth in agricultural production depends primarily on physical as well as "Socio - Economic" conditions of the study region. In the present time, the shrinkage in agricultural land due to various developmental activities and limited scope for further expansion of agricultural land put tremendous pressure upon the existing cultivated land. To support the population by 2023, we would be in need of about 100 MT. of additional food grains per year from the same area which is difficult because of encroachment of land and land under nonagricultural uses to meet the increasing demands of rail roads, buildings etc. Hence emphasis has to be laid upon to increase net sown area by land reclamation, multiple cropping and raising agriculture resources using **"Eco Friendly"** technology in different parts. The main objective of research paper is to highlight the mismanagement and subsequent depletion of the natural resources which has led to poverty, conflict and hunger. No, tangible efforts has been made towards in this area.

Sustainable development is multi dimensional concepts, with three interaction angles for natural resources management - "**Ecological Security, Economic Efficiency and Social Equity."** Sustainable development does not end with the

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sustainability of just the environmental and resource system but also requires the sustainability of economic and social system. Economic growth can be attained if poverty which is the major cause of natural degradation is addressed.

The resources like air, water, land, flora and fauna rest of the natural resources have their origin from these basic resources and interrelated, interconnected and interdependent. So the disturbance and the inappropriate management of any one resource affect the other resources as well.

The Study Area

For the study point of view, I have selected Kunda Tehsil in Pratapgarh district of Uttar Pradesh. The geographical extent of Kunda Tehsil is from 25° 34' north to 25° 56' north latitude and from 81° 19' east to 81° 46' east longitude. It has been divided into four blocks, i.e. Kunda, Kalakankar, Bihar and Babaganj enriched with natural (land, water and vegetation) and organic resources.

Objectives

The major objectives of the present paper can be enlisted as given below -

1. To find out the status of sustainable rural environment, agricultural resources and the root causes of it's spatial variation in Kunda tehsil of Pratapgarh district.
2. To assess the level of agricultural development.
3. To make suggestions to reduce spatial disparity and to promote balanced agricultural development.

Methodology

The present study is entirely based on secondary data which have been collected from various sources mainly from statistical magazine of tehsil Kunda district Pratapgarh for the year 2017- 18. After careful study of the different techniques of productivity measurement adopted by various predecessors like Kendall(1939), Shafi (1960), Sapre and Desh Pandey (1964), Bhatiya (1964), Dayal (1984), Julfikar and Ali (2007), Zaman & Ramman (2009), Srivatava & Singh (2010), Mishra & Sardar (2013), agricultural productivity has been calculated with the help of core indices, viz.

i. Standardized yield index
ii. Weighted crop equivalent index
iii. Cropping intensity index and
iv. Agricultural worker index.

To obtain land productivity and labor productivity six main crops such as Paddy, Wheat, Millet, Arhar, Pease and Sugarcane have been chosen according to their major share in yield and areal coverage to compute agricultural activity. This research paper emphasizes on the land resources of Tehsil Kunda. As we know land is an essential pre-requisite both for primary production as well as for meeting social priorities and therefore it must be available in adequate extent and desired quality. Water is also a critical input and it's availability should also be assured. Successful development planning for future now depends on scientific use and planning with specific consideration of maintaining and improving the interrelationship between **land and water cycles.** In developing countries like India, problems of soil erosion, land degradation are intimately associated with land and animal husbandry as well as growth promoting development activities. It is therefore necessary to ensure generation of **sustainable livelihood** in terms of food and income through proper maintenance and enhancement of the productivity of the resource base on a long term basis. The concern of the development planning is not only to manage land surface and soil profile, better nutrient supply to plants and more beneficial distribution of limited water sources but also to ensure **sustainable livelihood security.**

Livelihood is defined as adequate stock and flows of food and income to meet the basic needs, while the term **"Sustainable"** refers to maintenance or enhancement of productivity of the resource base on long term basis. Therefore, secured resources and adequate livelihood are pre-requisites for food, good husbandry and sustainable management of the natural resources based on land, water and

vegetation.

The utilization of land depends upon physical factors like topography, soil and climate as well as human factors such as the density of population, duration of occupation of the area, land tenure and technical levels of the people. There are spatial and temporal differences in land utilization due to the continued interplay of physical and human factors.

Agriculture is highly sensitive to climate variability and weather extremes such as droughts, floods and severe storms. As we know agriculture has an important slot in the Indian economy near by 70% of our population is still rural with farming as the principal source of livelihood, where as in the industrialized countries only 6 to 8 per cent are in farming (Swaminathan, 2018). Agriculture and allied activities constitute the single largest component of India's gross domestic product contribute nearly 25 % of the total. Agricultural productivity is sensitive two broad classes of climate induced effects. Direct effects from changes in temperature and precipitation are carbon-di-oxide concentrations.

1. Indirect effects through changes in soil moisture and the distribution and frequency of infestation by pests and diseases.

In tehsil Kunda, 94.7% population is directly or indirectly related to the agriculture and allied activities and 58.88% agricultural land is given to this sector the total land of the research area (See table 01).

In the study area the land use has been divided into four categories instead of 9 categories -

1. Land available for agriculture
2. Land not available for cultivation
3. Fallow land
4. Net sown area

Table 01 : Block Wise Land Utilization in Pratapgarh District (In Hectares)

Year	Total recoded land	Forest	Net sown area	Barren cultivable land	Current fallow land	other follow land	Land not available for cultivation	Miscellaneous land except agriculture	Permanent pastures and grazing land	Trees grooves	Area sown more than one	Net Irrigated land
1	2	3	4	5	6	7	8	9	10	11	12	13
2012-13	361507	568	208079	7059	65952	14292	9237	38822	724	16790	105634	268607
2013-14	361549	568	212159	7045	60983	15983	9244	30806	717	16044	112926	277828
2014-15	361576	568	215672	7531	59049	14058	9259	38822	668	15949	93038	266320
Block wise	2004-05											
Kalakankar	18156	0	10357	613	2975	965	411	2342	9	404	7349	9354
Babagan j	24980	18	12477	571	6401	610	1241	2960	67	635	9259	11649
Kunda	20389	0	14361	902	6064	2090	1055	2756	13	1140	7259	11594
Bihar	27581	4	14415	850	6482	409	953	3344	65	1059	9413	13030

Source 1. Bhulekh Adhikari, Pratapgarh
2. Economic & static department. Pratapgarh.

Table 02 : General Land Utilization in Kuda Tehsil of Pratapgarh District (In%)

Block wise	Land not available for Cultivation	Cultivable Land	Fallow Land	Net Sown Area
Kalakankar	16.11	5.44	21.08	57.34
Kunda	14.72	6.90	24.45	53.88
Babaganj	18.43	4.84	20.50	56.20
Bihar	18.43	4.84	20.50	56.20

* Source: Economic and Statistical department, District-Pratapgarh 2017-18

Land not Available for Cultivation:

This class consist of two types of land, viz. Land put to non-agricultural uses and 2. Barren un-cultivable waste. The area put to non-agricultural uses includes land occupied by villagers, towns, roads, railways, area under water, etc. In Tehsil Kunda, 16.39 per cent of land is not available for cultivation. In the block wise break up, Babaganj has highest 18.43 per cent followed by Bihar 16.33 per cent, Kalakankar 16.11 per cent and Kunda 14.72 per cent (see figure 01).

1. Land Available for Agriculture (Cultivable land)

It includes all cultivable land which is not included under net sown areas, but is put to some agricultural use. Land under thatching grass, bamboo, bushes, other groves for feed, etc. permanent pastures and other grazing land, forest etc. The highest cultivable land found in Kunda, i.e. 6.90% fallowed by Bihar 6.82%, Kalakankar 5.47% and Babaganj 4.8%. The research area Kunda Tehsil shows 6.0% cultivable land(see Fig. 01).

2. Fallow Lands

This category includes all that land which was earlier used for cultivation but is temporarily out of cultivation. Fallow land is of two types, viz. **current fallow and fallow other than current.**

Fallow of one year is called "Current Fallow" and that which is of 2 to 5 years is classified as fallow other than current fallow. Fallow land is left on cultivable from 1 to 5 year to help soil recap it's fertility in the natural way depending upon nature of soil and the nature of farming. In Kunda Block, 24.96% land is fallow land followed by Kalakankar 21.08%, Babaganj 24.50%, Bihar 17.83%. The total Kunda Tehsil fallow land is 20.96%. There is need to reduce the extent and frequency of fallow land in order to increase agricultural production. This can be done by proper dose of fertilizer providing irrigation facilities, crop rotation and combination and several other similar farms techniques (see Fig. No 01).

3. Net Sown Areas

Cropped area in the year under consideration is called net sown area. This area has a special significance in an agricultural country like India because agriculture production largely depends upon this type of land. There is an urgent need to increase net sown area for meeting the food requirements of rapidly increasing population in tehsil Kunda. Although there is not much scope for increasing area under this category due to natural limitation such as topography soil, climate, etc.

The following table no. 01 shows that the net sown area accounts for about 57.60% of the total reporting area of tehsil Kunda against the national average of about 46%. Kalakankar has the largest net

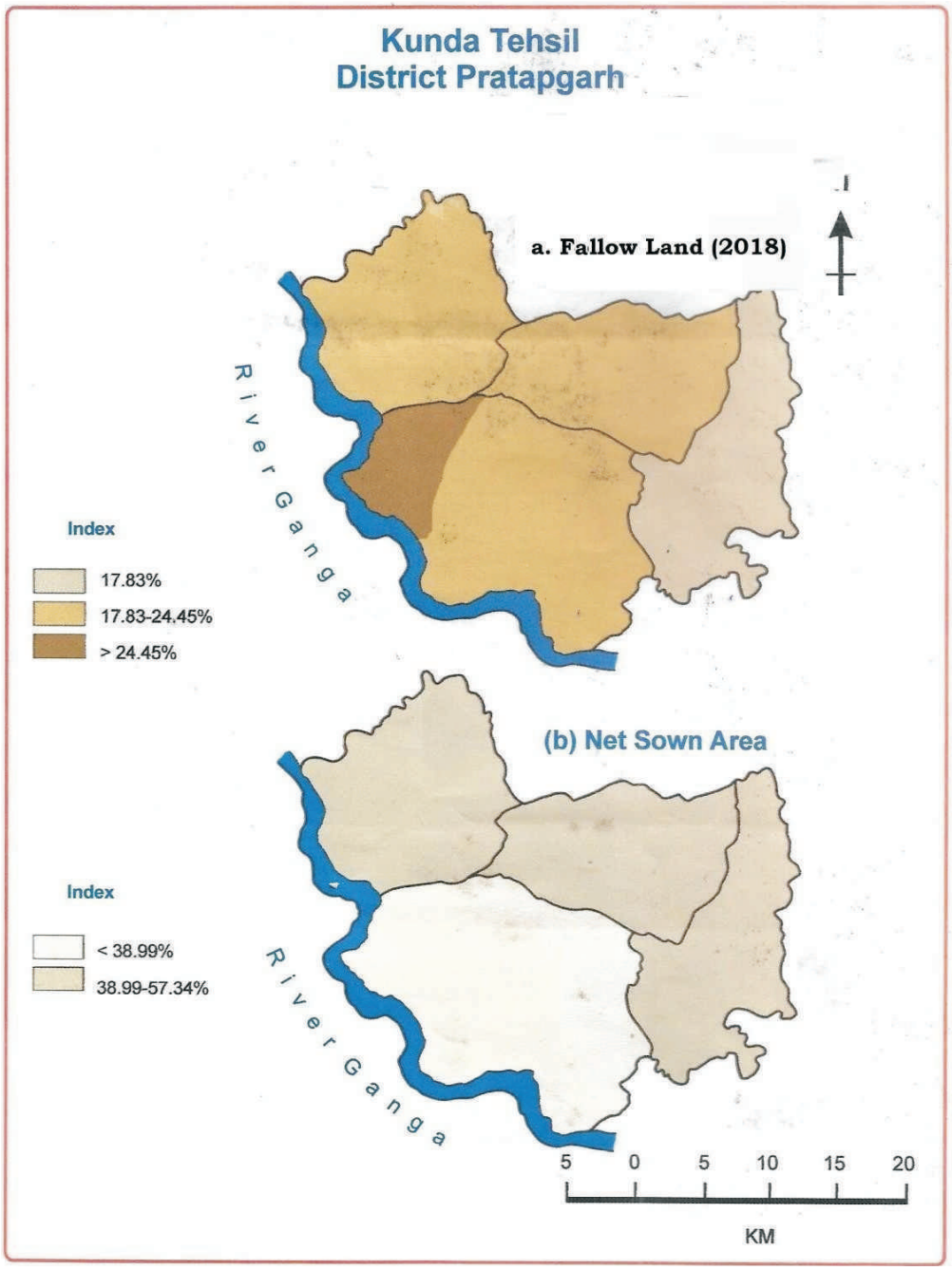
Kunda Tehsil
District Pratapgarh
a. Fallow Land (2018)
N
River Ganga
Index
17.83%
17.83-24.45%
> 24.45%
(b) Net Sown Area
Index
< 38.99%
38.99-57.34%
River Ganga
5 0 5 10 15 20
KM

Fig. 01

sown area which is about 57.34% followed by Babaganj (56.20%), Kunda 53.88% and Bihar 38.99%.

Problems

Over the last several years the pattern of monsoon in tehsil Kunda has become **un-predictable, uncertain and erratic.** Increase in frequency of drought due to climate change would force farmers and pastorals, which rely on rainfall to raise their crops and live stock to migrate to other areas in search of land and water. The problem of Tehsil Kunda is the marginal farmers and cultivators who are unaware of the recent scientific techniques and methods for the maximum cultivation of land for the optimum benefits.

Solution

1. To assess the land resources (which includes soil, water and vegetation) of the Tehsil Kunda and issue guidelines to and co- ordinate the activities of the departments connected with appropriate use of land resources.
2. To provide the highest forum for policy, planning and co-ordination of all issues connected with health and scientific management of states land resources.
3. To take an overview of all the schemes and assign priorities requiring land use changes or diversion of arable land from the point of view of eco-preservation, interaction between land and water cycle and productivity, total biomass production and social priorities.
4. To provide direction for bringing about an integrated scientific approach in development plan, implementation and monitoring of programmes related to land resources.
5. To collect, compile and make available statistical data, maps, etc. on land use and the status of natural resources for government user agencies and public.
6. To prepare guidelines for conservation, management and the use of natural resources to take into account the needs of population and available resource capabilities.
7. To continuously receive the implementation of the scheme and programmes of govt. department and other agencies which affect the land resources.
8. To take steps to ensure education, training, seminars, workshops and other means of improving the use of land other resources for development in a sustainable manner.

Conclusion

Land is an essential pre-requisite both for primary production as well as for meeting social priorities and therefore must be available in adequate extent and desired quality. Successful development planning for future will now depend on scientific land use planning. As we know 70% population of India directly or indirectly depend on agricultural and allied activities. So the proper utilization of land may enhance the frequency of production and economic growth of the study area. The concern of development planning is to ensure **"Sustainable Livelihood Security".** More ever most of the development programmes and schemes in Kunda Tehsil have a centralized programme delivery system. The involvement of poor beneficiaries of natural resource (land, water and vegetation) in resource management still remains on isolated example rather than a solution to the problem. The move towards decentralization if implemented promises more efficient equitable and sustainable resource use.

The need of the hour is to ensure equity issues in program implementation along with benefit and economic distribution of natural resource management.

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A Comparative Study of Population Growth, Automobiles on the Road, and Crime Rates in India: Evidence from Capital City

Rupesh Kumar Gupta

ABSTRACT

The study looks into the reasons of crime in India's capital city. Locations with significant population density and mobility, such as Delhi's east, north east, and south districts, have greater crime rates than the city's centre, north, and west districts, according to the study. There is a link between population growth, the amount of automobiles on the road, and crime rates. Delhi's population grew from 16.95 million to 22.52 million people between 2008 and 2018, while the number of automobiles doubled (5.9 million to 10.98 million), heinous crimes surged threefold (2,069 to 6,925), and non-heinous crime increased nearly six fold (47,281 to 2, 91,745). Poverty, heterogeneity, and great mobility of people have all been found to contribute to social disorder, and an informal social constraint on criminal behaviour has been suspected of encouraging it. People are becoming less integrated as cities grow, and there is less informal social supervision. A lack of integration and informal control explains higher levels of crime, disorder, victimisation, and fear of crime. GIS, GPS mapping, demographic and criminal monitoring were among the conclusions of this study, which were based on secondary published data.

Key Words: *population density, crime, urbanization, GIS mapping.*

Introduction

Crime is an activity which is against the law. The relationship between crime and the evolution of mankind may also be considered a historical one as in the Christian belief system Cain (first son of Adam and Eve) is believed to have committed first crime when he murdered his brother Able because of jealousy. The linkage between criminal activities and the socio-economic development of the society is undeniable. Due to the complex nature of the subject of crime, and its varied causes and consequences, various academic disciplines such as criminology, sociology, geography, psychology and demography study it from their own perspectives. Marshall and Clark (1952) wrote: “A crime is any act or omission prohibited by public law for the protection of the public and punishable by the state in a judicial proceeding in its own name”. Similarly Tappan (1960) defined that “A crime is an instrumental act or omission in violation of criminal law, committed without justification and sanctioned by the state as felony or misdemeanour”.

In developing a city into a smart city, many criteria must be met. One such criterion is security in the city. Threats to public safety are important issues, threats from all forms of crimes that may occur to the public must be avoided. The smart city concept provides a new way for the government to provide security for all city residents. The occurrence of crime is the result of interaction of law, offender and target at a place. Closely associated with this concept is the routine activities theory of crime, in which demographic or social class factors contribute to particular activity routines that merge three prerequisites for crime: (1) the presence of a motivated offender (such as an unemployed teenager), (2) a suitable target (such as a home containing goods which could be easily resold) and, (3) the absence of a capable guardian (homeowner, watchful neighbor, friend or relative) (Clarke and Felson, 1993, p.9; Knox 1995, p.256; Hackler 2000, p.169). The crime originates first in the mind of the offender and it occurs only when a suitable place is found. Before committing a crime, a criminal develops

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a map in his mind. In a spatial analysis of crimes in the Delhi state, Gupta (2020a, 2020b) identified 10 multi-crime hotspots by conducting an intensive field survey of different localities using Geographical Information System (GIS) as tool. Some of hotspots have been emerging due to specific socio-economic characteristics of the area but each crime has specific causes in particular area of crime occurrences.

Rapid Urbanization and expansion of cities due to continuous migration has created many problems in the cities of India. Slum resettlement, un-authorized colony development, overcrowding and economic disparities have led to the increase in crimes at public places in the city. Therefore, the study of each one of above separately is equally important. The study of place in relation to crime is a major dimension of the environmental criminology. The place is a territorial setting within which people interact. Some places in the city are more prone to crimes. The micro-physical ecology and landscape design of places plays an important role in the occurrence of crimes. Understanding of this relationship will help in prevention of crime through planning, designing and management of places.

The relationship between urbanization and crime rates has long been recognized by the criminologists. Another perspective in criminology emphasized that the structure of cities offers opportunity to the potential offenders (Glaeser and Sacerdote, 1999). Urban environments provide more suitable targets and so people are more tempted in cities to commit crimes. Criminologists have discussed the urban tendency towards crime for decades. Wirth (1938) discussed the observed connection between crime and urbanization and argued that this connection is the evidence for his theory, urbanism as a way of life. According to Wirth (1964), special urban characteristics such as size, density, heterogeneity and impersonality are responsible for a mode of living that generates more crime. Clinard (1942, p. 203) elaborated this view by arguing that there is more crime in densely populated urban areas than in scarcely populated rural areas because of the urban characteristics such as mobility, impersonal relations, differential association, limited participation in the community organizations, organized crime cultures, and a criminal type in the life experience of the offenders. Gerban (2007) propounded that the residents in rural areas are less confronted with crime because of higher levels of social cohesion and informal social control that lowers offence rates in a well-ordered physical surroundings. Criminals live more frequently in cities where their crimes are concentrated in city centers and their surroundings. The greater is the distance from the city centre, the lower is the occurrence of crime.

At present, there is no single term to denote the study of crime and place. Mike Davis explores crime and control in Los Angeles as an extreme example of the 'ecology of fear' (1999). Others refers to this as 'socio-spatial criminology' (Bottoms, 2007) or 'crime and community' (Hughes, 2007). On the more quantitative cartographic side, 'geo-criminology' and 'crime mapping' (Vann and Garson, 2001) are more frequently used. Park and Burgess's work in Chicago in the early twentieth century fore grounded the relationship between urban environment, actions and values. They saw social science as a form of 'human ecology' (1925). Burgess's 'zonal theory of urban development' suggested that Chicago – and other large cities – was structured around five concentric circles. The non-residential 'central business district' was surrounded by the 'zone in transition', an area of cheap rented housing attracting different generations of migrants. Next came three residential areas of increasing affluence. Other scholars built on this model. Shaw and McKay's (1942), who studied juvenile delinquency, showed that a very high proportion of young offenders had grown up in the 'zone in transition'. They explained this as an effect of the 'social disorganization' which is characteristic of this area. Increase in migrant population with shifting moral values, high levels of poverty and low levels of community cohesion produced teenagers prone to committing crime. Shaw and McKay (1942) emphasized the process of social disorganization

that leads to concentrations of crime. Poverty, residential mobility, ethnic heterogeneity, bad housing and weak social relations indicate disorganization that did not allow stable communities in neighborhoods. After several years of decline, they suggested, a greater number of offenders would settle in such neighborhoods and this would in turn explain that neighborhood's higher crime rates. Shaw and McKay (1942) concluded that the high levels of crime were not a function of the personal attributes of the groups living in the neighborhoods but rather argued that "the structural factors of poverty, high heterogeneity and high mobility created 'social disorganization', and it was community-level social disorganization that was presumed to cause the crime" (Wilcox, Land, Hunt 2003, p.28).

The crux of the issue is that the increase in urbanization causes less integration among people and as a consequence generates less informal social control. Less integration and less informal control explain higher levels of crime, disorder, victimization and fear of crime. The impact of the process of industrialization and urbanization on the reasons of crime is more evident as it promotes changes in social structure, cultural conflict and a change in the space environment and it induces an increasing number of criminal elements. The gap between the rich and the poor is ever increasing and so is the crime rate. Much of the empirical studies have been conducted to establish a relation between urbanization and crime and many a times the process of urbanization has been maintained to be the cause of rural crimes also. This way the urbanization has been considered as the tipping point for creation of new crimes and amplification of existing crimes too. The disruption of cultural value and morality is another feature of urbanized way of life which also accounts to crime augmentation. The rising reports of crime incidents by youth of urban areas is another controversial issue which is due to the loss of moral values as a result of new urban life, they are part of.

The literature shows that most of the work has focused on social disorganization, layout design, opportunity and unemployment, city size and density and heterogeneity informal social control etc. There hasn't been a body of work which discussed micro level of crime and reason behind this. Present work has tried to investigate the growth of population and crime pattern at the micro level in the mega city, Delhi. The study tries to explore relationship between different types of heinous and non-heinous crimes and its micro-environment. The crime has been mapped and monitored through GIS, and GPS technology. The role of crimes on urban mobility has also been assessed. This kind of work will be very relevant for administrators, planners and policy makers for future course of action.

Aim and research question

The purpose of this work is to analyze the macro level crime pattern in the country and discuss micro level on Delhi and its different districts. To find out the relation between population growth, number of vehicles, and the growth of crime. For this purpose, appropriate statistical tools like correlation and regression methods were used to get an appropriate result. Lastly, the GIS, GPS were applied for crime mapping of different time periods for different districts.

The Study area

National Capital Territory (NCT) is spread over an area of 1,484 sq. km. between 28^{0}23'17"N and 28^{0}53'00"N latitudes, between 76^{0}50'24"E and 77^{0}20'37"E longitudes. The demographic changes in NCT Delhi occurred more rapidly in the last hundred years and more than forty-fold (1911- 0.41 to 2011- 18.45 million) increase in its population is noticed, but it was not a uniform rise during the past century (figure 01). In the late twentieth century, the National Capital Territory of Delhi has grown more rapidly in terms of population (census of India).

Data and Methodology

For the analysis of the spatial pattern of crime, the data come from a variety of sources at different levels. The government's official published data provided by different agencies like the national crime research bureau (NCRB), the government of India, the Delhi Police website; and other sources of data came from different government reports,

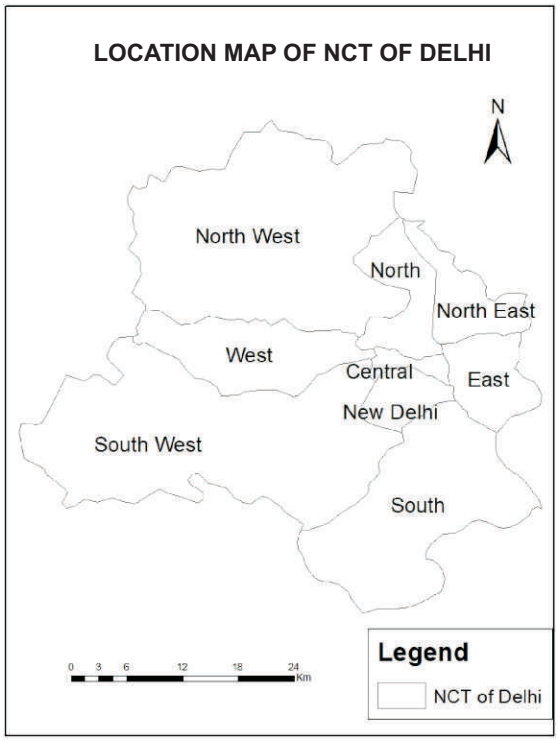

Figure 01

policies, documents, research thesis, observational data of projects, etc. To analyze the demographic structure of population in different districts, the census of India, published data and reports from premier organizations conducting survey in the entire country were considered. The other set of data relating vehicle data, were collected from transport department, the government of NCT Delhi, and the Ministry of statistics and program implementation, the government of India.

Data pertaining to the different districts have been collected from 1990 to 2018 in the same way as for the places of occurrences of crime. The data for detected crimes as well as undetected crimes were examined through police official and NCRB. NCRB is one of the prominent government bodies that provide authentic data in each year. For the comparative study, population data, different types of heinous and non-heinous crime data, and vehicle data of Delhi were taken up through appropriate statistical tool like correlation and regression techniques to analyze.

Population Growth and Crime Pattern

In India, in rural communities the fear of crime is lower than in the urban areas. Certain vulnerable parts of urban areas like high mobility centres, dark and lonely places, unattractive and uncared places, poorly designed subways, and housing, bus stand or bus terminal, metro and railway stations, and in general areas with non-functional street lights and so on are often implicated directly. If one goes by the direct proportionality of crime with urbanization, the following (table 01) statistical data (absolute no.) shows highest degree of crime in Uttar Pradesh, West Bengal, Bihar, Madhya Pradesh, and Andhra Pradesh and with least crime rate for Mizoram, Nagaland, and Goa. On the basis of some (table 01) selected attributes, it is observed that the crimes in different states are as follows,: Uttar Pradesh (14.77 per cent), followed by West Bengal (8.36 per cent), Bihar (8.33 per cent), Madhya Pradesh (6.8 per cent), and Andhra Pradesh (6.07 per cent) respectively. However, the universality in proportionality cannot be applied here, which also means it is not necessary that the crime rate increases with the degree of urbanization and urban population, as per the crime statistics (table 01).

According to the NCRB, a total of 4,75,369 cognizable crimes under the IPC were reported in 53 mega cities during the year 2011 as compared to 3,68,883 crimes in 35 mega cities during the year 2010. The cities of Delhi, Kanpur, Mumbai and Bengaluru have accounted for 9.9, 7.3, 6.7 and 6.3 per cent respectively of the total crimes reported from 53 mega cities.

The average rate of crime in urban agglomeration centres were at 295.1 which were much higher than the national crime rate of 192.2. (To find out the average of crime, first consider all India Population, that's 12,101.93 lakh, then 53 mega cities population 1,611.7 lakhs, incidence in all India level 23,25,575, and 53 cities incidence 4,75,369, now calculate the average rate of crime 192.2 in India

Table 01: Status of Crimes in India, 2011.

	States	Murder	Rape	Kidnapping & Abduction	Dacoity	Total/Rank	Percentage
1	Andhra Pradesh	**2808**	**1442**	**2154**	**126**	**6530 (5)**	**6.07**
2	Arunachal Pradesh	65	42	93	13	213 (25)	0.198
3	Assam	1303	110	3764	305	**5482 (7)**	**5.10**
4	Bihar	**3198**	**934**	**4268**	**556**	**8956 (3)**	**8.33**
5	Chhatisgarh	1110	1053	472	68	2703 (16)	2.515
6	Goa	48	29	28	2	107 (28)	0.099
7	Gujrat	1126	439	1214	221	3000 (14)	2.791
8	Haryana	1062	733	959	167	2921 (15)	2.718
9	Himachal Pradesh	130	168	212	1	511 (22)	0.475
10	Jammu and Kashmir	110	277	1077	14	1478 (19)	1.375
11	Jharkhand	1747	784	941	309	3781 (13)	3.518
12	Karnataka	1820	636	1395	214	4065 (11)	3.782
13	Kerla	365	1132	299	71	1861 (18)	1.731
14	Madhya Pradesh	**2511**	**3406**	**1288**	**118**	**7323 (4)**	**6.814**
15	Maharashtra	**2818**	**110**	**110**	**773**	3811 (12)	3.546
16	Manipur	78	53	110	1	242 (24)	0.225
17	Meghalaya	110	130	87	49	376 (23)	0.349
18	Mizoram	26	77	6	1	110 (27)	0.102
19	Nagaland	46	23	34	7	104 (29)	0.0967
20	Odisha	1477	1112	1139	417	**4145 (10)**	**3.857**
21	Punjab	842	479	681	28	2030 (17)	1.889
22	Rajasthan	1461	1800	3204	28	**6493 (6)**	**6.042**
23	Sikkim	14	16	10	0	40 (32)	0.372
24	Tamil Nadu	1877	677	1984	101	**4639 (9)**	**4.316**
25	Tripura	163	205	154	11	533 (21)	0.495
26	Uttar Pradesh	**4951**	**2042**	**8500**	**379**	**15872 (1)**	**14.770**
27	Uttarakhand	178	129	314	13	634 (20)	0.589
28	West Bengal	2109	2363	4285	236	**8993 (2)**	**8.368**
29	A & N Islands	14	13	15	1	43 (31)	0.040
30	Chandigarh	24	27	58	6	115 (26)	0.107
31	D & N Haveli	14	4	9	7	34 (33)	0.031
32	Daman & Diu	6	1	3	4	14 (34)	0.013
33	Delhi	**543**	**572**	**3767**	**33**	**4915 (8)**	**4.573**
34	Lakshadweep	0	0	0	0	0 (35)	0
35	Puducherry	32	7	12	5	56 (30)	0.0521
	Total UT's	633	624	3864	56	5177	4.817
	All India Total	34305	24206	44664	4285	107460	100

Sources: ncrb.nic.in

and 295.1 in the cities). Kochi reported the highest crime rate of 1636.4 among the mega cities in the country followed by Gwalior (709.3) and Durg Bhilainagar (683.0). The crime rate for each city is compared with the corresponding crime rate of the Domain State in Crime rate (IPC) in cities was generally higher than the corresponding crime rate of Domain State. The crime rate was lower than that of the respective Domain State in case of Chandigarh, Chennai, Coimbatore, Delhi (city), Hyderabad, Kannur, Kolkata, Kozhikode, Madurai, Malappuram, Mumbai, Surat, Thiruvananthapuram, Thrissur and Vasai Virar. The crime rate at national level increased by 2.5 per cent (from 187.6 in the year 2010 to 192.2 in the year 2011), however, the crime rate in cities has decreased by 13.7 per cent (from 341.9 in the year 2010 to 295.1 in the year 2011).

Given the slow growth rate of urbanization but high rate of crime can be the reason for people to call India unsafe. If one goes by the urbanization-Crime nexus then the rate of crime should not have been on the rising trend in India, but the statistics present a different picture which clearly depicts that urbanization alone is not the factor for rising crime in a state, even in an urbanized centre. However, one cannot rule out that crime is not related to urbanization at all. It is proper to say that there is no direct proportionality between the two, that is if one increases the other will also, but the two are associated to each other in such a way that in common parlance the two seems to be tipping point for each other. No doubt, as per the statistics the direct proportionality of crime with urbanization in Indian context has nullified and as such does not follow the common trends of western countries. It may be due to the values and customs that are unique to the Indian culture that in spite of rapid urbanization and subsequent increase in crime, the proportionality between the two is not yet exponential.

Urbanization and Crime in Capital City

The demographic changes in NCT Delhi occurred more rapidly in the last hundred years (1901-2011) and more than forty-fold increase in its population has been noticed, but it was not uniform during the past century (table 02, 03 & 04, figure 02 & 03). Though the temporal difference in population growth is the combined result of changes both in natural growth and in-migration patterns, but in NCT Delhi, it is largely associated with the trend of migration. In the late twentieth century, the National Capital Territory of Delhi has grown more rapidly in terms of population. The urban area, which was only 43.25 sq. km. in 1911, now increased to 1,113.65 sq. km. in 2011 (table 02). Apart from natural increase, this unprecedented growth may be attributed to the large scale migration from different parts of the country in search of livelihood and asylum seekers from neighboring countries. Delhi's population was a prime concern in its development in the second half of the past century when population growth was termed as explosive growth.

The district-wise urban data, as per Census 2011 reveals that New Delhi and Central districts of NCT Delhi are fully urbanized and have no rural area and population, whereas more than 99 per cent of the population in North-east, East, West and South districts are urban. The peripheral districts North, North-west and South-west have 98.04, 94.2, and 93.66 per cent urban population. Presently NCT Delhi has eleven districts. For the first time in 2001, the census was conducted district-wise in NCT Delhi (figure 03). The district-wise decadal population growth signifies that the maximum growth took place in the North-East district of NCT Delhi from the decades of 1961-71 to 1991-2001 but the population growth was much significant in East and North-west districts in the same period (table-03 and figure 03).

As per Census 2011, the population density in NCT Delhi is worked out at 11,320 persons per sq. km. as against 9,340 persons per sq. km. in 2001. The population density of NCT Delhi is far higher than the national average (382 per sq. km.) of population density. The population density in NCT Delhi is the highest among all states & union territories in India. The data of 1961 to 2011 (table 03 and figure 03) reveal a significant variation in population across the nine districts of the territory. The district-wise population density in 2011 varies from as low as 4,057

Table 02 : Decadal Population Growth in NCT Delhi: 1901-2011.

Census Year	Total Population	Percentage Decadal Growth	Average Annual Exponential Growth	Total Urban Population	Total Urban Area (sq.km)	Percent Urban Population
1901	405,819	-	-	214115	-	52.76
1911	413,851	1.98	0.20	237944	43.25	57.50
1921	488,452	18.03	1.67	304420	168.09	62.32
1931	636,246	30.26	2.68	447442	169.44	70.33
1941	917,939	44.27	3.73	695686	147.31	75.79
1951	1,744,072	90.00	6.63	1437134	201.36	82.40
1961	2,658,612	52.44	4.31	2359408	326.55	88.75
1971	4,065,698	52.93	4.34	3647023	446.26	89.68
1981	6,220,406	53.00	4.34	5768200	540.78	92.73
1991	9,420,644	51.45	4.24	8471625	685.34	89.93
2001	13,850,507	47.02	3.93	12905780	924.68	93.18
2011	16,787,941	21.21	1.94	16368899	1113.65	97.50

Source: Census of India 2001 and 2011, Economic Survey of Delhi: 2008-2009

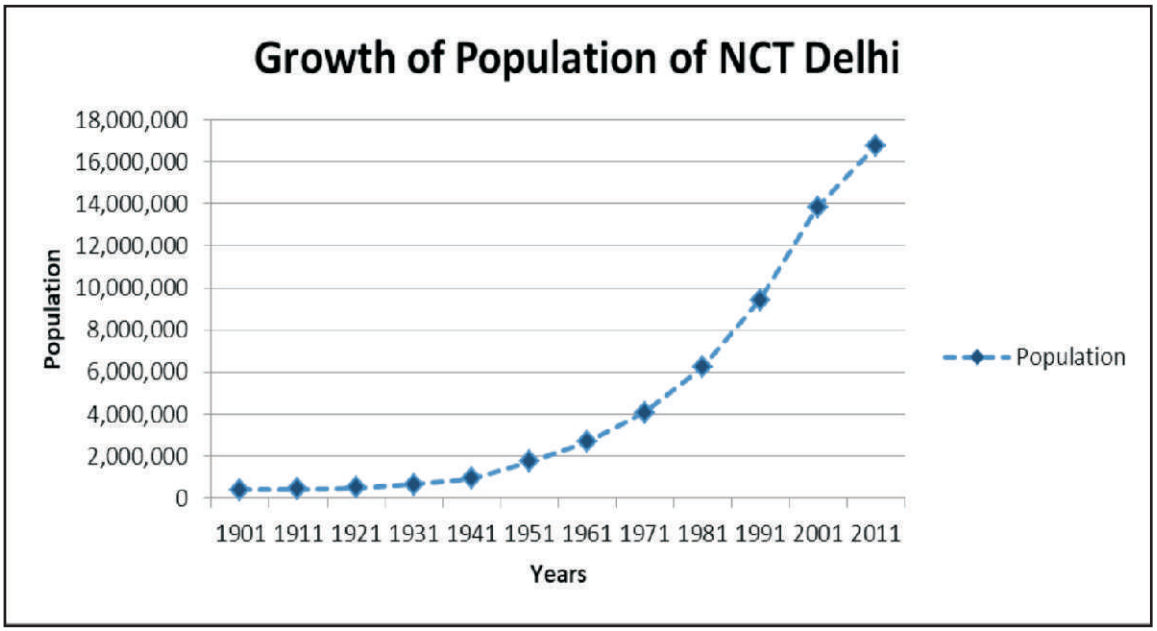

Figure 02 : Growth of Population of NCT Delhi (1901-2011)

Table 03 : Growth of Population of Different Districts of NCT Delhi.

Districts	1961	1971	1981	1991	2001	2011
North West	240973	450419	991186	1777968	2860869	3651261
North	611376	653224	657609	686654	781525	883418
North East	38155	157262	487466	1085250	1768061	2240749
East	135325	306232	623850	1023078	1463583	1707725
New Delhi	143846	164702	144115	168669	179112	133713
Central	672063	691223	691223	656533	646385	578671
West	250702	572976	958931	1433038	2128908	2531583
South West	251383	479189	679170	1087573	1755041	2292363
South	314789	589956	986856	1501881	2267023	2733752

Source: Provisional population NCT of Delhi, & Census of India, 2011

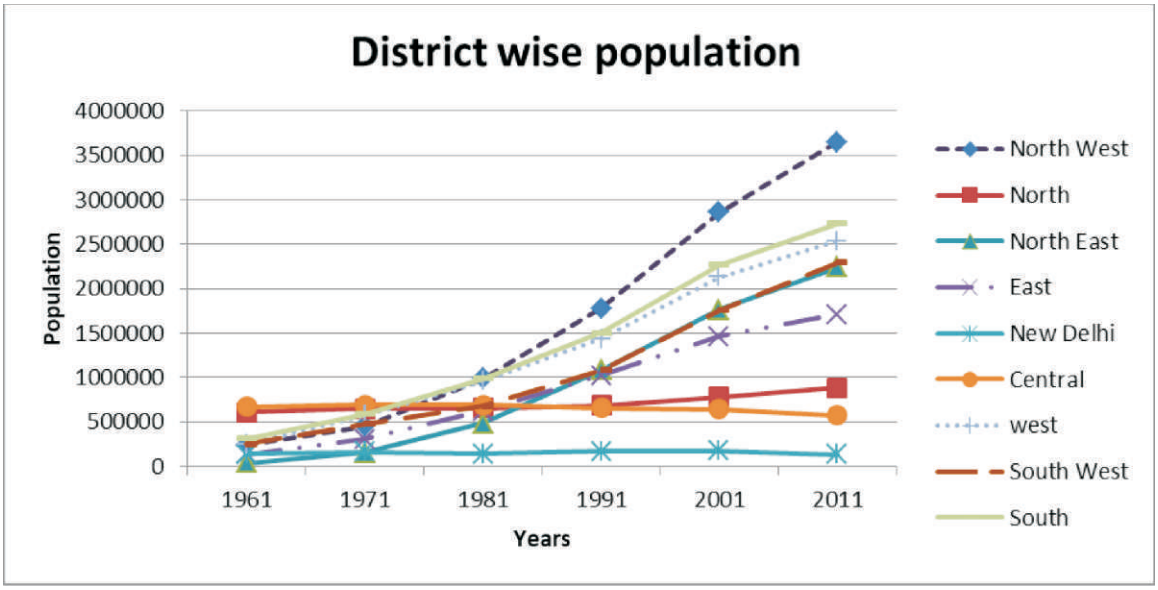

Figure 03 : District Wise Population Growth of NCT Delhi (1961-2011)

persons per sq. km. in New Delhi to as high as 36,155 persons per sq. km. in North-east district (table 04). Besides the North-east district, the population density of East, Central, West and North districts are above the average population density in NCT Delhi. The total migrants in Delhi Territory were 16,38,087 or 61.6 per cent of the total population in 1961 (Singh, 1971). An estimate of migration to NCT Delhi reveals that the shares of migration in population growth were 45.76 per cent in 1991, 56.12 per cent in 2001, and 25.16 per cent in 2011.

This is observed that most of the crime reported in the east, northeast, and south districts of Delhi (table 05, figure 04), where the east is prominent in the last 20 years, followed by the south, and the northeast. In other districts like New Delhi, North, Central Delhi, and south west these are least prone to crime (table 05, figure 04). It seems to be that the growth of population, the density of population,

Table 04 : District wise Population Density & Decadal Population Growth.

Districts	Population Density (person per sq.km.)			1961-1971	1971-1981	1981-1991	1991-2001	2001-2011
	2011	2001	1991	Per cent Decadal Variation (Population)				
North West	8,254	6,502	4,042	86.92	120.06	79.38	60.91	27.8
North	14,557	13,025	11,471	6.84	0.67	4.42	13.82	13.6
North East	36,155	29,468	18,088	312.17	209.97	122.63	62.92	26.8
East	27,132	22,868	15,986	126.29	103.72	63.99	43.06	16.8
New Delhi	4,057	5,117	4,791	14.50	-12.50	17.04	6.19	-20.7
Central	27,730	25,855	26,261	2.93	-0.07	-5.02	-1.55	-9.9
West	19,563	16,503	11,116	128.55	67.36	49.44	48.56	9.5
South West	5,446	4,179	2,583	90.62	41.73	60.13	61.37	30.6
South	11,060	9,068	6,012	87.41	67.28	52.19	50.95	20.5
NCT Delhi	11,320	9,340	6,352	52.93	53.00	51.45	47.02	21.2

Sources: Census of India, 2001, and 2011.

mobility of people, and growth rate of crime are related to each other (figure 05 & 06). Delhi has attracted a lot of traditionally rural populations for employment and a better life, consequently, it has become a more densely populated territory. Table 05 reveal that the east, south and north east districts comprises almost 58 per cent of crime out of total crime in Delhi. The data also highlights that the crime rate more than 20 percent in east, followed by south districts respectively.

Table 05 : District-Wise Crime Status of Delhi.

Districts	2001	Percent	2005	Percent	2010	Percent	2014	Percent
Central	10,607	8.47	8,322	7.98	9,343	7.3	28,568	6.92
East	10,732	8.57	13,148	12.6	30,418	**23.78**	1,04,870	**25.4**
North East	8,052	6.43	11,282	10.82	13,177	10.3	45,342	**10.98**
North	9,487	7.58	7,591	7.28	7,112	5.56	22,167	5.38
North West	23,473	**18.75**	2,515	2.41	12,753	9.97	36,530	8.84
New Delhi	6,593	5.26	5,412	5.18	3,528	2.76	6,495	1.57
South	25,770	**20.59**	25,939	**24.87**	27,376	**21.4**	88,033	**21.32**
South West	12,810	10.23	13,138	**12.59**	10,266	8.02	31,323	7.59
West	17,676	14.12	16,955	**16.25**	13,960	10.91	49,581	12
	1,25,200	100	1,04,302	100	1,27,933	100	4,12,909	100

Sources: ncrb.nic.in

The capital city, Delhi has been grappling with the problem of a variety of crimes-murders, rape, kidnapping, abduction, street crime, hate crime, etc. In the years 2013 and 2014, the number of rape cases shot up significantly and tripled within a year. In the year 2014, an almost doubling of crime was witnessed when the crime rates soared up by 99.22 per cent. The data reveal that the robbery, rape, snatching, molestation of women, kidnapping, non-heinous crime, total IPC, grand total crime increased six times in the last ten years. Where as motor vehicle theft increased five times, heinous, burglary, house theft increased three times and other IPC act just doubled during these periods. The other like theft cases drastically jumped 27 times, that is, 6,308 to 1,65,768 from 2008 to 2018 (table 06 & 07). The heinous crimes continued to increase along from 2008 to 2015, and in 2015 it was much higher, non-heinous crimes and total crimes continued to increase since 2008.

Figure 04 : Status of Crime in Delhi (1990 to2018) Sources: ncrb.nic.in

Table 06 : Population, Total Number of Vehicles and different Crimes.

Years	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Population (in Millions)	16.955	17.437	17.935	18.451	18.983	19.529	20.092	20.676	21.285	21.896	22.523
Total Vehicles (in Millions)	5.90	6.450	6.930	7.440	7.770	8.290	8.810	9.970	10.480	10.750	10.980
Total Heinous crimes	2,069	2,027	2,085	2,171	2,402	4,159	10,266	11,187	8,238	6527	6925
Total Non-Heinous	47,281	48,224	49,207	51,182	51,885	76,025	1,45,388	1,80,190	2,01,281	2,27,053	291745
Total IPC	**49,350**	**50,251**	**51,292**	**53,353**	**54,287**	**80,184**	**1,55,654**	**1,91,377**	**2,09,519**	**2,33,580**	**2,98,670**
Total ACT	6,754	4,053	4,667	5,896	6,080	6,616	9,908	8,599	7,401	11,134	14,134
Grand Total	56,104	54,304	55,959	59,249	60,367	86,800	1,65,562	1,99,976	2,16,920	2,44,714	3,12,804

Source: - NCRB, 2018, 2019, GNCT 2011, 2018, and CRRI 2009.

Table 06 (figure 05 and 06) shows that the growth of population has a direct relation with the number of vehicles and an increasing number of crimes. Hence it points to that the crime rate increased due to an increase in the number of vehicles, growth of population as well as mobility of people. All three aspects are related to each other and reveal with time the increasing trend. As far as the growth of crime rate is concerned, the growth of population and vehicles play silent and positive role to escalate the crime in the city.

Figure 05 reveals the total population and the total number of vehicles show an upward trend during the period of the study. Figure 06 depicts that total crimes under non-heinous category and IPC had been steady till 2012, but suddenly there has been an exponential jump in these crime rate upto the study period of 2018. But looking at total heinous crime and ACT, it is seen that these are at lower rate than the other offences. Table 07 reflects the average number of crimes in the context of heinous, non-heinous, and other different Acts those govern crimes. It is observed from table 07 that during the period of the study, the average number of cases of dacoity reported were 41, murder cases 549, attempt to murder 541, robbery cases 2,626 (the highest among all heinous crimes), riots 79, kidnapping for ransom 26 (the lowest among all heinous crimes) and rape 1,415.

In the case of total non-heinous crimes, the average number of cases of snatching was reported as 4,921, hurt 1,800, burglary 5,774, motor vehicle theft 24,889, house theft 6,393, other theft 45,430 (the highest among non-heinous crimes), the modesty of women 2,528, kidnapping 4,634, abduction 457 (the lowest among all heinous crimes), fatal accident 1,847, simple accident 5,809 and other crimes reported as per IPC 20,017.

Looking at the average number of cases those have been registered under different Acts, it is observed that the number of cases registered under IPC Act is 1,29,774 (the highest), Arms Act 1,003, Excise Act 2,164, Gambling Act 711, I.T. (P) Act 21 (the lowest), N. D. P. S. Act 486 and other Act 3,365 (table 07). Further, comparing the average number of crimes reported under heinous crimes, non-heinous crimes and different Acts of Laws, it has been found that total average number of non-heinous crimes are reported to be the highest (1, 24, 497) than cases those have been registered under different Acts were reported as 7,749 and the lowest average number of cases were registered under heinous crimes (5,278).

Table 08 reports the correlation among different heinous crimes. It is observed that there is a positive correlation among all the different crimes under this category. Further, looking at the correlation relationship, it is observed that dacoity crime has a

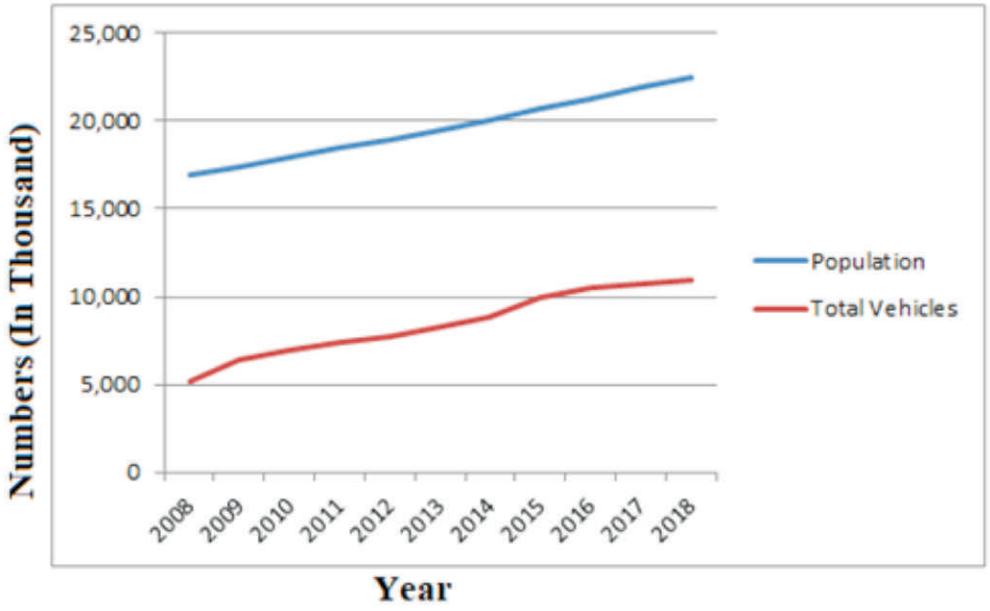

Figure 5: Population and Total Number of Vehicles

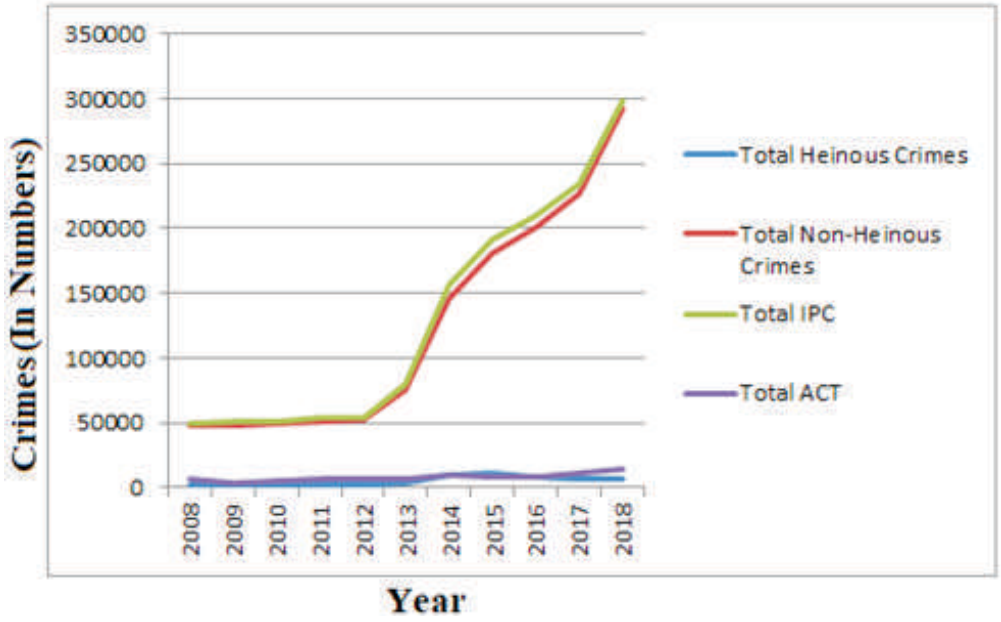

Figure 6: trend of different types of crimes

Table 07 : Number of Crimes during 2008-2018.

Crime Head	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Average
Dacoity	24	36	32	33	28	33	82	75	46	36	29	**41**
Murder	554	552	565	543	521	517	586	570	528	487	616	**549**
Att.to Murder	389	369	311	386	439	585	770	770	646	645	648	**541**
Robbery	541	515	599	562	608	1245	6464	7407	4761	3147	3038	**2626**
Riot	71	57	53	50	79	113	160	130	79	50	31	**79**
Kid for Ransom	24	29	18	25	21	30	38	36	23	16	23	**26**
Rape	466	469	507	572	706	1636	2166	2199	2155	2146	2540	**1415**
Total Heinous	**2069**	**2027**	**2085**	**2171**	**2402**	**4159**	**10266**	**11187**	**8238**	**6527**	**6925**	**5278**
Snatching	1377	1345	1671	1476	1440	3638	7350	9896	9571	8231	8138	**4921**
Hurt	1936	1938	1925	1946	1747	1768	2027	1898	1489	1352	1771	**1800**
Burglary	1926	1733	1502	1419	1715	2835	10309	12848	14307	9819	5106	**5774**
Motor Vehicle Theft	11020	13224	14966	14668	14391	14916	23384	32729	38644	40972	54863	**24889**
House Theft	1539	1948	1868	1918	1746	3216	12735	15318	14721	10739	4571	**6393**
Other Theft	6308	6559	6254	6313	5895	11992	42634	56385	77563	114054	165768	**45430**
Molestation of Women	611	552	601	657	727	3515	4322	5367	4165	3422	3864	**2528**
Kidnapping	1233	2254	2975	3529	3675	5793	6437	6869	5932	5573	6703	**4634**
Abduction	334	282	233	238	274	501	668	825	664	506	496	**457**
Fatal Accident	2015	2272	2104	2047	1822	1778	1629	1582	1548	1565	1952	**1847**
Simple Accident	6589	5342	5516	5233	5115	5788	6994	6503	5827	5108	5882	**5809**
Other IPC	12393	10775	9592	11738	13338	20285	26899	29970	26850	25712	32631	**20017**
Total Non Heinous	**47281**	**48224**	**49207**	**51182**	**51885**	**76025**	**145388**	**180190**	**201281**	**227053**	**291745**	**124497**
Total IPC	**49350**	**50251**	**51292**	**53353**	**54287**	**80184**	**155654**	**191377**	**209519**	**233580**	**298670**	**129774**
Arms Act	1218	931	884	1035	1017	921	753	700	688	993	1896	**1003**
Excise Act	2275	1396	2179	1946	1779	1894	1408	1967	2356	2827	3776	**2164**
Gambling Act	141	150	292	598	518	560	631	894	1098	1273	1668	**711**
I.T (P) Act	60	27	28	33	24	20	10	3	6	10	7	**21**
N.D.P.S Act	591	299	197	1127	829	442	322	277	297	376	585	**486**
OTHER Act	2469	1250	1087	1157	1913	2779	6784	4758	2956	5655	6202	**3365**
Total Act	6754	4053	4667	5896	6080	6616	9908	8599	7401	11134	14134	**7749**
Grand Total	**56104**	**54304**	**55959**	**59249**	**60367**	**86800**	**165562**	**199976**	**216920**	**244714**	**312804**	

Source: NCRB, Govt. of India, 2011, 2018, 2019, ncrb.nic.in

positive and high degree of correlation with an attempt to murder, kidnapping for ransom, and rape. This indicates that the act of dacoity also creates the possibility of crimes such as an attempt to murder, kidnapping for ransom, and rape crimes. Murder crime is reported to be fairly correlated with kidnapping for ransom. Attempt to murder has a high correlation with kidnapping for ransom, and rape cases. This indicates that there is a collateral possibility of happening of crimes (kidnapping for ransom, and rape cases) when an attempt to murder crime takes place. Kidnapping for ransom is having a low correlation with rape cases.

Table 08 : Correlation among Different Heinous Crimes.

	Dacoity	Murder	Att to Murder	Riot	Kid for Ransom	Rape
Dacoity	1.000000					
Murder	0.298824	1.000000				
Att to Murder	0.731555	0.154472	1.000000			
Riot	0.817520	0.086392	0.592038	1.000000		
Kid for Ransom	0.774786	0.414774	0.502933	0.820399	1.000000	
Rape	0.525242	0.177522	0.939991	0.323126	0.260584	1.000000

Source: based on table 7, NCRB data

Table 09 shows correlation results among different crimes under the category of heinous crime. It is observed that snatching crime is highly and positively correlated with burglary, motor vehicle theft, house theft, other theft, the modesty of women, kidnapping, abduction, and other crimes registered under IPC. The snatching was found to be negatively correlated with hurt and fatal accident crime cases. Hurt incidence was found to be negatively but moderately correlated with burglary, motor vehicle theft, house theft, other theft, the modesty of women, kidnapping, abduction, and other cases under IPC and positively with a fatal accident and simple accident. Burglary crime is found to be highly and positively correlated with house theft, the modesty of women, kidnapping, abduction, and other cases under IPC but negatively correlated with fatal accidents. Motor vehicle theft is found to be very highly correlated with other theft and other cases of IPC but negatively correlated with fatal accidents. House theft is highly and positively correlated with the modesty of women, abduction, and other IPC cases but negatively correlated with the fatal accident. Other cases of theft are highly correlated with kidnapping and other cases under IPC and negatively with a fatal accident. The modesty of women is reported to be highly correlated with kidnapping, abduction, and other IPC cases but negatively correlated with fatal accidents. The kidnapping act of crime is reported to be highly positively correlated with the abduction and other IPC crimes but highly negatively correlated with a fatal accident. Further, taking the case of abduction, it has been found that other IPC crimes and simple accident crimes are positively correlated but negatively correlated with fatal accidents. The fatal accident was found to be negatively correlated with a simple accident and other cases of IPC. At last, a simple accident is correlated with other cases registered with IPC.

Table 10 reports correlation among different crimes under the different Acts of Laws. It has been observed that positive and high correlation is found to be between Gambling & IPC Act, Excise

Act & IPC Act, IPC Act & Other Act, and Arms Act & Excise Act. The negative and high correlation is found between crimes registered under IPC Act & I T (P) Act, I T (P) Act & Gambling Act and I T (P) Act & Other Act. Apart from this, the below mentioned regression equations have been applied in order to trace the relationship among an increase in population and number of vehicles with a total number of crimes.

Table 09 : Correlation Among Different Heinous Crimes.

	Snatching	Hurt	Burglary	M V Theft	House Theft	Other Theft	M O Women	Kidnapping	Abduction	Fatal Accident	Simple Accident	Other IPC
Snatching	1.000000											
Hurt	-0.473641	1.000000										
Burglary	0.929007	-0.442739	1.000000									
M V Theft	0.847001	-0.563104	0.636736	1.000000								
House Theft	0.906485	-0.360656	0.991020	0.573016	1.000000							
Other Theft	0.771913	-0.548241	0.529738	0.982177	0.463814	1.000000						
M O Women	0.936681	-0.315972	0.853541	0.699500	0.855297	0.628294	1.000000					
Kidnapping	0.871569	-0.341252	0.733712	0.732550	0.737574	0.667466	0.936253	1.000000				
Abduction	0.907024	-0.227865	0.906791	0.577353	0.917180	0.486059	0.961735	0.827227	1.000000			
Fatal Accident	-0.798624	0.552167	-0.850880	-0.498682	-0.849969	-0.419603	-0.810496	-0.759428	-0.818505	1.000000		
Simple Accident	0.365581	0.448659	0.405028	0.061038	0.441009	0.044315	0.487757	0.272191	0.604867	-0.302104	1.000000	
Other IPC	0.951160	-0.385396	0.798044	0.866293	0.774691	0.826284	0.945967	0.917567	0.873132	-0.736529	0.413132	1.000000

Total Number of Crimes = $a + b_1$Population + e 1

Total Number of Crimes = $a + b_1$Vehicles + e 2

Total Number of Crimes = $a + b_1$ Population + b_2Vehicles + e 3

Table 10: Correlation among Different Crimes (Total Act)

	Total IPC	Arms Act	Excise Act	Gambling Act	I T (P) Act	N D P S Act	Other Act
Total IPC	1.000000						
Arms Act	0.320193	1.000000					
Excise Act	0.706679	0.754648	1.000000				
Gambling Act	0.945349	0.412891	0.775335	1.000000			
I T (P) Act	-0.751650	0.146939	-0.219510	-0.729713	1.000000		
N D P S Act	-0.275426	0.374647	0.056225	-0.023116	0.385584	1.000000	
Other Act	0.820835	0.218218	0.408598	0.696904	-0.613266	-0.281353	1.000000

As presented in Table 11, it is seen that these three models which have been framed considering the total number of crimes as the dependent variable and population and vehicles as the pair of independent variables. The table 11 compares the relations from equations 1, 2 and 3, the r-square and adjusted r-square values come out to be more than 0.80 and indicates that the model is a good fit. Further, the beta co-efficient in model 1 for the population is 48.1081, indicating that the population is actually contributing to increment in the total number of crimes. As per model 2, the beta co-efficient of vehicles is 45.0089, indicating that an increase in the number of vehicles is actually contributing to increment in the total number of crimes. Further, taking into account model number 3, the beta co-efficients of the population is 82.3722 and for vehicles it is 33.5063, indicating that an increase in the number of vehicles as well as a population is actually contributing to the rise of the total number of crimes. These co-efficients are found to be statistically significant at a 5 per cent significance level.

It is observed that the physical micro-environment and layout designs of places have an impact on the incidences of crime. The places fall under east and north east districts surrounded by economically low-class residential colonies, JJ clusters, low-income groups, low literacy, poor infrastructure and less police patrolling have a high incidence of crimes. As per the assessment of

Table 11 : Three Regression Models Results.

Equation No. (Model)	1	2	3
R-Square	0.8989	0.844163	0.91072
Adjusted R-Square	0.8877	0.826848	0.88845
Constant	-806101*	-243251*	-119470*
Population	48.1081*	-----	82.3722*
Vehicles	-----	45.0089*	33.5063*

* P-values are found to be Significant at 1% significance level

responses, non-serious crimes like pick-pocketing, snatching, assault, abuse, etc. are more prevalent than serious crimes like murder, rape, etc. Crowded areas, isolated places/shades, and vacant plots are major crime hot-spots. High mobility places like Anand Vihar, Seemapuri, Jahangirpuri located near the inter-state borders are more prone to crimes. It is true that police and authorities of transit places should co-operate to control crimes, however proper planning, designing, and surveillance provisions in and around transit stations play an important role to prevent or minimize the incidence of crimes. The socio-economic conditions are equally important, but the goal should not just be to reduce crime but to improve the quality of life of the people as only it makes society crimeless.

Conclusion

This research examines the spatial structure of crime in general and describes places with a disproportionately large population and high crime frequency. The data revealed that population expansion has a favourable relationship with vehicle growth and crime rates. According to the crime pattern theory and criminal opportunity theory (Brantingham, Paul 2016), a bad infrastructure, insufficient protection, and a lack of surveillance provide opportunity to the perpetrator, which supports the conclusions of this work. The findings of this study demonstrate that high-density areas, such as the east, north east, central, and south districts, have a higher rate of crime than other districts. Because of urban characteristics such as density, mobility, impersonal relations, differential association, limited participation in community organisations, organised crime cultures, and a criminal type in the life experience of offenders, the findings of this paper are very similar to the views of Wirth, 1964, and Clinard, 1942, that there is more crime in densely populated urban areas. Shaw and McKay (1942) concluded that high crime rates were caused by poverty, high heterogeneity, and high mobility, which resulted in'social disorganisation,' and it was community-level social disorganisation that was thought to be the source of the crime" (Wilcox, Land, Hunt 2003). This paper's conclusions have significant policy consequences. The crime regions should be viewed not only as sites where crime occurs, but also as places where more general societal disadvantages are evident. Recognizing this truth will help us gain a better knowledge of crime hotspots and better target prevention resources.

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कबीरधाम जिले के कालिक बाजारों का वितरण प्रतिरूप

अनुसुईया बघेल एवं रोली मनु परगनिहा

शोध सारांश

अल्प विकसित एवं विकासोन्मुख देशों में विपणन केंद्रों में होता है। प्रस्तुत शोध पत्र का उद्देश्य कबीरधाम जिले में कालिक बाजार केंद्रों का वितरण प्रतिरूप ज्ञात करना है। प्रस्तुत शोध पत्र भारतीय जनगणना 2011 छत्तीसगढ़ कबीरधाम जिले पर आधारित है। कालिक बाजारों के आँकड़े कबीरधाम जिले के चार तहसीलों–कवर्धा, बोड़ला, पंडरिया और सहसपुर लोहारा के लिए उपलब्ध हैं। कबीरधाम जिले में कालिक बाजारों का वितरण लगभग यादृच्छिक हैं। किन्तु मैकल वृष्टि छाया प्रदेश में यादृच्छिक से समवितरण की ओर तथा कवर्धा मध्यवर्ती उच्च प्रदेश एवं शिवनाथ पार मैदान प्रदेश में यादृच्छिक से गुंच्छित है। वही दिवस के अनुसार (सोमवार, मंगलवार, बुधवार, गुरुवार, शुक्रवार, शनिवार तथा रविवार गुंच्छित से यादृच्छिक प्रतिरूप है। 1961 से 2011 तक के बाजार केंद्रों का वितरण लगभग यादृच्छिक से समवितरण की ओर है। भारतीय जनगणना में बाजार केंद्रों से ग्रामों की दूरी को तीन भागों में 5 किमी. से कम दूरी, 5–10 किमी. दूरी तथा 10 किमी. से अधिक दूरी पाया गया है। कालिक बाजारों में ग्रामों की दूरी में वृद्धि 1991 से 2001 में अधिक वृद्धि हुई जबकि 2001–2011 में भी कालिक बाजारों से ग्रामों की दूरी में वृद्धि हुई है किंतु यह वृद्धि 1991–2001 की तुलना में कम है। कबीरधाम जिले में कालिक दूरी बढ़ने पर स्थानिक दूरी कम है।

शब्द संक्षेप : *कालिक, बाजार केन्द्र, निकटतम, स्थानिक, प्रतिरूप ।*

प्रस्तावना

विपणन केन्द्र सामाजिक, आर्थिक, सांस्कृतिक और अन्य क्रिया–कलापों का सम्पादन करने वाले स्थल होते हैं जहाँ क्रेताओं एवं विक्रेताओं का समूहन होता है तथा विपणन केन्द्र में किसी वस्तु का प्रस्तावित तथा भुगतान किया जाने वाला मूल्य क्रेताओं एवं विक्रेताओं के पारस्परिक निर्णयों से प्रभावित होता है। अतः यह कहा जा सकता है कि वे स्थल विपणन केन्द्र कहलाते हैं, जहाँ आर्थिक विनिमय के अतिरिक्त सामाजिक, सांस्कृतिक, धार्मिक, प्रशासनिक, राजनैतिक क्रियाकलापों का भी सम्पादन होता है। जेफरसन (1931) के शब्दों में ''विपणन केन्द्र स्थल अपने चतुर्दिक ग्रामीण क्षेत्रों के बहुविधि क्रिया–कलापों को सम्पादित करते हैं। ''हाडर (1971) महोदय के अनुसार'' विपणन केन्द्र किसी निर्धारण स्तर पर वस्तुओं के क्रेता–विक्रेता का नियमित समयान्तराल पर एक अधिकृत जनसमूह होता है। ''विपणन केन्द्र के मूल्यांकन एवं सीमांकन तथा वितरण की उस श्रृंखला से संबधित है जिसके द्वारा वस्तुएँ उत्पादन कर्ता एवं उपभोगकर्ता के मध्य प्रवाहित होती है। कालिक बाजार केन्द्र का महत्व प्रत्येक ग्रामीण क्षेत्र एवं नगरीय क्षेत्र में होता है, यह लोगों की आवश्यकता की पूर्ति में महत्वपूर्ण भूमिका निभाते है। ऐसे स्थल नियमित रूप से निश्चित समय अन्तराल पर मिलते है जो सप्ताह में एक दिन, दो दिन तथा कुछ स्थानों में सप्ताह के प्रत्येक दिन लगा करतें हैं। कालिक बाजार केन्द्रों की समयांतराल एवं स्थानिक अवस्थिति का एक निश्चित क्रम होता हैं।

मुख्यतः कालिक बाजार केन्द्र अपरान्ह काल में एकत्रित होकर सांयकल तक समाप्त हो जाते हैं। कालिक बाजार केन्द्रों में सब्जियाँ , कपड़े , अनाज, फल , गहने , आदि दैनिक आवश्यकताओं की सामग्री विक्रय के लिए

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आती है, जिन्हे खरीदने अधिकांश ग्रामीण क्षेत्र के लोग प्रायः पैदल एवं साइकल से ही आते हैं। परिवहन मार्गो एवं परिवहन के उत्तम साधन पर क्रेताओं एवं विक्रेताओं की संख्या पर सकारात्मक प्रभाव पड़ता है। ब्रोमले (1974) ''आवर्ती विपणन केन्द्रों को व्यावसायिक क्रिया–कलापों के केन्द्रों के अतिरिक्त सांस्कृतिक , धार्मिक , सामाजिक तथा राजनैतिक संबंधों से जोड़ते है।'' गार्नियर तथा डेलबेज (1979) के अनुसार भौगोलिक, आर्थिक तथा तकनीकी कारणों से उत्पन्न क्षेत्रीय भिन्नताएँ विपणन प्रक्रिया को जन्म देती है। विक्रेता की अपनी वस्तुएँ विक्रय करने तथा क्रेता भी उन्हें क्रय करने की इच्छा विपणन की दूसरी महत्वपूर्ण आवश्यकता है। इन दोनों के मध्य ''दूरी'' विपणन प्रक्रिया का नियंत्रक तत्व है।''

अध्ययन क्षेत्र

कबीरधाम जिला छत्तीसगढ़ के पश्चिमी भाग में स्थित है। कबीरधाम जिले की पश्चिमी सीमा मध्यप्रदेश की सीमा से मिलता है। कबीरधाम 21°32′ से 22°35′ उत्तरी अक्षांश तथा 80°48′ से 81°28′ पूर्वी देशान्तर के मध्य स्थित है। जिले का कुल क्षेत्रफल 4,235 वर्ग किमी. है। वर्ष 2011 की जनगण्ना के अनुसार कबीरधाम जिले की कुल जनसंख्या 8,22,586 है, जिसमें पुरूषों की संख्या 4,92,058 तथा महिलाओं की संख्या 4,10,768 है। कुल जनसंख्या में से अनुसूचित जाति 14.6 प्रतिशत तथा अनुसूचित जनजाति जनसंख्या 20.3 प्रतिशत है। जनसंख्या घनत्व 185 व्यक्तिप्रति वर्ग किमी. तथा लिंगानुपात 1,002 प्रति व्यक्ति है। कबीरधाम को प्रशासनिक दृष्टिकोण से चार विकासखण्ड तथा चार तहसील में विभक्त किया गया है। जिले में कुल 1,013 ग्राम हैं। कबीरधाम जिले को तीन भौतिक विभागों में मैकल वृष्टि छाया प्रदेश कवर्धा मध्यवर्ती उच्च प्रदेश तथा शिवनाथ पार मैदान प्रदेश में विभाजित किया गया है । मैकल श्रेणी की अधिकतम ऊँचाई 927 मीटर है जबकि न्यूनतम ऊँचाई 320 मीटर है। वही कबीरधाम उच्च प्रदेश की ऊँचाई 400–600 मीटर है तथा शिवनाथ पार मैदान की ऊँचाई 300–400 मीटर है।

कबीरधाम जिले में शिवनाथ नदी, महानदी की प्रमुख सहायक नदी है, प्रदेश के 80 प्रतिशत भाग में विस्तृत है। शिवनाथ नदी की प्रमुख सहायक नदी हॉफ, फोंक, आगर एवं सफरी नदी है, जो जिले की उत्तर–पश्चिम से प्रवाहित होकर दक्षिण–पूर्व की ओर प्रवाहित है। इसी प्रकार जिले के दक्षिण–पश्चिमी भाग नर्मदा अपवाह तंत्र के अंतर्गत आता है।

इस प्रवाह प्रणाली में फेन, हालेन, बंजर एवं जामुलिया प्रमुख हैं। यह नदियाँ अपने साथ उपजाऊ काली मिट्टी बहा कर लाती हैं, जिससे जिले में धान, चना, गन्ना तथा सोयाबीन की उपज होती है। जिले में सोयाबीन का उत्पादन छत्तीसगढ़ में अग्रणीय स्थान रखता है। कबीरधाम जिला विषम धरातल तथा पहाड़ी क्षेत्रों से घिरा हुआ है। मैकाल श्रेणी एवं कबीरधाम उच्च प्रदेश में अधिंकाश क्षेत्र वनस्पतियों से घिरा हुआ है। जिले में वनों का कुल क्षेत्रफल का 9.12 प्रतिशत है। जिले के मिश्रित वनों में तेंदु, महुआ, आम, प्रमुख हैं। इसके अतिरिक्त हर्रा, गोद, लाख, बहेड़ा, गुरबेल, मुसली जैसी औषधीय पौधों का भी विस्तार है।

उद्देश्य

प्रस्तुत प्रपत्र के उद्देश्य निम्निलिखित हैं :–

1. इस शोध प्रपत्र का उद्देश्य कबीरधाम जिले के आवर्ती बाजार केन्द्रों का अध्ययन करना,
2. जिले में विपणन केन्द्रों की उत्पत्ति, वितरण एवं आवर्तिता ज्ञात करना है।

आँकड़ों के स्रोत एवं विधितंत्र

प्रस्तुत अध्ययन भारतीय जनगणना छत्तीसगढ़ 2011 पर आधारित है। जिनके अनुसार कबीरधाम जिले में कुल कालिक बाजारों की संख्या 93 है। 1961 से 2011 के मध्य कबीरधाम के कालिक बाजारों के वितरण प्रारूप में परिवर्तन ज्ञात किया गया है। कालिक बाजारों का वितरण प्रारूप ज्ञात करने के लिए क्लार्क एवं इवान्स (1954) के द्वारा बताए गए विधि निकटतम पड़ोसी विश्लेषण (Nearest Neighbour Analysis) विधि का उपयोग किया गया है। डेसी के द्वारा अधिवासों के वितरण प्रतिरूप

को ज्ञात करने के लिए किया गया है।

कालिक बाजारों का वितरण प्रतिरूप

कालिक बाजारों के वितरण प्रतिरूप का अध्ययन बाजार केन्द्रों क घनत्व, उनकी आवर्तिता, भूवैन्यासिक एवं कालिक व्यवस्था तथा चक्रीय प्रवृत्ति, आदि विशिष्टताओं को समझने में सहायक होगा। इस उद्देश्य को ध्यान में रख कर कबीरधाम जिले के बाजार केन्द्रों के वितरण प्रतिरूप की व्याख्या की गई है। कबीरधाम जिले के बाजार केन्द्रों को देखने पर भौतिक कारकों का प्रभाव स्पष्ट लक्षित हो रहा है। पवर्तीय क्षेत्रों में आवासीय क्षेत्र की दुर्गमता के कारण बाजार केन्द्रों की भी कमी है। जिले के उत्तरी तथा पश्चिमी भाग में बाजार केन्द्रों की कमी तथा दक्षिणी और पूर्वी भाग में बाजार केन्द्रों की संख्या अपेक्षाकृत अधिक है। सन् 2018–19 में कबीरधाम जिले में कुल 84 बाजार केन्द्र हैं।

बाजार केन्द्रों का वितरण प्रतिरूप सभी तहसीलों में भिन्न–भिन्न है। जिले के वितरण प्रतिरूप को स्पष्ट करने के लिए निकटतम पड़ोसी बिन्दु विश्लेषण विधि का उपयोग किया गया है। सर्वप्रथम जिले में वितरित समस्त बाजार केन्द्रों को उनके निकटतम बाजार केन्द्रों से रेखाओं द्वारा जोड़ दिया गया है। तत्पश्चात् निकटवर्ती बाजार केन्द्रों की पारस्परिक दूरी ज्ञात कर ली गई है।

निकटतम पड़ोसी विश्लेषण विधि

कबीरधाम जिले के कालिक बाजारों के वितरण प्रतिरूप क्लार्क एवं ईवांस (1954) की बहुप्रचलित "निकटतम पड़ोसी विश्लेषण विधि" से ज्ञात किया गया है जिन्होंने वनस्पतियों के वितरण प्रारूप को ज्ञात करने हेतु निम्न सूत्र का प्रयोग किया था –

$$\mathbf{Rn = \overline{ra} / \overline{re}}$$

$\overline{Rn}$ = निकटतम पड़ोसी अनुपात

$\overline{ra}$ = निकटतम पड़ोसी वास्तविक दूरी का औसत

re = निकटतम पड़ोसी प्रत्याशित दूरी का औसत

निकटतम पड़ोसी वास्तविक दूरी का औसत

$$\overline{ra} = \Sigma NND / N$$

ΣNND = निकटतम पड़ोसी दूरियों का योग

N = कुल कालिक बाजार केंद्रों की संख्या

निकटतम पड़ोसी प्रत्याशित दूरियों का औसत

$$\overline{re} = 0.5\sqrt{A/N}$$

A = कुल क्षेत्रफल, N = कुल कालिक बाजार केंद्रों की संख्या

निकटतम पड़ोसी सूचकांक 0 से 2.14 के मध्य होता है। सूचकांक में 0 गुंच्छित (clustered) यादृच्छिक (Ramdom) और 2.14 समवितरण (uniform) वितरण को दर्शाता है।

डेसी (1960) के अनुसार वास्तविक दूरी (FOA) निकालने के लिए जितने प्रतिवर्तन निकटतम पड़ोसी होंगें। उनको कुल बिंदुओं की संख्या से विभाजित करने पर प्राप्त होगा। यही प्रक्रिया द्वितीय एवं तृतीय निकटतम पड़ोसी में भी होगा। (मानचित्र 01)।

वान्छित (Expected) अर्थात पाट्टीच्छक (Random) दूरी को ज्ञात करने के लिए $(2/3)^n$ यहां n से तात्पर्य प्रथम/द्वितीय/तृतीय निकटतम पड़ोसी से है। ba वास्तविक दूरी $(2/3)^n$ से कम होने पर गुंच्छित और $(2/3)^n$ से अधिक होने पर समवितरण को दर्शाता है, और वास्तविक दूरी यदि $(2/3)^n$ के बराबर होने पर यादृच्छिक (Random) वितरण को दर्शाता है। $(2/3)^n$ से वास्तविक दूरी जितना दूर होगा उतना ही गुंच्छित (Clustered) अथवा समवितरण (uniform) वितरण को बताता है सभी प्रतिवर्तन (Reflexive) निकटतम पड़ोसी जोड़े बन जाते है, तो यह पूर्णतः समवितरण (uniform) वितरण को व्यक्त करते है। इसके विपरीत यदि यादृच्छिक एक ही प्रतिवर्तन (Reflexive) निकटतम पड़ोसी बनने पर पूर्णतः गुंच्छित को बताता है।

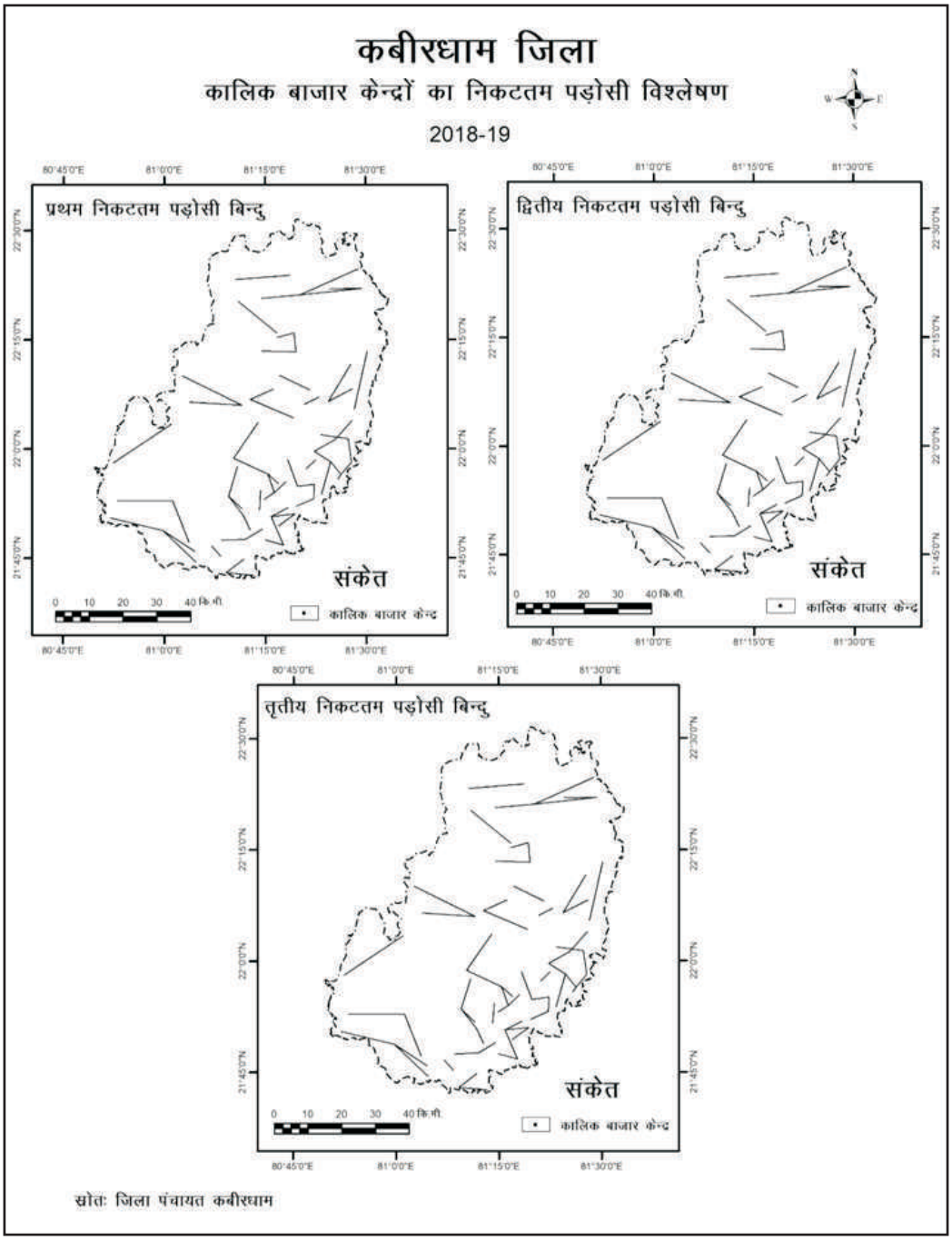
कबीरधाम जिला
कालिक बाजार केन्द्रों का निकटतम पड़ोसी विश्लेषण
2018-19
प्रथम निकटतम पड़ोसी बिन्दु
द्वितीय निकटतम पड़ोसी बिन्दु
तृतीय निकटतम पड़ोसी बिन्दु
संकेत
0 10 20 30 40 कि.मी.
कालिक बाजार केन्द्र
80°45'0"E
81°0'0"E
81°15'0"E
81°30'0"E
22°30'0"N
22°15'0"N
22°0'0"N
21°45'0"N
स्रोतः जिला पंचायत कबीरधाम

Fig. 01

सारणी 01 : कालिक बाजार केन्द्रों का निकटतम पड़ोसी विश्लेषण।

क्रं.	बाजार केन्द्र	प्रथम निकटतम पड़ोसी	द्वितीय निकटतम पड़ोसी	तृतीय निकटतम पड़ोसी
1	दलदली	1.4	2.3	4.2
2	लरबक्की	1.4	1.8	3.2
3	तरेगॉव	1.8	2.3	3
4	न्तेउर	1.5	3	2.6
5	कुई	1.5	2.1	3
6	कामठी	2.1	3	2.2
7	कोदवागोडान	1.3	2.4	4.7
8	मंझोलीलवन	1.3	2.6	4.5
9	बैजलपूर	0.4	1.3	1.8
10	जुजवानी	0.4	1.6	1.7
11	दरिया	1.6	1.8	1.7
12	मडमडा	1.3	1.7	2
13	खैरझिटी	1.4	1.4	1.4
14	किशुनगढ	1.5	2.7	4.4
15	म्हली	1.5	1.7	3
16	कुण्डा	1.4	1.6	2
17	चिल्फी	1.9	1.7	4.9
18	बहनाखोदरा	1.3	3.6	3.8
19	झलमला	1.3	1.9	4.5
20	कुसुमघटा	1.1	3.6	2.5
21	पोडी	0.4	1.1	1.8
22	पोडा मवेशी बजार	0.4	1.1	2
23	रेगाखारखूर्द	1	1.4	2.7
24	राजनवागॉव	0.6	1	2
25	रघ्घुपारा	0.6	2	3.2
26	भगतपूर	0.8	1	1.7
27	रूसे	0.9	1.7	1१2
28	मोहगॉव	0.9	0.9	1.7
29	श्रवेली	1	0.9	1.2
30	सेनबरसा	1.2	1.2	2.5
31	दुल्लापूर	0.8	2.2	2.1
32	छामापूर	0.8	2.1	1.7
33	धौराबद	1.1	1.1	1.4
34	म्रका	1.1	1.2	1.7
35	बनो	0.9	1.2	1.2
36	डेहरी	0.6	0.9	1.7
37	झलमला	0.6	1.5	1
38	च्चेरी	0.9	1.5	1.4
39	कोलयारी	1	1.2	1.5
40	गुडा	0.3	1.3	1.1
41	सोनपुरी	0.3	2	1.3
42	थ्बरकोना	1.1	1.5	1.7
43	इन्दौरी	1.5	1.1	1.5
44	प्नेका	0.8	0.8	1.1
45	दशरगपुर	0.6	1.1	1.6
46	वोसमदा	1.1	1.2	1.5
47	दुधिया	0.6	0.9	1.1
48	झिरौना	0.5	1.1	1.1
49	सेमरिया	0.4	1.2	1.1
50	म्हराजपूर	0.6	1.4	2.1

51	दानीटोला	0.6	1.5	1.4
52	गैदपूर	0.6	1.2	1.5
53	बम्हनी	0.6	1.1	1.4
54	चाराभाटा	0.6	0.7	1.3
55	हथलेवा	0.6	0.9	1
56	श्रामपूर	0.9	0.9	1.2
57	धरमगढ.	0.7	1.3	1.5
58	गौरामाटी	1.4	1.3	2.1
59	रणवीरपूर	1.4	1.2	1.4
60	बीरेन्द्रपूर	0.6	0.8	1.4
61	रेगाटोला	0.9	1.4	1.2
62	नवघटा	0.5	1.4	1.4
63	दनियाखुर्द	0.4	1.2	1.7
64	गौछिया	0.4	1.2	1.8
65	बचेडी	0.5	1.1	1.7
66	उडियाकलाखुर्द	0.5	1.5	0.8
67	भिमैरी	0.7	1	1.4
68	सिल्हाटी	0.7	1	1.4
69	बिडौरा	1	1.7	1.2
70	रक्से	0.2	0.5	1.2
71	बबई	0.2	1.7	1.1
72	बीजाबैरागी	0.4	1.1	1.5
73	मोहगॉव	0.4	1.3	1
74	सिघनगढ	1.1	1.5	1
75	खम्हरिया	1.3	1.6	1.7
76	खोलवा	0.8	1.8	0.5
77	सिघनपूरी	0.8	1.8	1.7
78	कोलयारी	.0.9	2	1.1
79	नवागॉव	1.8	3	1.3
80	तेलीटोला	2	3.7	1.5
81	खारा	1.3	2.5	1.6
82	बेहरखार	1.3	3.7	1.8
83	रेगाखार	3.7	2.7	1.8
84	खैरबनाकला	0.6	2.1	2
	कुल	81.4	136.8	136.8

स्रोत : जिला पंचायत, कबीरधाम 2017–2018

डेसी ने 1960 में निकटतम पड़ोसी विश्लेषण के रूप में संयुक्त राज्य अमेरिका के निचले इलाकों में नदी के किनारे बसे हुए अधिवासों के अंतराल का विश्लेषण किया है। डेसी ने अपने विश्लेषण में 2 से 6 तक निकटतम बिंदु ज्ञात किया परंतु प्रस्तुत अध्ययन में केवल 3 निकटतम पड़ोसी का विश्लेषण किया है। प्रस्तुत विश्लेषण में प्रस्तुत सबसे निकटतम बिंदु को प्रथम पड़ोसी माना है, दूसरे निकटतम बिंदु को दूसरा तथा तीसरे निकटतम बिंदु को तीसरा पड़ोसी माना है। तत्पश्चात् तीनों निकटतम बिंदुओं में से आपस में मिलने वाले पड़ोसी समूहों की गणना की है। प्रस्तुत विश्लेषण में प्रथम पड़ोसी बिंदु में 22 पड़ोसी समूह मिले है। उनमें बाजार केंद्रों की संख्या 44 होगी। इसी प्रकार दूसरे पड़ोसी बिंदु में 11 पड़ोसी समूह हैं इसमें बाजार केंद्रों की संख्या 22 है तथा तीसरे पड़ोसी बिंदु में 4 पड़ोसी समूह है, इसमें बाजार केंद्रों की संख्या 8 है। डेसी के अनुसार निकटतम बिंदु वाले अंकों का अनुपात (2/3) n होता है। कबीरधाम जिले में कुल कालिक बाजारों की संख्या 84 है, इनमें प्रथम प्रतिवर्तन निकटतम पड़ोसी जोड़े 22, द्वितीय प्रतिवर्तन निकटतम पड़ोसी जोड़े 11 एवं तृतीय प्रतिवर्तन निकटतम पड़ोसी जोड़े 8 है। अतः प्रथम, द्वितीय एवं तृतीय

सारणी 02 : प्रतिवर्तन निकटतम पड़ोसी की वास्तविक दूरी।

क्र.सं.	निकटतम पड़ोसी	$\overline{ra}$	$\overline{re}$	वितरण
1	प्रथम पड़ोसी	0.524	0.167	गुंच्छित
2	द्वितीय पड़ोसी	0.262	0.444	गुंच्छित
3	तृतीय पड़ोसी	0.190	0.269	गुंच्छित

स्रोत : जिला पंचायत, कबीरधाम 2017–2018

निकटतम पड़ोसी में वास्तविक दूरी की गणना निम्नानुसार की गई है। प्रथम प्रतिवर्तन निकटतम पड़ोसी की वास्तविक दूरी 44/84 = 0.524 द्वितीय प्रतिवर्तन निकटतम पड़ोसी की वास्तविक दूरी 22/84 = 0.262 तृतीय प्रतिवर्तन निकटतम पड़ोसी की वास्तविक दूरी 8/84 = 0.190 क्रिस्टाहलर (1933) के केन्द्र स्थल सिद्धान्त. षटभुज समान वितरण को स्पष्ट करता हैं उपरोक्त (सारणी क्रमांक 02) से स्पष्ट है कि प्रथम, द्वितीय एवं तृतीय प्रतिवर्तन निकटतम पड़ोसी जोड़ों में यादृच्छिक से वास्तविक दूरी कम पाया गया है। अतः तीनों स्तर पर निकटतम पड़ोसी मूल्य गुंच्छित वितरण को व्यक्त करता है। उल्लेखनीय है कि प्रथम प्रतिवर्तन निकटतम पड़ोसी वितरण के अनुसार कालिक बाजारों का वितरण यादृच्छिक से गुंच्छित की ओर जबकि तृतीय प्रतिवर्तन निकटतम पड़ोसी का मूल्य लगभग गुंच्छित वितरण को दर्शाता है।

दिवस के अनुसार कालिक बाजार केंद्रों का वितरण प्रतिरूप (Distributional Patterns of Periodic Markets by Day)

कबीरधाम जिले के निकटतम पड़ोसी विश्लेषण में बाजार केंद्रों के वितरण प्रतिरूप का अध्ययन बाजार केंद्रों के दिवस के अनुसार किया गया है। कबीरधाम जिले के कालिक बाजार केंद्रों के निकटतम पड़ोसी विश्लेषण मूल्य (Rn) सोमवार (0.78),मंगलवार (0.41), बुधवार (0.638), गुरुवार (0.53) शुकवार (0.56), शनिवार (0.73) एवं रविवार (0.72) के लगभग समान है।

सारणी 03 : कबीरधाम जिला : दिवस के अनुसार कालिक बाजार केन्द्रों का वितरण प्रतिरूप।

क्रं.	दिवस	बाजारों की संख्या	$\overline{ra}$	$\overline{re}$	Rn
1	सोमवार	13	3.2	21.6	0.78
2	मंगलवार	9	1.7	26.1	0.41
3	बुधवार	9	2.1	27.4	0.638
4	गुरूवार	8	1.6	21.6	0.53
5	शुकवार	9	2.3	22.5	0.56
6	शनिवार	7	2.5	20.8	0.73
7	रविवार	22	4.1	26.0	0.72

स्रोत : जिला पंचायत, कबीरधाम 2017–2018

कबीरधाम जिले में कालिक बाजारों का वितरण यादृच्छिक (Random) से गुंच्छित (Clustered) (0.64) की ओर है। सप्ताह के सातों दिनों के अनुसार बाजारों का वितरण प्रारूप भिन्न–भिन्न पाया गया है। किन्तु सोमवार, मंगलवार, बुधवार, गुरूवार, शुकवार, शनिवार एवं रविवार सातों दिनों में लगने वाले कालिक बाजारों का वितरण प्रारूप यादृच्छिक से गुंच्छित की ओर है।

उल्लेखनीय है उपरोक्त (सारणी क्रमांक 03) से स्पष्ट है कि रविवार और सोमवार को लगने वाले बाजारों का वितरण प्रारूप यादृच्छिक के नजदीक है, जबकि मंगलवार को लगने वाले कालिक बाजारों का वितरण प्रारूप यादृच्छिक से अधिक दूर गुंच्छित की ओर है।

मैकल श्रेणी प्रदेश जो विषम धरातल का उच्च प्रदेश है, पहाड़ी क्षेत्र है, यहां बाजारों का वितरण केवल उन्हीं श्रेणी में सकेन्द्रित है जहां समान धरातल उपजाऊ मिट्टी का क्षेत्र है, जो कृषि के लिए आवश्यक है, शेष कालिक बाजारों का अभाव से पाया गया है, इन क्षेत्रों में यातायात के साधनों में कमी पायी गई है। इसके विपरीत शिवनाथ पार का मैदान समतल धरातल, उपजाऊ मिट्टी तथा यातायात के साधनों से बाजार केन्द्रों का वितरण अधिक है।

सारणी 04 : जिला कबीरधाम : भौतिक विभाग के अनुसार निकटतम पड़ोसी विश्लेषण।

क्र.सं.	भौतिक विभाग	बाजारों की संख्या	$\overline{ra}$	$\overline{re}$	Rn
1	मैकल वृष्टि छाया प्रदेश	8	5.5	3.23	0.788
2	कवर्धा मध्यवर्ती उच्च प्रदेश	59	4.07	3.28	1.239
3	शिवनाथ पार मैदान प्रदेश	16	3.3	10.4	1.457

स्रोत : जिला पंचायत, कबीरधाम 2017–2018.

सारणी क्रमांक 04 से स्पष्ट है कि मैकल श्रेणी प्रदेश में कालिक बाजारों का वितरण यादृच्छिक से गुंच्छित (0.788) है। इसके विपरीत कवर्धा उच्च प्रदेश (1.239) तथा शिवनाथ पार के मैदान (1.457) में बाजारों का वितरण यादृच्छिक से समवितरण की ओर है। यद्यपि यह मूल्य कवर्धा उच्च प्रदेश, शिवनाथ के मैदानी क्षेत्र में यह मूल्य अधिक है अर्थात् समवितरण की ओर अधिक झुकाव है।

कालिक बाजारों के वितरण प्रारूप में परिवर्तन (1961–2011)

कालिक बाजारों की संख्या में 1961 की जनगणना से 2011 की जनगणना तक वृद्धि का आकलन किया गया है, भारतीय जनगणना के अनुसार कबीरधाम जिले में कालिक बाजारों की संख्या में सन् 1961 वर्ष में 32 थी जो वर्ष 1971 में 43, वर्ष 1981 में 47, वर्ष 1991 में 56, वर्ष 2001 में 89 तथा 2011 में 93 हो गई है। अध्ययन में पाया गया कि प्रत्येक दसवर्षीय अन्तराल में जिले के कालिक बाजारों की संख्या में वृद्धि हुई है। इन बाजार ग्रामों का विभिन्न जनगणना के अनुसार निकटतम पड़ोसी विश्लेषण किया गया है। कबीरधाम जिले के बाजार ग्रामों के निकटतम पड़ोसी विश्लेषण मूल्य (Rn) वर्ष 1961, 1971, 1981, 1991, 2001 तथा 2011 में क्रमशः 0.67, 0.57, 0.74, 0.68, 1.12 तथा 1.12 ज्ञात हुआ है।

सारणी 05 : जिला कबीरधाम : कालिक बाजारों के वितरण प्रारूप में परिवर्तन (1961–2011)

क्र.सं.	वर्ष	बाजारों की संख्या	निकटतम पड़ोसी वास्तविक दूरी का औसत	निकटतम पड़ोसी प्रत्याशित दूरी का औसत	निकटतम पड़ोसी सूचकांक
1	1961	32	9.3	13.8	0.67
2	1971	43	6.8	11.9	0.57
3	1981	47	8.5	11.4	0.74
4	1991	56	7.1	10.4	0.68
5	2001	89	9.1	8.2	1.12
6	2011	93	9.1	8.1	1.12

स्रोत्र : भारतीय जनगणना, कबीरधाम, दुर्ग, बिलासपुर (1961 – 2011)

सारणी क्रमांक 05 से यह स्पष्ट है कि 1961,1971,1981 और 1991 में कालिक बाजारों का वितरण यादृच्छिक से गुंच्छित है। इसका कारण इन चारों दस वर्षीय अंतराल में बाजारों की संख्या में बढ़कर के 89 हो गई है, और बाजारों का वितरण प्रारूप यादृच्छिक से समवितरण की ओर है। इसी तरह का वितरण प्रारूप 2011 में भी देखने को मिलता है।

ग्रामों का कालिक बाजार केन्द्र से दूरी (Distance of Villages From Periodic Markets).

भारतीय जनगणना 2011 में बाजार केन्द्रों से ग्रामों की दूरी को तीन भागों 5 किमी. से कम दूरी, 5 – 10 किमी. दूरी तथा 10 किमी. से अधिक दूरी में बाटा गया है। दूरी के अनुसार ग्रामों की संख्या में अन्तर ज्ञात करने के लिए काई वर्ग परीक्षण किया गया है। काई वर्ग परीक्षण अत्यन्त महत्वपूर्ण और सर्वाधिक लोकप्रिय अप्रचालीय परीक्षण (Non parametric test) है ।

Degree of freedom = (k-1) (r-1)

k = खानों (Calumms) की संख्या

r = पंक्तियो (Row) की संख्या

$\chi^2 = \sum \sum (0 - ?)^2 / E$

$\chi^2 = 23.74$

df = (k-1) (r-1)

df = (3-1) (4-1)

df = 2x3

df = 6

df = 6, P=0.001 पर सारणी मूल्य 22.48 से आकलित मूल्य 81.88 अधिक है। अतः कबीरधाम जिले के चारों तहसीलों में ग्रामों से कालिक बाजार केंद्रों की दूरी में सार्थक अंतर पाया गया है।

कबीरधाम में कुल 1,013 ग्रामों में से 84 कालिक–बाजार केन्द्र है। शेष 929 ग्रामों के निवासी अपनी आवश्यकता की पूर्ति के लिए समीपवर्ती बाजारों में खरीदी के लिए आते हैं। कबीरधाम जिले में 40.07 ग्राम कालिक बाजारों से 5 किमी. से कम दूरी पर स्थित हैं। उल्लेखनीय है कि 45.2% ग्राम के लोग बाजार केन्द्रों पर खरीदी के लिए 5 से 10 किमी. की दूरी तय करते हैं। शेष 14.8% ग्राम की दूरी बाजार से 10 किमी. से अधिक है, कालिक बाजारों से ग्रामों की दूरी के अनुसार ग्रामों की संख्या में जिले के सभी तहसील में अंतर पाया गया है। बाजारों से ग्रामों की दूरी बोड़ला विकासखण्ड में (एक चौथाई) 26.3% ग्रामों की दूरी 10 किमी. है। इसके विपरीत मात्र 24.9 % ग्राम बाजारों से 5 किमी. से कम दूरी पर स्थित है। इसी तरह पंडरिया विकास खण्ड में 16% ग्राम 10 किमी. से अधिक दूरी एवं 38.9% ग्राम 5 किमी. से कम दूरी पर स्थित है। इसके विपरीत कवर्धा एवं सहसपूर लोहारा के बाजारों से 10 किमी. से अधिक दूरी पर स्थित ग्रामों का प्रतिशत क्रमशः 2.6 % और 3.8% है जबकि कवर्धा में 56.4% और सहसपूर लोहारा में 52.9 % ग्राम कालिक बाजारों से 5 किमी. से कम दूरी पर स्थित है। अतः जिले के बोड़ला विकास खण्ड में बाजारों से ग्राम की दूरी 10 किमी. से अधिक है। इसके विपरीत कवर्धा विकास खण्ड में बाजारों से तय की गई दूरी 10 किमी. से अधिक वाले ग्रामों का प्रतिशत अपेक्षाकृत कम है। 5 किमी. से कम दूरी वाले ग्रामों की संख्या अपेक्षा से अधिक है। 2001 में कवर्धा तहसील में 56.4 ग्राम के लोग कालिक बाजार केन्द्र पहुँचने के लिए 5 किमी. से कम दूरी तय करते थे, बोड़ला तहसील में 18.3 प्रतिशत ग्राम के लोग 10 किमी. से अधिक दूरी तय कर अपनी आवश्यकता की पूर्ति करते हैं। 1991 में कवर्धा तहसील में 88.3 % ग्राम के लोग 5 किमी. से कम दूरी तय करते थे। इसके विपरीत 3.5% ग्राम के लोग कालिक बाजार केन्द्र तक पहुँचने के लिए 10 किमी. से अधिक दूरी तय करते है। वर्ष 1991 में कालिक बाजार केन्द्र निकटवर्ती ग्राम में लगा करती थी तथा बाजार आकार में छोटे होते थे। वर्ष 2001 तथा 2011 में इन छोटे– छोटे बाजार केन्द्रों का सविलय कर बड़े बाजार केन्द्र बनाए गए हैं। अतः कालिक बाजार से ग्रामों की दूरी वर्ष 1991 की तुलना में बढ़ गई है। कालिक बाजार केन्द्र आकार में बड़े होने के साथ विक्रय के लिए लाई वस्तुओं में भी भिन्नता पाई गयी है। 1991 में कबीरधाम जिले में कालिक बाजारों से 5 किमी. से कम दूरी वाले ग्रामों 75.5% थी जो 2001 में घटकर 42.3% तथा 2011 में पुनः घटकर 39.9%हो गया है। इसके विपरीत कालिक

बाजारों से 10 किमी. से अधिक दूरी वाले ग्रामों की संख्या 1991 में 8.6% थी जो 2001 में बढ़कर 13.2% और 2011 में पुनः बढ़कर 14.9% हो गया है। उल्लेखनीय है कि कालिक बाजार से 5 से 10 किमी. की दूरी वाले ग्रामों की संख्या 1991 में 15.9% थी, जो 2001 में बढ़कर 44.5% हो गया है और 2011 में पुनः बढ़कर 45.2 % हो गया है।

सारणी 06 : कबीरधाम जिला : कालिक बाजारों से ग्रामों की दूरी (1991–2011)।

		दूरी (किमी.)					
वर्ष	तहसील	< 5		5–10		> 10	
		ग्रामों की संख्या	प्रतिशत	ग्रामों की संख्या	प्रतिशत	ग्रामों की संख्या	प्रतिशत
1991	कबीरधाम जिला	444	75.5	94	15.9	50	8.6
	पण्डरिया	102	64.9	23	14.6	32	20.5
	बोड़ला	57	74.6	22	16.9	11	8.5
	कवर्धा	150	88.3	14	8.2	6	3.5
	सहसपूर–लोहारा	135	78.9	35	20.4	1	0.8
2001	कबीरधाम जिला	426	42.3	448	44.5	132	13.2
	पण्डरिया	95	40	110	45.0	39	16
	बोड़ला	160	35.8	205	45.9	81	18.3
	कवर्धा	88	56.4	64	41.0	4	2.6
	सहसपूर–लोहारा	83	51.8	69	43.2	8	5
2011	कबीरधाम जिला	338	39.9	383	45.2	125	14.9
	पण्डरिया	95	38.9	110	45.1	39	16
	बोड़ला	72	24.9	141	48.8	76	26.3
	कवर्धा	88	56.5	64	41.0	4	2.5
	सहसपूर–लोहारा	83	52.9	68	43.3	6	3.8

स्रोत्र : भारतीय जनगणना 1991, 2001 एवं 2011.

सारणी क्रमांक 06 में 1991 से 2001 में कालिक बाजारों से ग्रमों की दूरी में वृद्धि हुई है। जबकि 2001–2011 में कालिक बाजारों से ग्रामों की दूरी में अधिक वृद्धि हुई है, किन्तु यह वृद्धि 1991 से 2001 की तुलना में कम है। कालिक बाजारों से ग्रामों की दूरी में वृद्धि में अंतर पाया गया है, क्रेता एवं विक्रेता पिछले दशक की तुलना में अधिक दूरी तय कर बाजार केन्द्र पहुंचते हैं। इस वृद्धि में यातायात के साधानों ने वृद्धि ने महत्वपूर्ण भूमिका निभाई है। वर्ष 1991, 2001 तथा 2011 में कालिक बाजारों से ग्रामों की दूरी में अंतर पाया गया है। यह ज्ञात करने के लिए काई वर्ग परीक्षण किया गया है। काई वर्ग परिक्षण से स्पष्ट होता है, कि df= 4, P=0-001 पर सारणी मूल्य 22.46 से आकलित काई मूल्य 81.88 अधिक है। अतः कबीरधाम जिले में 1991, 2001 और 2011 में कालिक बाजारों की दूरी में सार्थक अंतर पाया गया है।

स्थानिक एवं कालिक विश्लेषण (Spatial and Periodic Analysis)

किसी भी क्षेत्र में बाजार केंद्रों की कालिक कारकों एवं

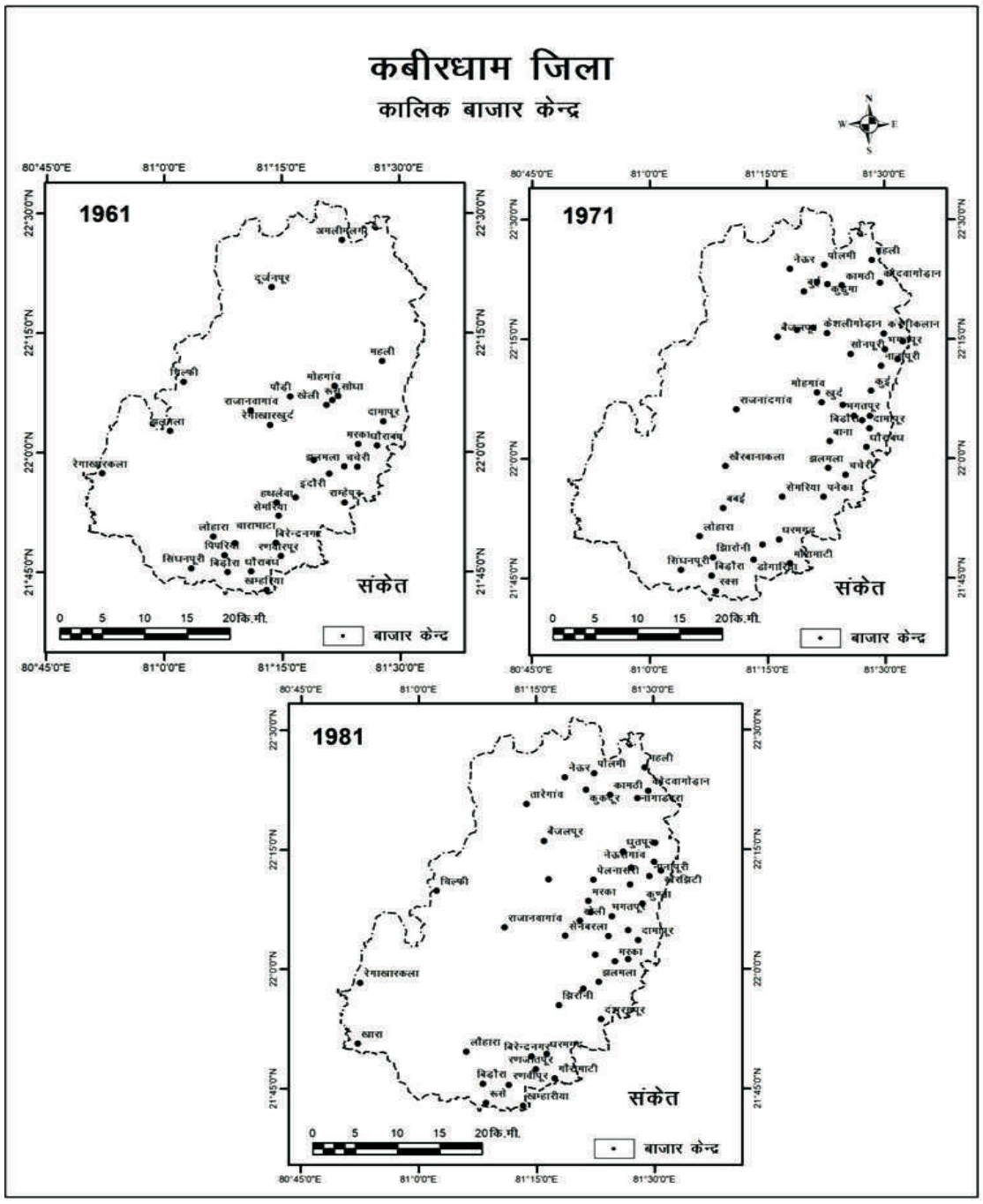
कबीरधाम जिला
कालिक बाजार केन्द्र
1961
1971
1981
संकेत
बाजार केन्द्र
0 5 10 15 20कि.मी.
80°45'0"E
81°0'0"E
81°15'0"E
81°30'0"E
22°30'0"N
22°15'0"N
22°0'0"N
21°45'0"N

Fig. 05

भौतिक विशेषताओं का अध्ययन करके संबंधित क्षेत्र के अर्थ तंत्र में विपणन केंद्रों के महत्व को स्पष्ट किया जा सकता है। प्रायः बाजार केंद्रों की अवस्थितिगत विशेषताएँ बाजार की गहनता एवं विरलता को दर्शाती है। ''विपणन केंद्रों के स्थानिक वितरण से तात्पर्य विपणन संवर्धन के उस आर्थिक–सामाजिक भू–विन्यास के असंगठित रूप से है जिसके माध्यम से किसी क्षेत्र के निवासी अपनी आवश्यकताओं की पूर्ति करते हैं'' (श्रीवास्तव एवं दीक्षित 1996)"। बाजार केंद्रों के स्थानिक वितरण उस क्षेत्र के विकास को दर्शाता है अर्थात् विकासोन्मुख क्षेत्र में आवर्ती बाजार केंद्रों की संख्या अधिक पायी जाती है। कबीरधाम जिले के निकटवर्ती बाजार केंद्रों का परस्पर संगठन ज्ञात करने के लिए समान दिवस, समीपवर्ती दिवस, एक दिवस अंतराल एवं दो दिवस अंतराल के निकटवर्ती बाजार केंद्रों की औसत स्थानिक दूरी को ज्ञात किया गया है।

कबीरधाम जिले में सोमवार से रविवार तक अलग–अलग दिनों के आधार पर कालिक बाजार का औसत दूरी ज्ञात किया गया है जिसमें समान दिवस में बाजारों की औसत दूरी (7.6 कि.मी.) प्राप्त किया गया है। इसी प्रकार समीपवर्ती दिनों में लगने वाले बाजार केंद्रों की औसत दूरी सोमवार से मंगलवार एवं रविवार (5.2 कि.मी.) ज्ञात किया गया है। एक दिन के अंतराल में लगने वाले बाजार केंद्रों की औसत दूरी सोमवार से बुधवार एवं शनिवार (5.7) किमी. ज्ञात किया गया है। तथा दो दिनों के अंतराल में लगने वाले बाजार केंद्रों की औसत दूरी उदाहरण सोमवार से गुरुवार एवं शुकवार (4.8 कि.मी.) ज्ञात किया गया है।

कालिक एवं स्थानिक दूरी के मध्य विपरीत संबंध है। अर्थात् स्थानिक दूरी कम होने के साथ–साथ कालिक दूरी बढ़ती गई है। जैसे–जैसे कालिक दूरी बढ़ती जा रही है,स्थानिक दूरी कम होती है। कबीरधाम जिले में समान दिनों पर लगने वाले बाजार केंन्द्र अधिक दूरी पर स्थित है। समीपवर्ती दिनों पर लगने वाले बाजार केन्द्रों तथा एक दिवस अंतराल पर लगने वाले बाजार केन्द्रों की स्थानिक औसत दूरी (5.7 किमी.) समान दिनों में लगने वाले बाजार केन्द्रों की औसत दूरी (7.6 किमी.) से कम है तथा दो दिवस अंतराल में लगने वाले बाजार केन्द्रों की स्थानिक औसत दूरी घटकर और भी कम हो (4.8 किमी.) हो गयी है। सामान दिवस पर लगने वाले बाजार केन्द्रों की स्थानिक औसत दूरी सबसे अधिक है। इसके विपरीत दो दिवस अंतराल में लगने वाले बाजार केन्द्रों की स्थानिक औसत दूरी सबसे कम है।

निष्कर्ष

कबीरधाम जिला के कालिक बाजार केंद्रों के निकटतम पड़ोसी विश्लेषण के आधार पर निकटतम बिंदु वाले अंकों का अनुपात (2/3) होता है प्रथम समूह का (2/3)=0.52, द्वितीय समूह का (2/3)2=0.26 तथा तृतीय समूह का (2/3)3=0.10 है अर्थात् कबीरधाम जिले के बाजार केंन्द्र एक यादृच्छिक से गुंच्छित की ओर है। कबीरधाम जिला में कालिक बाजार केन्द्रों पर सोमवार से रविवार तक निकटतम पड़ोसी विश्लेषण किया गया है। जिसमें जिले में सप्ताह के सभी दिवसों (सोमवार, मंगलवार, बुधवार, गुरुवार, शुक्रवार, शनिवार एवं रविवार) को कालिक बाजार केंद्रों का वितरण याद्दच्छिक से गुंच्छित की ओर है। कबीरधाम जिले के कालिक बाजार केंद्रों के दिन के अनुसार दूरी के आधार पर बाजार केन्द्रों का वितरण का अध्ययन किया गया है जिसके अनुसार सोमवार (5.5) दिवस के कालिक बाजार केन्द्रों की औसत दूरी सर्वाधिक तथा गुरुवार (2.2) दिवस की औसत दूरी सबसे कम है। कालिक बाजार केंद्रों की संख्या कम होने पर औसत दूरी अधिक तथा बाजार केन्द्रों की संख्या अधिक होने पर औसत दूरी कम होती है। अध्ययन क्षेत्र में बाजार केन्द्रों के आधार पर आवृत्ति रविवार, सोमवार, मंगलवार को सर्वाधिक तथा शनिवार को सबसे निम्न है। कबीरधाम जिला में कालिक केन्द्रों पर सोमवार से रविवार तक का अलग–अलग दिनों का औसत दूरी के आधार पर समान दिवस में 7.6 कि. मी. प्राप्त किया गया। दो दिवस के अंतराल में लगने वाले बाजार केन्द्रों की औसत दूरी 4.8 कि.मी. ज्ञात किया गया

है। कबीरधाम जिला मे कालिक दूरी बढ़ने पर स्थानिक दूरी कम है और स्थानिक दूरी अधिक होने के साथ–साथ कालिक दूरी कम है। पिछले दो दशकों में कालिक बाजारों की ग्रामों की दूरी में वृद्धि हुई, जो यातायात के साधनों में वृद्धि से संभव हुआ है। कबीरधाम जिले में कालिक बाजारों से बढ़ती हुई दूरी के अनुसार ग्रामों की संख्या में कमी हुई है।

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मौजूदा भारत–नेपाल सीमा विवाद में चीन की अप्रत्यक्ष भूमिका

अमित सिंह

शोध सारांश

दशकों पुराना भारत–नेपाल सीमा विवाद पिछले कुछ समय से अपने चरमोत्कर्ष पर है और विश्व–राजनीति में चर्चा का मुख्य विषय बना हुआ है। बीते दिनों नेपाल ने न केवल अपने सबसे घनिष्ठ पड़ोसी राष्ट्र भारत द्वारा जम्मू–कश्मीर राज्य पुनर्गठन के बाद जारी भारतीय मानचित्र का कड़ा विरोध किया बल्कि उसके द्वारा निर्मित कैलाश–मानसरोवर यात्रा को सुगम बनाने वाली 80 किलोमीटर लम्बी 'धारचूला लिपुलेख सड़क परियोजना' के उद्घाटन पर भी खुलकर आपत्ति जाहिर की और तो और नेपाली संसद ने नेपाल का एक नया नक्शा जारी कर कालापानी से लेकर लिपुलेख और लिंपियाधुरा तक के सम्पूर्ण भारतीय क्षेत्र को अपने अभिन्न संप्रभु हिस्से के रूप में दर्शा दिया। वास्तविकता में भारत–नेपाल के मध्य हाल के दिनों में हुए कालापानी और लिपुलेख जैसी सीमा सम्बन्धी विवादों में चीन की परोक्ष भूमिका को नकारा नहीं जा सकता है और विशेषज्ञों के मतानुसार चीन की शह पर ही नेपाल ने भारत के साथ अपने पुरातन 'रोटी–बेटी' वाले द्विपक्षीय सम्बन्धों को ताक पर रखते हुए इतना आक्रामक रूख अख्तियार किया जबकि दोनों देशों के मध्य यह सीमा विवाद कोई नया नहीं अपितु कई वर्षों पुराना है। एशिया के दो विशालकाय राष्ट्रों भारत और चीन के बीच हिमालय की गोद में बसे छोटे से स्थलबद्ध राष्ट्र नेपाल का सामरिक महत्व देखते हुए चीन ने यहाँ प्रबल कूटनीतिक सम्बन्ध स्थापित कर कई बड़ी परियोजनाओं में निवेश कर रखा है और पिछले कम्युनिस्ट नेपाली प्रधानमंत्री के०पी०शर्मा ओली के नेतृत्व वाली वामपंथी सरकार का झुकाव भी साम्यवादी चीन के प्रति पूर्णतः सकारात्मक रहा। हालाँकि पर्दे के पीछे से चीन द्वारा प्रायोजित इन कुटिल विस्तारवादी प्रायोजनों से भली–भांति परिचित भारत सरकार द्वारा नेपाल संग चल रहे मौजूदा सीमा विवाद के शान्तिपूर्ण समाधान हेतु द्विपक्षीय वार्ता के माध्यम से विभिन्न स्तरों पर प्रयास किया जा रहा है परन्तु इस विवाद में साम्यवादी चीन की इस अप्रत्यक्ष संलिप्तता ने भारत के सम्मुख एक जटिल सुरक्षा–दुविधा उत्पन्न कर दी है जिसके आने वाले समय में दूरगामी परिणामों का विश्लेषण करना नितान्त आवश्यक है।

मुख्य शब्दः *भारत–नेपाल सीमा विवाद, चीन–नेपाल गठजोड़, कालापानी क्षेत्र, सुगौली सन्धि, बेल्टएण्ड रोड इनिशिएटिव।*

प्रस्तावना

21वीं सदी में भारत और चीन एशिया की ही नहीं अपितु विश्व की दो सर्वाधिक तेजी से उभरती हुयी महाशक्तियाँ हैं। एक ओर जहाँ 'रिपब्लिक ऑफ इण्डिया' के रूप में भारत विश्व का सबसे बड़ा लोकतान्त्रिक राष्ट्र है जिसकी नीतियाँ गुटनिरपेक्षता एवं शांतिपूर्ण सह–अस्तित्व के स्तम्भों पर आधारित है, जो अपने पड़ोसी देशों की संप्रभुता के आदर एवं उनके साथ सहयोगात्मक सम्बन्धों पर बल देती हैं तो वहीं दूसरी ओर 'पीपुल्स रिपब्लिक ऑफ चाइना' विश्व का सबसे बड़ा साम्यवादी राष्ट्र है जिसकी साम्राज्यवादी, विस्तारवादी आक्रामक नीतियाँ जग–जाहिर हैं और बुद्ध का अनुसरण करने वाला दलाई लामा का शन्तिप्रिय देश तिब्बत इसका ज्वलन्त उदाहरण है। अपनी इन्हीं नीतियों के फलस्वरूप वर्तमान में चीन का भारत समेत लगभग उसके हर पड़ोसी राष्ट्र के साथ किसी न किसी रूप में सीमा–विवाद बना हुआ है। माओ की अगुवाई में कोमिन्तांग सरकार के पतन के बाद 01 अक्टूबर 1949 को अस्तित्व में आए इस नये साम्यवादी चीन की मंशा सदैव से ही भारत के प्रति शंकास्पद रही है। यहाँ तक दोनों के बीच सीमा विवाद को लेकर 1962 में सशस्त्र संघर्ष भी हो चुका

अमित सिंह, शोध अध्येता, रक्षा एवं स्त्रातेजिक अध्ययन विभाग, पी० पी० एन० पी०जी० कॉलेज, कानपुर, सम्बद्ध छत्रपति शाहू जी महाराज विश्वविद्यालय, कानपुर (उत्तर प्रदेश)।

है। जहाँ चीन ने एकतरफा युद्धविराम घोषित करते हुये भारत के कुछ बड़े भू–भागों पर अवैध रूप से कब्जा जमा लिया। तब से आज तक दोनों देशों के बीच गम्भीर सीमा विवाद बना हुआ है और कई बार यह वैचारिक मतभेद डोकलाम और गलवान जैसी हिंसक झड़पों का भी रूप ले चुका है। इधर विगत कुछ वर्षों से विस्तारवादी चीन निरन्तर भारत के पड़ोस में स्थित राष्ट्रों पर अपना प्रभुत्व स्थापित करने में लगा हुआ है। वह भारतीय उपमहाद्वीप में स्थित भारत के निकटवर्ती राष्ट्र–राज्यों को आर्थिक व सामरिक सहायता प्रदान कर भारत की घेरेबन्दी करने का पूरा प्रयत्न कर रहा है और इसके लिये वह पाकिस्तान, म्यांमार, बांग्लादेश, नेपाल, श्रीलंका, सेशेल्स, मालदीव, आदि पड़ोसी देशों में अपना प्रभाव बढ़ा रहा है[2] ताकि उचित समय आने पर वह इन देशों में विकसित भू–भाग एवं अन्य आधारभूत सुविधाओं का प्रयोग भारत के विरूद्ध कर सके तथा अन्तर्राष्ट्रीय–पटल पर इन राष्ट्रों का समर्थन अपने पक्ष में प्राप्त कर भारत की छवि को धूमिल कर सकें। इसीलिए चीन हमेशा से भारत के विरूद्ध पाकिस्तान प्रायोजित छद्म कार्यवाहियों का समर्थन करता रहा है और कहीं न कहीं अप्रत्यक्ष रूप से उनमें लिप्त भी रहा है। भारत पर अपनी स्थिति को मजबूत करने की मंशा से चीन ने पाकिस्तान के साथ पहले से ही कई समझौते किये हुये हैं जिनमें हाल ही के दशकों में किये गये 'ग्वादार बन्दरगाह' तथा 'चीन–पाकिस्तान आर्थिक गलियारा' (China-Pakistan Economic Corridor) प्रमुख हैं लेकिन अब वह भौगोलिक रूप से भारत के सबसे करीबी और घनिष्ठतम पड़ोसी नेपाल को अपना अगला मोहरा बनाकर भारत पर अपनी पकड़ और मजबूत करना चाह रहा है। भारत और चीन के बीच मध्य–हिमालय के दक्षिणी ढलान पर अवस्थित नेपाल एक अन्तस्थ राष्ट्र (Buffer State) है। जिसका अपना एक अलग सामरिक महत्व है। इसी के चलते नेपाल की आन्तरिक राजनीतिक–अस्थिरता का लाभ उठाकर चीन ने पिछले कुछ दशकों में वहाँ अपनीपैठ मजबूत कर ली है और सड़कों से लेकर हाईवे, रेलवे, एयरपोर्ट जैसी कई बड़ी परियोजनाओं में आर्थिक निवेश कर भारत के लिये चुनौती खड़ी कर दी है।

उद्देश्य

प्रस्तुत शोध का मूल उद्देश्य भारत–नेपाल सम्बन्धित मौजूदा कालापानी और लिपुलेख सरीखे सीमा विवादों के तत्कालिक सम्भावित कारकों का विश्लेषण कर इस विवाद में तीसरे पक्ष अर्थात् चीन की अप्रत्यक्ष भूमिका का वस्तुपरक चित्रण करना है ताकि भारत परिस्थितियों के अनुरूप अपनी सामरिक नीति का निर्धारण कर अपनी भावी सुरक्षा व शांति को सुनिश्चित कर सके और भविष्य में उसके साथ ऐसी विपरीत परिस्थितियों की पुनरावृत्ति न हो।

तथ्यों के स्रोत तथा विधितंत्र

इस शोध से सम्बन्धित समस्त तथ्य व जानकारीयां मूलतः द्वितीयक आंकड़ों अर्थात् महत्वपूर्ण प्रकाशनों में प्रकाशित लेख–कार्यों, समाचार पत्रों तथा पत्र–पत्रिकाओं इत्यादि पर आधारित हैं जिनका आवश्यकता के अनुसार चयन कर संदर्भित किया गया है एवं शोध समस्या को ध्यान में रखते हुए विश्लेषणात्मक क्रिया–विधि का प्रयोग किया गया है।

मौजूदा भारत–नेपाल विवादित क्षेत्र की भौगोलिक अवस्थिति तथा सामरिक महत्व

वर्तमान में भारत–नेपाल के बीच चल रहा मौजूदा सीमा विवाद लिपुलेख–कालापानी–लिंपियाधुरा क्षेत्र को लेकर है जिसका मुख्य कारण महाकाली नदी का उद्गम स्थल है जिसे नेपाल में काली नदी और भारत के मैदानी भागों में शारदा नदी के नाम से भी जाना जाता है। ब्रिटिश इण्डिया और नेपाल के मध्य वर्ष 1816 में हुई सुगौली सन्धि के अनुसार यही नदी इन दोनों देशों के बीच अन्तर्राष्ट्रीय सीमा का निर्धारण करती है[4] जिसमें साफ–साफ उल्लेखित है कि नदी के पूर्वी तरफ के भू–भाग पर नेपाल नरेश का तो पश्चिमी तरफ के भू–भाग पर भारत का एकाधिकार होगा लेकिन वर्तमान में इस नदी के उदगम स्थल को लेकर ही भारत और नेपाल के बीच गम्भीर वैचारिक मतभेद हैं। भारत लिपुलेख के समीप से निकलने वाली जलधारा को नदी का उद्गम स्थल मानता है जबकि नेपाल यहाँ से 16 किलोमीटर दूर लिंपियाधुरा के समीप निकलने वाली

कूटी–यांग्ती जलधारा को नदी का उदगम स्थल मानता है। वस्तुतः भारत, नेपाल तथा चीन अधिकृत तिब्बत की सीमाओं के ट्राई–जंक्शन पर स्थित[5] विवादित कालापानी का क्षेत्र समुद्रतल से लगभग 3600 मीटर की ऊँचाई पर 372 वर्ग किलोमीटर में फैला हुआ एक पर्वतीय भू–भाग है जो कि सामरिक दृष्टि से अत्यधिक महत्वपूर्ण है। इस इलाके के सबसे ऊपरी भाग में लिपुलेख दर्रा स्थित है और वहीं से उत्तर–पश्चिम की ओर कुछ दूरी पर लिंपियाधुरा नामक दर्रा स्थित है। वैसे तो यह सम्पूर्ण इलाका भारतीय राज्य उत्तराखण्ड के पिथौरागढ़ जिले के धारचूला तहसील के अन्तर्गत आता है लेकिन नेपाल इसे अपने सुदूर पश्चिम प्रान्त के अधीन दार्चुला जिले का हिस्सा बताता है।

Figure 01 : Map view indicating the disputed area of Lipulekh-Kalapani-Limpiyadhura

Source: BBC News, https://www.bbc.com/news/world-asia-52967452

भारत के लिए इस क्षेत्र की सामरिक महत्ता इसलिए और अधिक बढ़ जाती है क्योंकि यहाँ से वह सीमा पार उत्तर हिमालयी क्षेत्र में होने वाली चीनी पीपुल्स लिबरेशन आर्मी की सभी सैन्य गतिविधियों पर आसानी से नजर रख सकता है। भारत ने यहाँ चीन से लगने वाली सीमा पर भारत–चीन युद्ध के बाद से ही इण्डो तिब्बतन बार्डर पुलिस (ITBP)को तैनात कर रखा है और नेपाल से लगने वाली सीमा पर सशस्त्र सीमा बल (SSB)के जवानों की तैनाती कर रखी है। चीन भी इस क्षेत्र के स्त्रातेजिक महत्व से भली–भांति परिचित है और नेपाल के माध्यम से इस क्षेत्र पर अपना प्रभुत्व स्थापित करना चाहता है। चीनी गणराज्य स्वयं तो लगातार विवादित सीमा 'लाइन ऑफ

एक्चुअल कंट्रोल' पर अपने कब्जे वाले भू–भाग में सामरिक महत्व की अवसंरचना का तेजी से निर्माण कर रहा है तथा इसे अपनी मूलभूत आवश्यकताओं के अनुकूल बताता है परन्तु भारत द्वारा किए जाने वाले निर्माण–कार्य पर सदैव इसी प्रकार प्रत्यक्ष या अप्रत्यक्ष रूप से आपत्ति जताता रहा है। चीन–नेपाल गठजोड़ ने अनादि काल से चले आ रहे भारत–नेपाल मैत्रीपूर्ण मधुर सम्बन्धों पर कुठाराघात किया है और चीन के उकसावे पर नेपाल के आकस्मिक आक्रामक रवैये ने भारत को अचम्भित कर दिया है जिसके फलस्वरूप भारत की सीमा सम्बन्धी चिन्तायें और चुनौतियां और अधिक बढ़ गयी हैं।

भारत–नेपाल सम्बन्ध एवं चीन की अप्रत्यक्ष भूमिका

भारत और नेपाल के मध्य मैत्रीपूर्ण सम्बन्ध अनादिकाल से चले आ रहे हैं[6] जिसका उल्लेख कई पौराणिक ग्रन्थों में मिलता है। रामायण के अनुसार नेपाल का जनकपुर, अयोध्या के प्रभु श्रीराम का ससुराल अर्थात् माता देवी सीता की जन्मस्थली है। वहीं नेपाल के लुम्बिनी प्रान्त को महात्मा बुद्ध की जन्मस्थली होने का गौरव प्राप्त है। इस प्रकार दोनो राष्ट्र न केवल भौगोलिक और भाषायी आधार पर बल्कि धार्मिक, ऐतिहासिक, सांस्कृतिक आधार पर भी एक दूसरे से अविछिन्न रूप से जुड़े हुए हैं। आधुनिक नेपाल के निर्माता होने का श्रेय गोरखा महाराज पृथ्वी नारायण शाह को जाता है जिन्होंने 1768 में तमाम बिखरे हुए पहाड़ी रियासतों को एकीकृत कर एक नये हिन्दू–राष्ट्र नेपाल की नींव रखी। नेपाल की भारत के साथ लगभग 1750 किलोमीटर लम्बी खुली थलीय सीमा है जोकि पांच भारतीय राज्यों उत्तराखण्ड, उत्तर प्रदेश, बिहार, सिक्किम तथा पश्चिम बंगाल से होकर गुजरती है। नदियों के बहाव के कारण अधिकतर सीमावर्ती इलाका मैदानी है। फलस्वरूप दोनों देशों के बीच आवागमन की सुविधा के कारण घनिष्ठ व्यापारिक सम्बन्ध और सामाजिक एकरूपता है। इन द्विपक्षीय सम्बन्धों में और अधिक प्रगाढ़ता लाने के लिए दोनों देशों ने आपसी सहमति से 31 जुलाई 1950 को 'भारत–नेपाल शांति और मित्रता की सन्धि' को अंगीकार किया जिसमें वर्णित प्रावधानों के फलस्वरूप नेपाली नागरिकों को भारत में अपने भारतीय नागरिकों के समान सारी आधारभूत सुविधायें, अवसर एवं अधिकार प्राप्त हो गये और आज भी लगभग 60 लाख नेपाली नागरिक भारत में रहकर इन सुविधाओं का पूरा लाभ ले रहे हैं। कालान्तर में वर्ष 1990 में नेपाल में बहुदलीय लोकतंत्र की स्थापना के साथ ही भारत नेपाल सम्बन्ध और अधिक मधुर हो गये जिसका अंदाजा भारत के पूर्व प्रधानमंत्री भारतरत्न श्री अटल बिहारी बाजपेयी के इस वक्तव्य से लगाया जा सकता है कि ''विश्व के कोई भी देश इतने निकट नहीं हो सकते जितने भारत और नेपाल हैं। इतिहास ने, संस्कृति ने, धर्म ने, नदियों ने हमें एक सूत्र में बाँधा है।''[7] पिछले कई दशकों से अपनी इसी भौगोलिक अन्तस्थ स्थिति के अनुरूप नेपाल व्यापार एवं आवागमन सुविधाओं हेतु पूर्ण रूप से भारत पर आश्रित था और भारत ने भी हर मौके पर एक अच्छे पड़ोसी की भूमिका के तहत नेपाल की आर्थिक एवं रणनीतिक मदद कर द्विपक्षीय सम्बन्धों को सम्बल प्रदान किया है। परन्तु पिछले कुछ वर्षों में नेपाल की राजनीतिक उथल–पुथल और कम्युनिस्ट विचारधारा के बढ़ते प्रभाव ने भारत–नेपाल सौहार्दपूर्ण सम्बन्धों में खटास पैदा कर दी है जिसका मुख्य कारण नेपाल का चीन की तरफ बढ़ता आकर्षण और झुकाव है।

वैसे तो भारत–नेपाल के बीच कुछ मामूली मतभेदों को छोड़कर सीमा सम्बन्धी कोई जटिल विवाद नहीं है और दोनों देशों ने आपसी सहमति से लगभग 98 प्रतिशत सीमा–निर्धारण का कार्य भी पूरा कर लिया है लेकिन 2015 में नेपाली संविधान–निर्माण प्रक्रिया के दौरान मधेशी समुदाय की अवहेलना पर उत्पन्न विवाद में भारत की भूमिका को नेपाल के आंतिरिक मामलों में दखल के रूप में देखा गया और नेपाल के माओवादी विचारधारा से प्रेरित राजनीतिज्ञों ने अवसर का लाभ उठाते हुए बहुमत हासिल कर सरकार का गठन किया जिसने चीन के साथ सम्बन्धों में नेपाल की भारत विरोधी एक नयी पृष्ठभूमि तैयार कर दी। इन दिनों साम्यवादी चीन के बहकावे में आकर नेपाल ने भारत विरोधी स्वर उच्चारित करना शुरू कर दिया है तथा इस सन्दर्भ में कुछ महत्वपूर्ण घटनाक्रमों का बिन्दुवार

विवरण इस प्रकार है–

- वर्ष 2017 में भारत के संरक्षित राज्य भूटान में चीनी घुसपैठ ने भारत–चीन के मध्य 'डोकलाम विवाद' को जन्म दिया। उस समय भारतीय सेना के हस्तक्षेप से बुरी तरह बौखलाये चीन ने भारत को यह धमकी तक दे डाली कि इस विवाद का अन्जाम उसे कालापानी में भुगतना पड़ेगा जबकि यह कालापानी क्षेत्र भारत–नेपाल सीमा विवाद के अन्तर्गत आता है।
- नवम्बर 2019 में भारत ने जम्मू–कश्मीर राज्य पुर्नगठन के बाद भारतीय गणराज्य का एक नवीन मानचित्र जारी किया जिस पर नेपाल ने कड़ा विरोध जाहिर करते हुए इसे नेपाली संप्रभुता के विपरीत बताया।
- 5–6 मई 2020 में भारत के पूर्वी लद्दाख प्रान्त की पैगांग झील के पास चीनी अतिक्रमण के दौरान भारत–चीन सेना के जवान आमने–सामने आ गए और इसके ठीक तीन दिन बाद 8 मई 2020 को भारत द्वारा निर्मित कैलाश मानसरोवर यात्रा को सुगम बनाने वाली लगभग 80 किलोमीटर लम्बी 'धारचूला लिपुलेख सड़क परियोजना' के उद्घाटन को लेकर नेपाल ने एक नया विवाद पैदा कर दिया।[8]
- 18 मई 2020 को प्रधानमंत्री के० पी० शर्मा ओली के नेतृत्व वाली नेपाली कैबिनेट ने नेपाल के एक नये नक्शे को मंजूरी देते हुये भारतीय क्षेत्र में आने वाले लिपुलेख से लेकर कालापानी और लिंपियाधुरा तक के सम्पूर्ण क्षेत्र को नेपाल का अभिन्न हिस्सा बता दिया और नेपाली राष्ट्रपति विद्यादेवी भंडारी ने कहा कि लिंपियाधुरा लिपुलेख और कालापानी का पूरा इलाका नेपाल के अन्तर्गत आता है और इन इलाकों को वापस पाने के लिए मजबूत कूटनीतिक कदम उठाये जायेंगे।[9]
- इसके बाद 15 जून 2020 की रात लद्दाख की गलवान घाटी में भारत और चीन के सैनिकों के बीच एक रक्त–रंजित संघर्ष हुआ[10] जिसने भारत–चीन सम्बन्धों को अधम स्तर पर पहुँचा दिया लेकिन इसी बीच नेपाल ने 17 हजार फीट ऊँचाई वाले लिपुलेख दर्रे के समीप भारत से लगने वाली अपनी सीमा पर 'नेपाली आर्म्ड पुलिस फोर्स' (NAPF) की 44वीं बटालियन तैनात कर दी ताकि वह भारत की हर सैन्य गतिविधि पर पूरी नजर रख सके।[11] इस घटना ने चीन–नेपाल गठजोड़ को उजागर कर भारत को अचम्भित कर दिया।

हालांकि बीते दिनों नेपाल में जारी राजनीतिक अस्थिरता का संज्ञान लेते हुये नेपाल की सुप्रीम कोर्ट ने वहाँ की वामपंथी सरकार द्वारा संसद भंग करने की प्रक्रिया को असंवैधानिक बताते हुये ऐतिहासिक फैसला सुनाया है जिसके फलस्वरूप नेपाल में शेर बहादुर देउबा के नेतृत्व वाली नेपाली कांग्रेस की सरकार पुनः सत्तारूढ़ हो गयी है[12] इस नव–निर्वाचित नेपाली सरकार का दृष्टिकोण भारत के प्रति सकारात्मक माना जा रहा है जिससे भारत–नेपाल सम्बन्धों में सुधार की सम्भावनायें बढ़ गयी हैं।

उपसंहार

निःसन्देह नेपाल पर बढ़ते चीनी प्रभुत्व ने भारत के सामने एक जटिल सुरक्षा–दुविधा उत्पन्न कर दी है। विस्तारवादी नीति के तहत तिब्बत के स्वायत्त क्षेत्र पर चीन के कब्जे ने न केवल नेपाल तक उसकी सीधी पहुँच को आसान कर दिया है बल्कि नई दिल्ली–काठमाण्डू राजनीति को भी बुरी तरह प्रभावित किया है। चीन द्वारा नेपाल को उसकी महत्वाकांक्षी परियोजना 'बेल्ट एण्ड रोड इनिशिएटिव' में शामिल किये जाने तथा प्रस्तावित चीन–नेपाल रेल परियोजना से भारतीय उपमहाद्वीप में उसकी उपस्थिति और मजबूत हो गयी है लेकिन यह सत्य है कि आज इक्कीसवीं सदी में भारत की स्थिति बदल चुकी है। भारत विश्व में आर्थिक, सामाजिक, राजनीतिक, वैज्ञानिक एवं सैन्य इन सभी स्तरों पर प्रबल भूमिका अदा कर रहा है। अतः चीन द्वारा प्रत्यक्ष या अप्रत्यक्ष रूप से किये जाने वाले इन सभी अनुचित क्रियाकलापों का भारत न केवल प्रबलता से प्रतिकार कर रहा है अपितु उसे दर्पण दिखा रहा है कि अब विस्तारवादी चीन से भारत भयभीत होने वाला नहीं है साथ ही साथ वह अपनी क्षेत्रीय अखंडता

एवं प्रभुसत्ता को अक्षुण्य बनाये रखने में पूर्णतः सक्षम है।

वर्तमान में भारत को चाहिए कि इस प्रतिकूल स्थिति को दृष्टिगत रखते हुये नेपाल के साथ प्रागैतिहासिक काल से चले आ रहे अपने द्विपक्षीय सम्बन्धों को प्राथमिकता दे और ऐसा तभी सम्भव है जब दोनों देशों के जनमानस में व्याप्त अविश्वास की भावना को सौहार्दपूर्ण तरीकों से दूर किया जाये। इसके लिये भारत को नेपाल में आर्थिक निवेश के साथ–साथ प्रबल सांस्कृतिक निवेश पर भी विशेष ध्यान देना चाहिये। वैश्वीकरण के इस युग में भारत को दोनों पक्षों के आर्थिक–व्यापारिक–सामरिक हितों के अनुरूप 'पारस्परिक लाभ के सिद्धान्त' पर आधारित नीतियों के तत्वाधान में अपनी विदेश नीति में आवश्यक आमूल–चूल परिवर्तनों को प्राथमिकता देनी चाहिये। वहीं भारत को जल्द से जल्द नेपाल के साथ जुड़े सभी सीमा सम्बन्धित विवादों का ऐतिहासिक दस्तावेजों एवं मानचित्रों के आधार पर आपसी सहमति से निस्तारण कर लेना चाहिये ताकि चीन इसे मुद्दा बनाकर भारत के विरूद्ध किसी प्रकार का कूटनीतिक लाभ प्राप्त न कर सके। इसके साथ ही मौजूदा चीन–नेपाल गठजोड़ के मद्देनजर भारत को अपने राष्ट्रीय एवं सामरिक हितों को ध्यान में रखते हुये नेपाल से लगने वाली अपनी सीमा पर आधारभूत संरचनाओं सड़क, रेलवे, हवाई पट्टी, सैन्य सम्बन्धी सुविधाओं के निर्माण पर भी विशेष बल देना होगा ताकि भारत की भावी सुरक्षा एवं शांति को सुनिश्चित किया जा सके।

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यू0 एस0 सेलिनिटी डायग्राम आधारित जल संसाधनों की गुणवत्ता का एक प्रतीकात्मक अध्ययन

दिनेश कुमार एवं राकेश कुमार

शोध सारांश

भारत में अधिकतर जिलों में भू–जल लगातार जहरीला होता जा रहा है। इन क्षेत्रों के पानी में आर्सेनिक, फ्लोराइड, नाइट्रेट, लोहा, सीसा, कैडमियम, क्रोमियम जैसे खतरनाक पदार्थ पाये गये है। ताजा आँकड़ों के मुताबिक बिहार, उत्तर प्रदेश, झारखण्ड सहित दस राज्यों के 89 जिलों के भू–जल में आर्सेनिक की मात्रा 0.05 मिलीग्राम प्रति लीटर से अधिक हो गयी है। मिनिस्ट्री ऑफ हेल्थ ऑफ इण्डिया (M.H.I.) तथा यूरोपियन समुदाय (U.E.) के अनुसार पेय जल की गुणवत्ता विभिन्न प्राचालों के मानक द्वारा निर्धारित होता है। जौनपुर जनपद गंगा घाटी के पूर्वी उत्तरी प्रदेशस्थ वाराणसी मण्डल के पश्चिमोत्तर भाग में अवस्थित है जो 4,038 वर्ग किमी0 मे फैला है, 2011 के जनगणना के आधार पर यहां की कुल जनसंख्या 44,94,204 थी। प्रस्तुत अध्ययन मे जनपद के जल की गुणवत्ता का अध्ययन प्राथमिक आकड़ों के प्रतिदर्शो से किया गया है। प्रतिदर्शो का विश्लेषण मृदा विज्ञान एवं कृषि रसायन विभाग, का0 हि0 वि0 वि0 वाराणसी में जल परीक्षण कराया गया है तथा इसके रासायनिक परिणामों को सारणीयकृत किया गया है तथा इन्हीं के आधार पर सम्पूर्ण घुलित ठोस, पी0एच0 मूल्य, विद्युत चालकता, सोडियम, मैग्निशियम, क्लोराईड, बाईकार्बोनेट, और कार्बोनेट के आइसोप्लेथ मानचित्र बनाये गये है। अमेरिका के यू0 एस0 सेलिनिटी डायग्राम के आधार पर जनपद में भू–जल गुणवत्ता का मानचित्रण Arc GIS 10.2 से किया गया है।

शब्द संक्षेप *– जल संसाधन, जल गुणवत्ता, पी एच (pH), चालकता, कठोरता।*

प्रस्तावना

जल सभी संसाधनों का आधार है तथा इसकी उपलब्धता के कारण अन्य प्राकृतिक संसाधनों का दोहन एवं संरक्षण सम्भव है (सिंह एवं सिंह 1984)। यह एक नव्यकरणीय संसाधन है जिसको एक बार उपयोग के बाद पुनः शोधन कर उपयोग योग्य बनाया जा सकता है (Jalali 2009)। लोगों द्वारा पृथ्वी पर विद्यमान कुल शुद्ध जल का 2 प्रतिशत से कम उपयोग किया जा रहा है (Davis and De Wiest 1966) ।जल संसाधन समान रूप में वितरण नहीं है जिस कारण सर्वत्र समान रूप से जलापूर्ति भी नहीं हो पाती है (Mathur and Maheswari 2005)। इसके परिणामस्वरूप वर्तमान मे कुछ देशों में भयंकर जल संकट उत्पन्न हो गया। अनेक स्थानों पर जल के उपलब्ध होने पर भी जल संकट की स्थिति बन गया है, क्योकि वहाँ निरन्तर विद्यमान जल स्रोतों के गुणवत्ता में ह्रास हो रही है (गुर्जर एवं जाट 2005)। इस स्थिति में जनपदीय स्तर पर जल संसाधनों के आँकलन, उपयोग प्रतिरूप, समस्यायें एवं उनके निदान का अध्ययन आवश्यक हो जाता है। इसी परिप्रेक्ष्य में प्रस्तुत शोध पत्र में मध्य गंगा मैदान के अन्तर्गत पूर्वी उत्तर प्रदेश के जौनपुर जनपद के जल संसाधन–सतही एवं भौम जल संसाधन, उपयोग प्रतिरूप एवं उपयोग जनित समस्याओं एवं उनके निदान हेतु प्रबन्धन का अध्ययन किया गया है।

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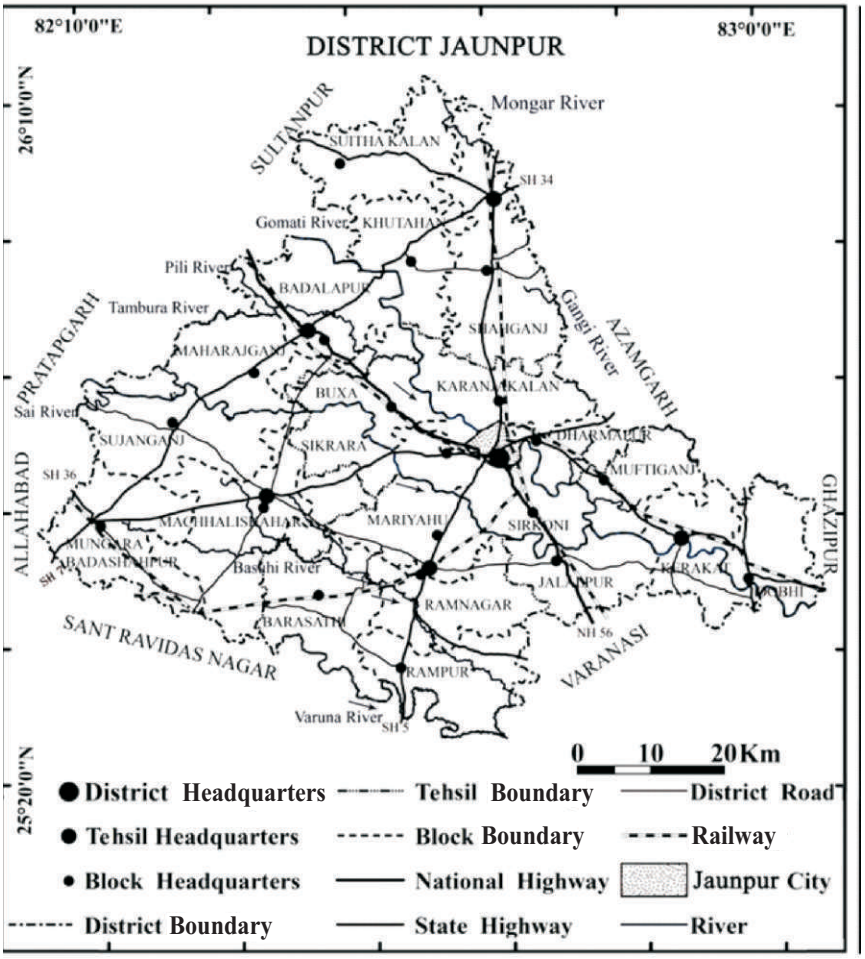

Fig. 01

मध्य गंगा के मैदान में गोमती नदी के पावन तट पर बसा जौनपुर जनपद भारत के इतिहास में एक अपना विशेष स्थान रखता है। जौनपुर जनपद का अक्षांशीय विस्तार $25^{o}26'$ से $26^{o}11'$ उत्तरी अक्षांश तथा $82^{o}8'$ से $83^{o}5'$ पूर्वी देशांतर के मध्य है जो गंगा घाटी के पूर्वी उत्तरी प्रदेशस्थ वाराणसी मण्डल के पश्चिमोत्तर भाग में अवस्थित है। यह क्षेत्र सांस्कृतिक एवं राजनैतिक दृष्टिकोण से महत्वपूर्ण है। इस जनपद के उत्तर एवं उत्तर–पश्चिम में सुल्तानपुर तथा दक्षिण में वाराणसी एवं संत रविदास नगर तथा पूर्व में गाजीपुर एवं आजमगढ़ तथा पश्चिम में इलाहाबाद व प्रतापगढ़ जनपद अवस्थित है (मानचित्र सं0 01)। जौनपुर जनपद का भौगोलिक क्षेत्रफल 4,038 वर्ग किमी0 है, 2011 के जनगणना के आधार पर कुल जनसंख्या 44,94,204 थी, जिसमें 22,73,739 स्त्री तथा 22,20,465 पूरूषों की जनसंख्या है। इस प्रकार समस्त जनसंख्या में 41,47,624 (92.29%) जनसंख्या ग्रामीण है एवं 3,46,580 (7.71%) जनसंख्या नगरीय क्षेत्रों में निवास करती है, तथा इस जनपद की समुद्र सतह से औसतन ऊँचाई 79.66 मी0

है। जनपद में सतही तथा भूमिगत जल दोनों की भरपूर उपलब्धता हैं। सतही जल के रुप में नदी, नालें, नहर, तालाब तथा भूमिगत जल की औसत गहराई 5 मी. हैं।

अध्ययन का उद्देश्य

प्रस्तुत अध्ययन का उद्देश्य जौनपुर जनपद के सतही जल एवं भौम जल के गुणवत्ता का विश्लेषण करना है।

विधितंत्र एवं आँकड़ा एकत्रीकरण

प्रस्तुत शोध पत्र में गुणात्मक एवं मात्रात्मक दोनो विधियों के साथ–साथ विशलेषण के लिए अनुसंधान की विभिन्न विधियों, तकनीकों एवं उपकरणों का उपयोग तथा सांख्यिकीय विधि एवं गणितिय सूत्रों का प्रयोग करने का प्रयास किया गया है। यह भौगोलिक अध्ययन प्राथमिक एवं द्वितीयक आँकड़ा स्रोत पर आधारित है। जल संसाधन, जल की उपयोगिता, जल गुणवत्ता, जल स्तर की गिरावट,आदि का आँकलन करने के लिए आँकड़ों का एकत्रीकरण, द्वितीयक आँकड़ों एवं सर्वेक्षण द्वारा किया गया है।

प्राथमिक आँकड़ों का एकत्रीकरण मुख्यतः प्रतिदर्शों के आधार पर किया गया। इसके लिये जनपद के 21 विकासखण्डों मे प्रत्येक विकासखण्ड से 2 प्रतिदर्श तथा सतही जल के लिए नदियों एवं नहरों से 10 प्रतिदर्श एकत्रित किये गये है। द्वितीयक आँकड़ों के लिये सरकारी तथा गैर सरकारी संस्थाओं से प्राप्त अप्रकाशित आँकड़ों का संग्रह किया गया है। इन आँकड़ों का M. S. Office के माध्यम से सारणीयन एवं विश्लेषण, आदि किया गया है। प्रतिदर्श के विश्लेषण के लिये मृदा विज्ञान एवं कृषि रसायन विभाग का0 हि0 वि0 वि0 वाराणसी में जल परीक्षण कराया गया है तथा इसके रासायनिक परिणामों को सारणीयकृत किया गया है तथा इन्ही के आधार पर सम्पूर्ण घुलित ठोस, पी0एच0 मूल्य, विद्युत चालकता, सोडियम, मैग्निशियम, क्लोराईड, बाईकार्बोनेट, और कार्बोनेट के आइसोप्लेथ मानचित्र बनाये गये है। अमेरिका के यू0 एस0 सेलिनिटी डायग्राम के आधार पर जनपद में भू–जल गुणवत्ता का मानचित्रण Arc GIS 10.2 से किया गया है। अध्ययन की प्रकृति के अनुसार इन आँकड़ों को व्यवस्थित एवं विश्लेषित किया गया है तथा उपर्युक्त समस्त उपलब्ध आँकड़ों का सांख्यिकीय पद्धति के प्रतिशत विश्लेषण विधि के द्वारा परिणाम ज्ञात करने का प्रयास किया गया है।

परिणाम एवं विशलेषण

जौनपुर जनपद मध्य गंगा मैदान में अवस्थित होने के कारण यहाँ की अधिकांश जनसंख्या गाँवों में निवास करती है और गाँव में रहने से ही यहाँ की अधिकांश जनसंख्या कृषि कार्यों में संलग्न है, जिसके फलस्वरूप मानव की विभिन्न आवश्यकताओं की पूर्ति जल से ही होती है (Rai and Sharma1990)। अतः पेय जल एवं कृषिगत सिंचाई उपयोग के लिए जल की गुणवत्ता का परीक्षण करना आवश्यक था। जल के गुणवत्ता के विश्लेषण के लिये जल को दो प्रकारों यथा, सतही जल एवं भौमजल में बाँटा गया है।

सतही जल गुणवत्ता

अध्ययन क्षेत्र में सतही जल गुणवत्ता के लिए जनपद में दस प्रतिदर्श लिये गये हैं। 1. सरौना गाँव के पास बसुही नदी, 2. योगापुर गाँव के पास मड़ियाहूँ राजवाहा, 3. जलालपुर के पास सई नदी, 4. काच्छीडीह गाँव के पास मुगरा बादशाहपुर राजवाहा (इलाहाबाद शाखा), 5. शाहीपुल के पास गोमती नदी, 6.शाहगंज राजवाहा, 7. गुजर ताल जौनपुर से, तथा तीन प्रतिदर्श नहरों से शाहगंज शाखा, मड़ियाहूँ एवं इलाहाबाद शाखाओं के जनपद के विभिन्न स्थानों से लिया गया है। इन दस प्रतिदर्शों में सर्वाधिक घुलित ठोस की मात्रा 454.4 पी0 पी0 एम0 जगदीशपुर पम्प नहर के प्रतिदर्श में है, विद्युत चालकता सर्वाधिक जगदीशपुर पम्प नहर के प्रतिदर्श में 710 माइक्रो म्होज/सेमी0 है। यू0एस0 सेलिनिटी डायग्राम के आधार पर सभी प्रतिदर्श C_2-S_1 श्रेणी में पाये गये है, जो सिंचाई के लिए अनुकूल है। S.A.R. की मात्रा 8.12–19.00 पी0 पी0 एम0 के बीच है (तालिका सं. 03 एवं मानचित्र 03B)।

भू–जल गुणवत्ता

पेय जल व सिंचाई के लिए लोग मुख्यतः भू–जल पर निर्भर है इसलिए भू–जल गुणवत्ता के लिए प्रत्येक

तालिका 01 : भू–जल की रासायनिक विशेषताओं के आधार पर पेय जल का मानक।

		M.H.I. 2009	W.H.O.2013	E.U. 2015
पी एच (pH)		6.5 - 8.5	-	सम्मिलित नहीं किया गया है
चालकता (Conductivity)		-	-	250 µm/cm @ 200C
रंग (Colour)		5.00 (Hazen)	-	सम्मिलित नहीं किया गया है
घुलित ऑक्सीजन		-	-	सम्मिलित नहीं किया गया है
कठोरता(Hardness)		200 mg/l	-	सम्मिलित नहीं किया गया है
धनायन	एलुमिनियम (AL)	0.03 mg/l	0.20 mg/l	0.20 mg/l
	अमोनिया (NH4)	-	-	0.50 mg/l
	आर्सेनिक(AS)	0.01 mg/l	0.01 mg/l	0.10mg/l
	बोरॉन(B)	0.5 mg/l	0.30 mg/l	1.00 mg/l
	कैडमियम (Cd)	0.003 mg/l	0.003 mg/l	0.005 mg/l
	कॉपर(Cu)	0.05 mg/l	2.00 mg/l	2.00 mg/l
	क्रोमियम (Cr)	0.05 mg/l	0.05 mg/l	0.05 mg/l
	ऑयरन (Fe)	0.30 mg/l	-	0.20 mg/l
	लेड(Pb)	-	0.01 mg/l	0.01 mg/l
	सोडियम (Na)	-	200.00 mg/l	200.0 mg/l
	जिंक(Zn)	5.00 mg/l	3.00 mg/l	-
	क्लोराईड(Cl)	250.00 mg/l	250.00 mg/l	250.0 mg/l
ऋणायन	फ्लोराइड (F)	1.00 mg/l	1.50 mg/l	1.50 mg/l
	सल्फेट(SO4)	200.00 mg/l	400.00 mg/l	250.0 mg/l
	नाइट्रेड(NO3)	45.00 mg/l	-	50.0 mg/l

स्रोत : 1. जल संसाधन मंत्रालय, केन्द्रीय भूमि जल बोर्ड लखनऊ पृष्ठ सं0 22–30

2. http://www.lenntech.com/WHO Drinking Water Standard.htm

3. http://www.lenntech.com/EUs Drinking Water Standard.htm

विकासखण्ड से दो–दो प्रतिदर्श को हैण्डपम्प, पम्पसेट एवं नलकूप से लिया गया है। प्रतिदर्श के विश्लेषण के लिए मृदा विज्ञान एवं कृषि रसायन विभाग का0 हि0 वि0 वि0 वाराणसी में जल परीक्षण कराया गया है। व्यक्तिगत रूप से एकत्र किये गये प्रतिदर्श के रासायनिक विश्लेषण के आधार पर सम्पूर्ण घुलित ठोस, पी0एच0 मूल्य, विद्युत चालकता, सोडियम, मैग्निशियम, क्लोराईड, बाईकार्बोनेट, और कार्बोनेट के आइसोप्लेथ मानचित्र बनाये गये है। अमेरिका के यू0 एस0 सेलिनिटी डायग्राम के आधार पर जनपद में भू–जल गुणवत्ता का मानचित्रण किया गया है (मानचित्र सं. 03)।

क्लोराईड संकेद्रण (Cl^-)

जनपद के सतही जल में क्लोराइड का संकेन्द्रण 21.3–92.3 पी0 पी0 एम0 के मध्य है। सर्वाधिक क्लोराइड संकेन्द्रण 92.3 पी0 पी0 एम0 सिरकोनी विकासखण्ड के जगदीशपुर पम्पनहर में है तथा सबसे कम क्लोराइड की मात्रा 21.3 पी0 पी0 एम0 मड़ियाहूँ राजवाहा में है। जनपद के भू–जल में क्लोराइड का संकेन्द्रण 24.85–163.3 पी0 पी0 एम0 के मध्य है। सर्वाधिक क्लोराइड संकेन्द्रण 163.3 पी0 पी0 एम0 बदलापुर विकासखण्ड के उदयपुर गेलहवा गाँव में है तथा सबसे कम क्लोराइड की मात्रा 24.85 पी0 पी0 एम0 सुजानगंज (अलहीया), धर्मापुर (राजेपुर), सुईथाकला (सराय मोहुद्दीनपुर), में है। जनपद में क्लोराइड की मात्रा सिंचाई के मानक के अन्दर पायी गयी इसलिए जनपद का जल सिंचाई के लिए उपयुक्त है (मानचित्र सं. 02A)।

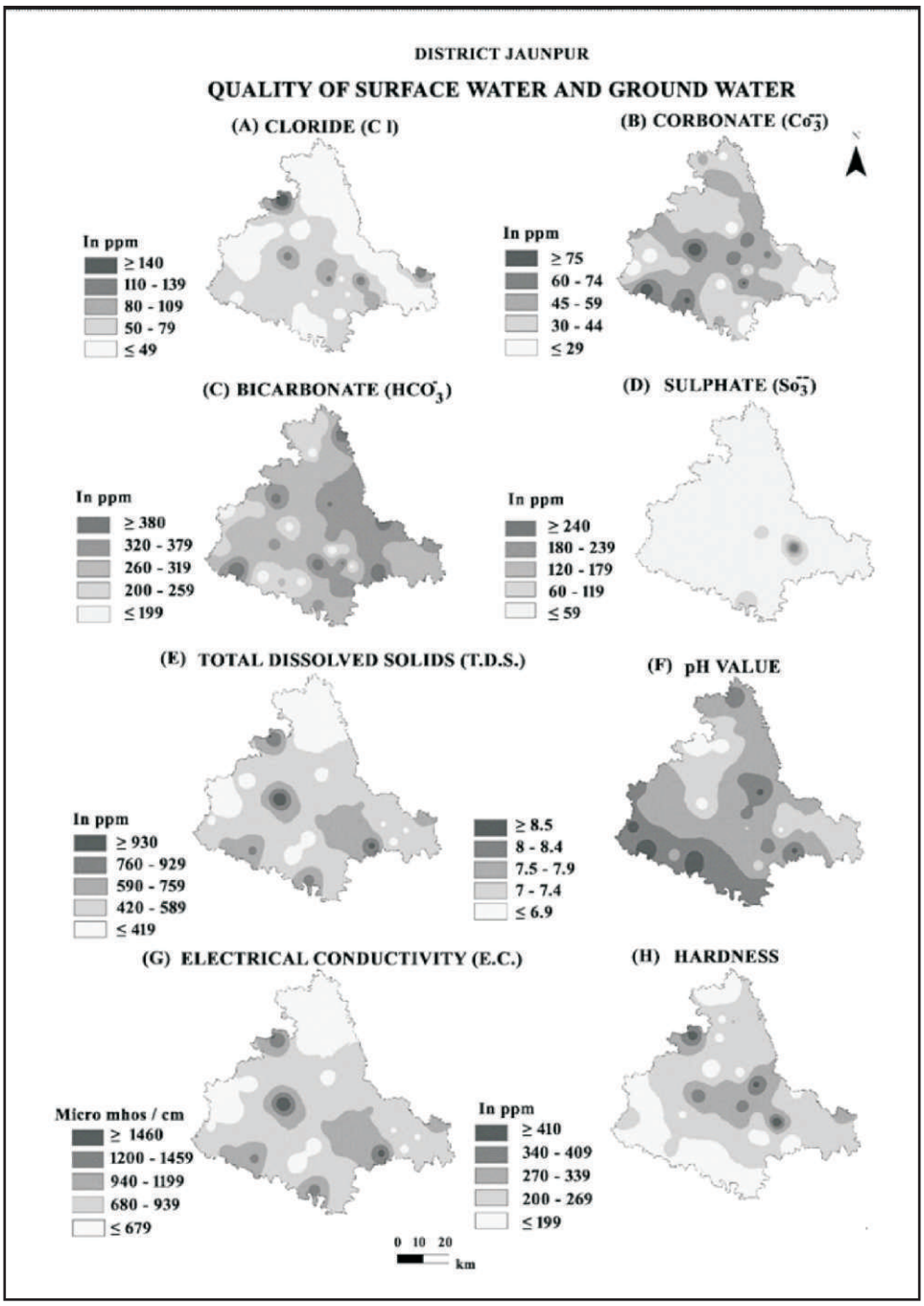
DISTRICT JAUNPUR
QUALITY OF SURFACE WATER AND GROUND WATER
(A) CLORIDE (C l)
In ppm
≥ 140
110 - 139
80 - 109
50 - 79
≤ 49
(B) CORBONATE (Co_3^{--})
In ppm
≥ 75
60 - 74
45 - 59
30 - 44
≤ 29
(C) BICARBONATE (HCO_3^-)
In ppm
≥ 380
320 - 379
260 - 319
200 - 259
≤ 199
(D) SULPHATE (So_3^{--})
In ppm
≥ 240
180 - 239
120 - 179
60 - 119
≤ 59
(E) TOTAL DISSOLVED SOLIDS (T.D.S.)
In ppm
≥ 930
760 - 929
590 - 759
420 - 589
≤ 419
(F) pH VALUE
≥ 8.5
8 - 8.4
7.5 - 7.9
7 - 7.4
≤ 6.9
(G) ELECTRICAL CONDUCTIVITY (E.C.)
Micro mhos / cm
≥ 1460
1200 - 1459
940 - 1199
680 - 939
≤ 679
(H) HARDNESS
In ppm
≥ 410
340 - 409
270 - 339
200 - 269
≤ 199
0 10 20
km

Fig. 02

कार्बोनेट (CO_3^-)

अध्ययन क्षेत्र के सतही जल में कार्बोनेट का संकेन्द्रण 9.6–90 पी0 पी0 एम0 के मध्य है। सर्वाधिक कार्बोनेट संकेन्द्रण 90 पी0 पी0 एम0 शाहगंज विकासखण्ड के गुजरताल के प्रतिदर्श में पायी गयी तथा सबसे कम कार्बोनेट की मात्रा 9.6 पी0 पी0 एम0 सरौना गॉव के पास बसुही नदी के प्रतिदर्श में है। जनपद के भू–जल में कार्बोनेट का संकेन्द्रण 18–90 पी0 पी0 एम0 के मध्य है। यहाँ सर्वाधिक कार्बोनेट संकेन्द्रण 90 पी0 पी0 एम0 सिकरारा विकासखण्ड के गोनापार गाँव में है तथा सबसे कम कार्बोनेट की मात्रा 18 पी0 पी0 एम0 करंजाकला (मल्हनी), प्रतिदर्श में है। जनपद में कार्बोनेट की मात्रा सिंचाई के मानक के अन्दर पायी गयी इसलिए जनपद का जल सिंचाई के लिए उपयुक्त है (मानचित्र सं. 02B)।

बाईकार्बोनेट संकेन्द्रण (HCO_3^-)

जौनपुर जनपद के सतही जल में बाइकार्बोनेट का संकेन्द्रण 115.9–207.4 पी0 पी0 एम0 के मध्य है। यहाँ सर्वाधिक बाईकार्बोनेट संकेन्द्रण 207.4 पी0 पी0 एम0 सिरकोनी विकासखण्ड के जगदीशपुर पम्पनहर के प्रतिदर्श में पायी गयी तथा सबसे कम बाईकार्बोनेट की मात्रा 115.9 पी0 पी0 एम0 शाहगंज विकासखण्ड में शाहगंज राजवाहा के प्रतिदर्श में है। जनपद के भू–जल में बाईकार्बोनेट का संकेन्द्रण 158.6–427 पी0 पी0एम0 के मध्य है। भू–जल में सर्वाधिक बाईकार्बोनेट संकेन्द्रण 427 पी0 पी0 एम0 जलालपुर विकासखण्ड के जगापुर गाँव में है तथा सबसे कम बाईकार्बोनेट की मात्रा 158.6 पी0 पी0 एम0 मड़ियाहूँ (चकताला), प्रतिदर्श में है। जनपद में बाईकार्बोनेट की मात्रा सिंचाई के मानक के अन्दर पायी गयी इसलिए जनपद का जल सिंचाई व पीने के लिए उपयुक्त है (मानचित्र सं. 02C)।

सम्पूर्ण घुलित ठोस (T.D.S.)

जनपद के सतही जलमें सम्पूर्ण घुलित ठोस का विस्तार 204.8 पी0 पी0 एम0 से 1100.0 पी0 पी0 एम0 के मध्य पाया गया है। सम्पूर्ण घुलित ठोस का उच्च संकेन्द्रण जनपद के मध्य एवं दक्षिण–पश्चिमी भाग (सिकरारा, जलालपुर, रामपुर, एवं मछलीशहर विकासखण्ड) में है, जबकि न्यूनतम संकेन्द्रण जनपद के उत्तरी एवं उत्तर–पश्चिम भाग (शाहगंज, सुईथाकला, खुटहन, एवं करंजाकला विकासखण्ड) में है।

तालिका 02 : जौनपुर जनपद के चयनित प्रतिदर्षो में विद्यमान सम्पूर्ण घूलित ठोस, 2016

क्रम संख्या	सम्पूर्ण घूलित ठोस (TDS) ppm	प्रतिदर्श की संख्या
1.	≤599	37
2.	600-799	9
3.	800-899	2
4.	900-999	1
5.	≥1000	1

स्रोतः व्यक्तिगत रूप से एकत्र किये गये प्रतिदर्श के रासायनिक विश्लेषण के आधार पर परिकलित।

जनपद में सम्पूर्ण घुलित ठोस एवं पी0 एच0 मूल्य के आधार पर जनपद में पेय जल एवं सिंचाई के लिए जल उपयुक्त है, लेकिन जनपद में स्थित प्रतिदर्श सं0 20 (सिकरारा विकासखण्ड) का सम्पूर्ण घुलित ठोस मूल्य 1100. 0 पी0 पी0 एम0 है जो सर्वाधिक है (मानचित्र सं. 02E)।

पी0 एच0 (pH)

पी0 एच0 के माध्यम से जल की अम्लीयता एंव क्षारीयता का अनुमान लगाया जाता है (Adams et. al 2001)। जनपद में सतही जल के पी0 एच0 का संकेन्द्रण 7. 3–8.2 के मध्य है। सर्वाधिक पी0 एच0 संकेन्द्रण 8.2 सई नदी जलालपुर विकासखण्ड एवं गोमती नदी शाही पुल के

प्रतिदर्श में पायी गयी तथा सबसे कम पी0 एच0 की मात्रा 7. 3 सरौना गाँव के पास बसुही नदी के प्रतिदर्श में है। जनपद के भू–जल में पी0 एच0 का संकेन्द्रण 6.9–8.7 के मध्य है। सर्वाधिक पी0 एच0 का संकेन्द्रण 8.7 बरसठी विकासखण्ड के कटवार गॉव में है तथा सबसे कम पी0 एच0 की मात्रा 6. 9 बदलापुर (उदयपुर गेलहवा), प्रतिदर्श में है। जनपद के सभी प्रतिदर्शो में प्राप्त पी0 एच0 मूल्य 6.9 से 8.7 के बीच है। अतः जनपद का भू–जल क्षारीय है। प्राप्त पी0 एच0 मूल्य के आधार पर सभी भू–जलउपयोग के लिए उपयुक्त है (मानचित्र 02F)।

वैद्युत चालकता (EC)

अध्ययन क्षेत्र में सतही जल की वैद्युत चालकता 320 माइक्रो म्होज/से0मी0 से 710 माइक्रो म्होज/से0मी0 के बीच पायी गयी। सर्वाधिक वैद्युत चालकता (710 माइक्रो म्होज/से0मी0) सिरकोनी विकासखण्ड के जगदीशपुर पम्पनहर में है तथा सबसे कम वैद्युत चालकता (320 माइक्रो म्होज/से0मी0) शाहगंज विकासखण्ड में शाहगंज राजवाहा के प्रतिदर्श में है। जनपद के भू–जल में वैद्युत चालकता का संकेन्द्रण (420–1720 माइक्रो म्होज/से0मी0) के मध्य है। सर्वाधिक वैद्युत चालकता (1720 माइक्रो म्होज/से0मी0) सिकरारा विकासखण्ड के गोनापार प्रतिदर्श में है तथा सबसे कम वैद्युत चालकता (420 माइक्रो म्होज/से0मी0) सुईथाकलॉ विकासखण्ड में सराय मोहुद्दीन के प्रतिदर्श में है। वैद्युत चालकता अधिक होने के कारण जनपद का भू–जल मध्य गुणवता वाला है (मानचित्र सं. 02G)।

जल की कठोरता (HARDNESS)

जनपद में सतही जल की कठोरता का संकेन्द्रण 120–218 पी0 पी0 एम0 के मध्य है। सर्वाधिक सतही जल की कठोरता का संकेन्द्रण 218 पी0 पी0 एम0 सिरकोनी विकासखण्ड के जगदीशपुर पम्पनहर के प्रतिदर्श में पायी गयी तथा सबसे कम सतही जल की कठोरता की मात्रा 120 पी0 पी0 एम0 गुजर ताल, शाहगंज विकासखण्ड के प्रतिदर्श में है। सिरकोनी विकासखण्ड के जगदीशपुर पम्प नहर का जल सिंचाई के योग्य नहीं है, जबकि जनपद के अन्य भागों का सतही जल सिंचाई हेतु अनुकूल पाया गया है। जनपद के भू–जल में जल की कठोरता का संकेन्द्रण 130–462 पी0 पी0 एम0 के मध्य है। यहाँ सर्वाधिक भू–जल की कठोरता का संकेन्द्रण 462 पी0 पी0 एम0 रासीपुर गाँव, सिरकोनी विकासखण्ड में है तथा सबसे कम भू–जल की कठोरता की मात्रा 130 पी0 पी0 एम0 बक्सा (धनियामऊ) के प्रतिदर्श में है। उपरोक्त विश्लेषण के आधार पर सिरकोनी क्षेत्र का भू–जल सिंचाई के योग्य नहीं है, जबकि जनपद के अन्य भागों का भू–जल सिंचाई हेतु अनुकूल पाया गया है (मानचित्र सं. 02H)।

सोडियम संकेन्द्रण (Na^+)

अध्ययन क्षेत्र में सतही जल के सोडियम संकेन्द्रण 44.1–98 पी0 पी0 एम0 के मध्य है। सर्वाधिक सोडियम संकेन्द्रण 98 पी0 पी0 एम0 सिरकोनी विकासखण्ड के जगदीशपुर पम्पनहर के प्रतिदर्श में पायी गयी तथा सबसे कम सोडियम की मात्रा 44.1 पी0 पी0 एम0 शाहगंज राजवाहा के प्रतिदर्श में है। सिरकोनी विकासखण्ड के जगदीशपुर पम्प नहर का जल सिचाई के योग्य नहीं है, जबकि जनपद के अन्य भागों का जल सिंचाई हेतु अनुकूल पाया गया है। जनपद के भू–जल में सोडियम का संकेन्द्रण 58–237.3 पी0 पी0 एम0 के मध्य है। अध्ययन क्षेत्र में सर्वाधिक सोडियम संकेन्द्रण 237.3 पी0 पी0 एम0 सिकरारा विकासखण्ड के गोनापार गाँव में है तथा सबसे कम सोडियम की मात्रा 58 पी0 पी0 एम0 सुईथाकला (सराय मोहुद्दीनपुर) के प्रतिदर्श में है। सिकरारा क्षेत्र का भू–जल सिंचाई के योग्य नहीं है, जबकि जनपद के अन्य भागों का भू–जल सिंचाई हेतु अनुकूल पाया गया है (मानचित्र सं0 03A)।

सोडियम अधिशोषण अनुपात (SAR)

अध्ययन क्षेत्र में सोडियम अधिशोषण अनुपात का सिंचाई में जल के गुण का निर्धारण हेतु बहुत ही महत्वपूर्ण है (APHA 1992)। तालिका संख्या 03 से स्पष्ट हो जाता है कि अध्ययन क्षेत्र में सिंचाई के लिए जल अच्छा है।

तालिका 03 : सिंचाई जल में सोडियम अधिशोषण अनुपात (SAR) का सम्बन्ध, 2016

क्रम	SAR	जल के प्रकार	प्रतिदर्श संख्या
1.	0-9	निम्न सोडियम जल (S_1)	49
2.	10-17	मध्यम सोडियम जल (S_2)	1
3.	18-28	अधिक सोडियम जल (S_3)	0
4.	Above 28	बहुत अधिक सोडियम जल (S_4)	0

स्रोतः व्यक्तिगत रूप से एकत्र किये गये प्रतिदर्श के रासायनिक विश्लेषण के आधार पर परिकलित।

8 सतही एवं 42 भू–जल के प्रतिदर्शों के आधार पर सोडियम अधिशोषण अनुपात (SAR) तथा विद्युत चालकता (EC) का मान यू0 एस0 सैलिनिटी डायग्राम में रखने पर ज्ञात होता है कि इसमें 1 प्रतिदर्श जलालपुर विकासखण्ड (जगापुर) C_3-S_2 श्रेणी में आता है जो मध्य अच्छा समूह में अवस्थिति है तथा 19 प्रतिदर्श (C_3S_1) श्रेणी के अन्तर्गत है, जो मध्य खराब है। शेष 30 प्रतिदर्श (C_2S_1) श्रेणी के अन्तर्गत है, जो अच्छे जल के अन्तर्गत आते है (मानचित्र सं. 03B)।

अवशिष्ट सोडियम कार्बोनेट (RSC)

अध्ययन क्षेत्र में अवशिष्ट सोडियम कार्बोनेट (सरौना) बसुही नदी में 1.22 मिली इक्यूवेलेन्ट/ली0 पाया जाता है जो सबसे कम है जबकि सबसे अधिक 8.3 मिली इक्यूवेलेन्ट/ली0 (गरियाँव) मुगरा बादशाहपुर में पाया जाता है, यदि सिंचाई के दृष्टि से देखा जाय तो एक प्रतिदर्श सुरक्षित है, पाँच प्रतिदर्श उपयुक्त तथा 44 प्रतिदर्श अनुपयुक्त के अन्तर्गत आते है (तालिका सं0 04)। अवशिष्ट सोडियम कार्बोनेट (RSC) निम्नलिखित सूत्रों द्वारा ज्ञात किया जाता है– $RSC= (CO_3^{-}+HCO_3^{-})-(Ca^{2+}+Mg^{+2})$.

तालिका 04 : सिंचाई जल में अवशिष्ट सोडियम कार्बोनेट (RSC) सम्बन्ध, 2016

जल श्रेणी	RSC(मिली इक्यूवेलेन्ट/ली0)	प्रतिदर्शो की संख्या
सुरक्षित (Safe)	< 1.25	1
उपयुक्त (Marginal)	1.25-2.5	5
अनुपयुक्त (Unsuitable)	>2.5	44

स्रोतः व्यक्तिगत रूप से एकत्र किये गये प्रतिदर्श के रासायनिक विश्लेषण के आधार पर परिकलित।

जल की गुणवत्ता

जनपद में जल की गुणवत्ता व्यक्तिगत रूप से लिए गये प्रतिदर्शे के विश्लेषित निष्कर्षों के आधार पर यह परिणाम प्राप्त किया गया है कि जनपद में विद्युत चालकता (EC) 320 से 1720 माइक्रो म्होज/सेमी0 के बीच है तथा सोडियम अधिशोषण अनुपात (SAR) की मात्रा 8.12 से 45. 22 पी0 पी0 एम0 के बीच है। सोडियम अधिशोषण अनुपात (SAR) तथा विद्युत चालकता (EC) का मान यू0 एस0 सैलिनिटी के डायग्राम में रखने पर ज्ञात होता है कि जनपद का लगभग 87 प्रतिशत भाग मध्यम अच्छा, 17 प्रतिशत भाग निम्न अच्छा तथा 5 प्रतिशत भाग का जल उपयोग हेतु उपयुक्त नहीं हैं। इसमें सत्रह प्रतिदर्श (अकरा) रामपुर, (गुतवन) रामनगर, (चकताला) मड़ियाहूँ, (परियावॉ, रासीपुर) सिरकोनी, (महरेव) जलालपुर, (रंजीतपुर एवं गोनापार) सिकरारा, (सराय युसुफ, अगुवाकलॉ) मछलीशहर, (गरियॉव) मुगर्रा बादशाहपुर, (गजना, राजेपुर) धर्मापुर, (मुफ्तीगंज) मुफ्तीगंज, (जरासी) डोभी, (उदयपुर गेलहवॉ) बदलापुर, (लमहन) महराजगंज तथा (सवन्सा) बक्सा विकासखण्ड C_3-S_1 श्रेणी में आते है जो मध्यम अच्छा समूह में अवस्थित है, तथा जलालपुर (जगापुर) प्रतिदर्श (C_3S_2) श्रेणी के अन्तर्गत है, जो मध्य खराब है। शेष प्रतिदर्श (C_2S_1) श्रेणी के अन्तर्गत है,जो अच्छे जल के अन्तर्गत आते

हैं (मानचित्र सं0 3C)।

बहुचर सह–सम्बन्ध

जल के गुणवत्ता के विश्लेषण में विभिन्न प्राचालों के मध्य सहसम्बन्ध का अध्ययन कार्ल पियर्सन विधि द्वारा किया गया है, जिसमें भू–जल के संन्दर्भ में धनायन, ऋणायन, सम्पूर्ण घूलित ठोस, पी0 एच0 मूल्य तथा वैद्युत चालकता के मध्य बहुचर सह–सम्बन्ध निकाला गया है। इसमें उच्च स्तरीय धनात्मक सह–सम्बन्ध वैद्युत चालकता और सम्पूर्ण घूलित ठोस तथा सोडियम और सम्पूर्ण घूलित ठोस तथा कठोरता और कैल्सियम मैग्नीशियम में है, जबकि वैद्युत चालकता, नाईट्रेट ($N0_3$) और सम्पूर्ण घूलित ठोस एवं नाईट्रेट ($N0_3$) में उच्चस्तरीय ऋणात्मक सह–सम्बन्ध पाया गया है (तालिका संख्या 05)।

तालिका 05 : जौनपुर जनपद के चयनित भू–जल प्रतिदर्शो में बहुचर सह–सम्बन्ध।

Parameters	TDS	Cl-	Co_3^{--}	HCO_3^-	SO_4	NO_3	Na^+	Ca^{++} + Mg^{++}	pH	Hardness	EC
TDS	1										
Cl^-	0.77	1									
Co_3^{--}	0.35	0.27	1								
HCO_3^-	0.26	0	-0.08	1							
SO_4	0.56	0.46	0.03	0.03	1						
NO_3	-0.05	0.06	-0.12	0.33	-0.16	1					
Na^+	1	0.77	0.35	0.26	0.56	-0.05	1				
$Ca^{++}+Mg^{++}$	0.29	0.52	0.08	0.2	0.38	0.23	0.29	1			
pH	-0.06	-0.27	0.21	-0.05	-0.06	-0.22	-0.06	-0.63	1		
Hardness	0.28	0.56	0.07	0.18	0.36	0.24	0.28	0.98	-0.63	1	
EC	1	0.77	0.35	0.27	0.56	-0.04	1	0.29	-0.06	0.28	1

Correlation is significant at the 0.05 level

निष्कर्ष

उपरोक्त तथ्यों के आधार पर यह कहा जा सकता है कि जल एक नव्यकरणीय संसाधन है जिसको एक बार उपयोग के बाद पुनः शोधन कर उपयोग योग्य बनाया जा सकता है। इस प्रकार एक तरफ सतही जल के प्रयोग में कमी एवं भू–जल में अतिदोहन के फलस्वरूप देश के अधिकांश भागों में जलीय पर्यावरण में ह्रास हो रहा है। जौनपुर जनपद गंगा घाटी के पूर्वी उत्तरी प्रदेशस्थ वाराणसी मण्डल के पश्चिमोत्तर भाग में अवस्थित है। आठ प्रतिदर्शों में सर्वाधिक घुलित ठोस की मात्रा 454.4 पी0 पी0 एम0 जगदीशपुर पम्प नहर के प्रतिदर्श में है, विद्युत चालकता सर्वाधिक जगदीशपुर पम्पनहर के प्रतिदर्श में 710 माइक्रो म्होज/सेमी0 है। यू0एस0 सेलिनिटी डायग्राम के आधार पर सभी प्रतिदर्श C_2-S_1 श्रेणी में पाये गये है जो सिंचाई के लिए अनुकूल है। S.A.R. की मात्रा 8.12–19.00 पी0 पी0 एम0 के बीच है। जनपद में सम्पूर्ण घुलित ठोस एवं पी0 एच0 मूल्य कार्बोनेट बाईकार्बोनेट सोडियम के आधार पर जनपद में पेय जल एवं सिंचाई के लिए जल उपयुक्त है। सतही जल की कठोरता का संकेन्द्रण 120–218 पी0 पी0 एम0 के मध्य है। उच्च स्तरीय धनात्मक सह–सम्बन्ध वैद्युत चालकता और सम्पूर्ण घूलित ठोस तथा सोडियम और सम्पूर्ण घूलित ठोस तथा कठोरता और कैल्सियम मैग्नीशियम में है, जबकि वैद्युत चालकता, नाईट्रेट (N03) और सम्पूर्ण घूलित ठोस एवं नाईट्रेट (N03) में उच्चस्तरीय ऋणात्मक सह–सम्बन्ध पाया गया है। सत्रह प्रतिदर्श (अकरा) रामपुर, (गुतवन) रामनगर, (चकताला) मड़ियाहूँ, (परियावॉ, रासीपुर) सिरकोनी, (महरेव) जलालपुर, (रंजीतपुर एवं गोनापार) सिकरारा, (सराय युसुफ, अगुवाकलॉ) मछलीशहर, (गरियॉव) मु0 बादशाहपुर, (गजना, राजेपुर) धर्मापुर, (मुफ्तीगंज) मुफ्तीगंज, (जरासी)

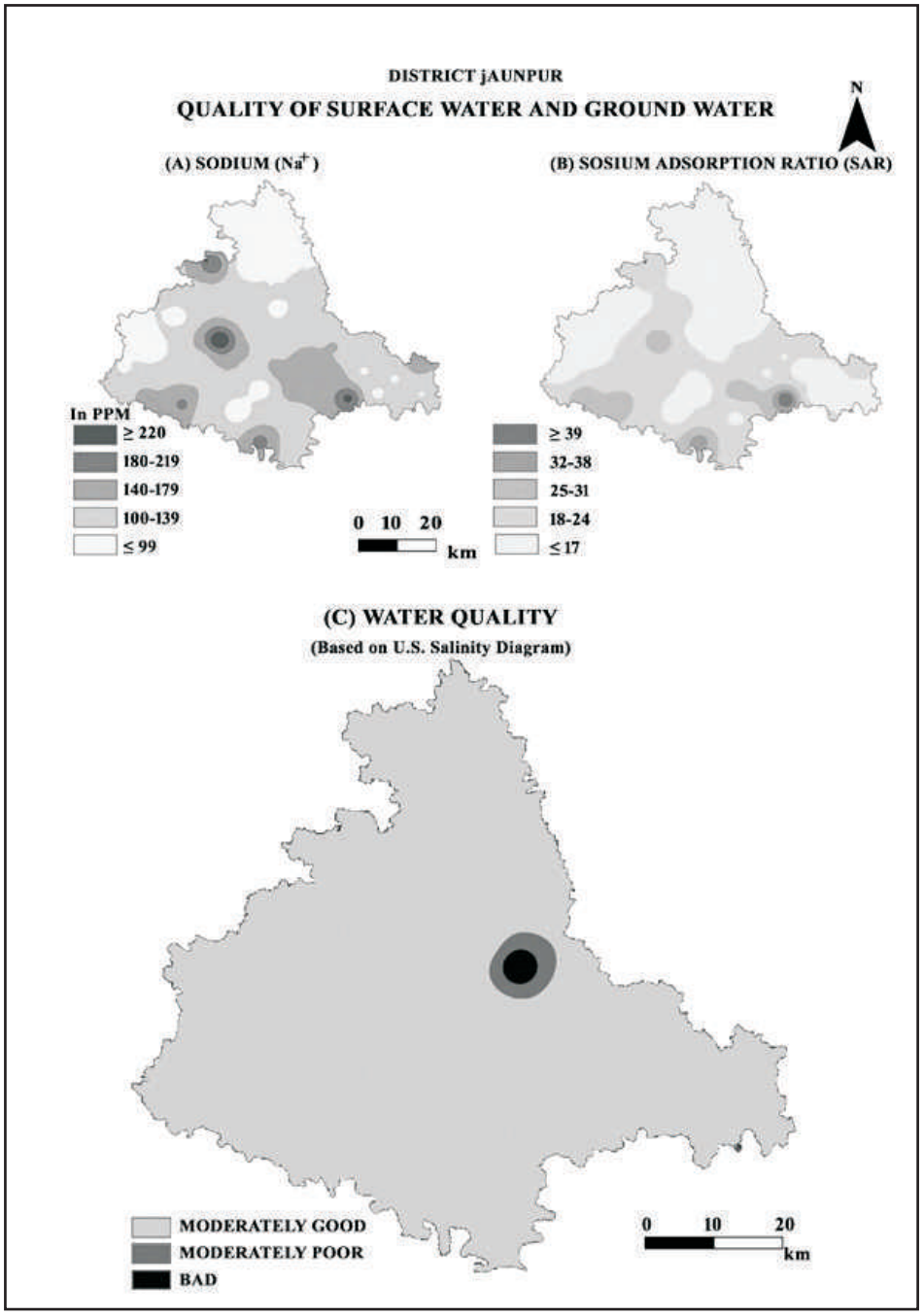
DISTRICT jAUNPUR
QUALITY OF SURFACE WATER AND GROUND WATER
N
(A) SODIUM (Na^+)
(B) SOSIUM ADSORPTION RATIO (SAR)
In PPM
≥ 220
180-219
140-179
100-139
≤ 99
0 10 20
km
≥ 39
32-38
25-31
18-24
≤ 17
(C) WATER QUALITY
(Based on U.S. Salinity Diagram)
MODERATELY GOOD
MODERATELY POOR
BAD
0 10 20
km

Fig. 03

डोभी, (उदयपुर गेलहवॉ) बदलापुर, (लमहन) महराजगंज तथा (सवन्सा) बक्सा विकासखण्ड C_3-S_1 श्रेणी में आते है जो मध्यम अच्छा समूह में अवस्थिति है, तथा जलालपुर (जगापुर) प्रतिदर्श (C_3-S_2) श्रेणी के अन्तर्गत है, जो मध्य खराब है। शेष प्रतिदर्श (C_2-S_1) श्रेणी के अन्तर्गत है,जो अच्छे जल के अन्तर्गत आते है

संदर्भ सूची

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जम्मू कश्मीर का धार्मिक पर्यटनः वैष्णव देवी तीर्थ का व्यवसायिक अध्ययन

दीप नारायण पाण्डेय

शोध सारांश

वर्तमान समय में पर्यटन एक विस्तृत आर्थिक तंत्र बन रहा है। भारतीय साहित्य में पर्यटन के लिए साधारणतया भ्रमण, पर्यटन, देशाटन और तीर्थाटन जैसे शब्दों का उल्लेख मिलता है। जम्मू और कश्मीर की अर्थव्यवस्था मुख्यतः कृषि पर आधारित और संबद्ध गतिविधियों पर निर्भर है। प्रत्येक वर्ष, हजारों तीर्थयात्री वैष्णो देवी और अमरनाथ के पवित्र मंदिरों की यात्रा करते हैं, जिसका राज्य की अर्थव्यवस्था पर महत्वपूर्ण प्रभाव पड़ा है। अकेले वैष्णो देवी यात्रा में से स्थानीय अर्थव्यवस्था को सालाना करोड़ों रूपये की आमदनी होती है। इस शोध पत्र के निम्नलिखित उद्देश्य हैं : वैष्णव देवी तीर्थ पर व्यवसाय से जुड़े लोगों की शैक्षिक स्थिति को जानना ? यहाँ के व्यवसायी वर्ग का व्यवसाय अपनाने की प्रकृति किस प्रकार की है ? व्यवसायियों का कोरोना काल में आजीविका का साधन क्या था?

मूल शब्दः *पर्यटन, आर्थिक तंत्र, अर्थव्यवस्था, शैक्षिक स्थिति।*

प्रस्तावना

भारत में प्राचीन काल से ही यात्रा, देशाटन एवं तीर्थाटन एक परम्परा के रूप में स्थापित रहा है। भारतीय साहित्य में पर्यटन के लिए साधारणतया भ्रमण, पर्यटन, देशाटन और तीर्थाटन जैसे शब्दों का उल्लेख मिलता है। इन शब्दों के अर्थ में ही पर्यटन का स्वरुप स्पष्ट रूप से दिखाई देता है।

वर्तमान समय में पर्यटन एक विस्तृत आर्थिक तंत्र बन रहा है। साधारणतया व्यापार और तीर्थाटन के लिए यात्राएँ भारत में परम्परा के रूप में स्थापित रही हैं। देशाटन और तीर्थाटन से प्रारंभ हुए पर्यटन की परिभाषा अब बदल चुकी हैं। अब यह शिक्षा, स्वास्थ्य लाभ, मनोरंजन, व्यापार और धार्मिक यात्रा, आदि जैसे नई बातों के बारे में पता लगाने का रूप ले चुका है। पर्यटन एक उद्योग के रूप में स्थापित हो गया है। आद्योगिक रूप लेने से इसके कई प्रकार विकसित हो गया।

अर्थव्यवस्था

जम्मू और कश्मीर की अर्थव्यवस्था मुख्यतः कृषि पर आधारित और संबद्ध गतिविधियों पर निर्भर है। रेशम उत्पादन और मछली पालन के लिए भी कश्मीर घाटी जानी जाती है। कश्मीर में लकड़ी का उपयोग उच्च गुणवत्ता वाले क्रिकेट बैट बनाने के लिए किया जाता है, जिसे कश्मीर में विलो के नाम से जाना जाता है। राज्य को बड़ी मात्रा में विदेशी मुद्रा की आय कश्मीरी केसर से होती है । जम्मू और कश्मीर से सेब, जौ, चेरी, आड़ू, नाशपाती, मक्का, बाजरा, संतरा, चावल, केसर, शर्बत, सब्जियां और गेहूं, आदि का कृषि निर्यात होता है , जबकि निर्मित निर्यात में हस्तशिल्प, कालीन और शॉल शामिल हैं।

राज्य के आर्थिक विकास में बागवानी की अहम भूमिका है। जम्मू कश्मीर अपने बागवानी उद्योग के लिए जाना जाता है और यह राज्य का सबसे धनी क्षेत्र है। राज्य के बागवानी उत्पादों में सेब, खुबानी, चेरी, नाशपाती, आलूबुखारा, बादाम और अखरोट शामिल हैं।

डोडा जिले में उच्च श्रेणी के नीलम के भंडार हैं । हाल के वर्षों में, कई उपभोक्ता वस्तुओं की कंपनियों ने इस क्षेत्र में विनिर्माण इकाइयाँ खोली हैं। एसोसिएटेड चौंबर्स ऑफ कॉमर्स एंड इंडस्ट्री ऑफ इंडिया (एसोचौम) ने कई

डॉ. दीप नारायण पाण्डेय, असिस्टेंट प्रोफेसर, विशिष्ट आपदा प्रबंधन केंद्र, जवाहर लाल नेहरु विश्वविद्यालय, नई दिल्ली।

औद्योगिक क्षेत्रों की पहचान की है जो राज्य में निवेश आकर्षित कर सकते हैं, और तदनुसार, यह औद्योगिक पार्क और विशेष आर्थिक क्षेत्र स्थापित करने के लिए संघ और राज्य सरकार के साथ काम कर रहा है। राज्य में औद्योगिक विकास कई प्रमुख बाधाओं का सामना करता है, जिसमें अत्यधिक पहाड़ी परिदृश्य और बिजली की कमी शामिल है।

प्रत्येक वर्ष, हजारों हिंदू तीर्थयात्री वैष्णो देवी और अमरनाथ के पवित्र मंदिरों की यात्रा करते हैं, जिसका राज्य की अर्थव्यवस्था पर महत्वपूर्ण प्रभाव पड़ा है। अकेले वैष्णो देवी यात्रा में से स्थानीय अर्थव्यवस्था को सालाना करोड़ों रूपये की आमदनी होती है। कश्मीर घाटी में पर्यटन हाल के वर्षों में फिर से शुरू हो गया है, गुलमर्ग राज्य भारत के शीर्ष पर्यटन स्थलों में से एक बन गया। गुलमर्ग भारत में सबसे लोकप्रिय पर्यटन स्थल स्थलों में से एक है, यहां दुनिया का सबसे ऊंचा हरित गोल्फ कोर्स भी है। हालांकि राज्य में हिंसा में कमी के साथ राज्यों की अर्थव्यवस्था विशेष रूप से पर्यटन को बढ़ावा मिला है।

भारत में धार्मिक पर्यटन के माध्यम से धार्मिक सद्भाव के विकास का कार्य सैकड़ों वर्षों से जारी है। यह तीर्थ भारत के जम्मू राज्य के रियासी जनपद में स्थित है। यहाँ पर बड़ी संख्या में देश–विदेश से श्रद्धालु धार्मिक पर्यटन के उद्देश्य से आते हैं। जिससे यहाँ एक बड़ा व्यवसायिक गतिविधि का जन्म हुआ है। इस व्यवसायिक गतिविधि का लाभ सभी धर्म के व्यक्ति उठाते हैं।

कोविड के दौरान पूरे देश की तरह यहाँ का भी व्यापारी वर्ग काफी प्रभावित हुआ। जो व्यवसायी वर्ग यहाँ पीढ़ी दर पीढ़ी व्यवसाय करता करता आ रहा है उसे कोविड काल में व्यवसाय का विकल्प तलाशने में परेशानी हुई। कई तो ऐसे हैं जो पीढ़ियों से माता वैष्णो देवी के पर्यटन कारोबार पे पूरी तरह निर्भर हैं।

उद्देश्य

प्रस्तुत शोध पत्र में व्यापारी और सेवा कार्य से जुड़े व्यक्तियों का सामाजिक अध्ययन किया गया है। इस शोध पत्र के निम्नलिखित उद्देश्य हैं

- वैष्णव देवी तीर्थ पर व्यवसाय से जुड़े लोगों की शैक्षिक स्थिति को जानना ?
- यहाँ के व्यवसायी वर्ग का व्यवसाय अपनाने की प्रकृति किस प्रकार की है ?
- व्यवसायियों का कोरोना काल में आजीविका का साधन क्या था?

सर्वेक्षण के द्वारा उपरोक्त उद्देश्य प्राप्त करने का प्रयास किया गया है। प्रस्तुत शोध पत्र का सेम्पल साइज 100 है। निदर्शन पद्धति से सर्वेक्षण किया गया है। मात्रात्मक पद्दति से इस शोध कार्य को पूरा करने का प्रयास किया गया है। आकड़ा विश्लेषण के लिए सांख्यकीय पद्धति और आरेख पद्धति का प्रयोग किया गया है। आकड़ों के प्रदर्शन के लिए आरेख पद्धति का प्रयोग किया गया है।

व्यवसाय से जुड़े लोगों की शैक्षिक स्थिति

भारत जैसे देश में शिक्षा को नौकरी के लिए ही आवश्यक माना जाने लगा है जबकि शिक्षा मनुष्य के सर्वांगीण विकास के लिए आवश्यक मानी गई है। वैष्णव देवी तीर्थ पर व्यवसायरत व्यवसायियों के शिक्षा के स्तर को जानने का प्रयास किया गया है।

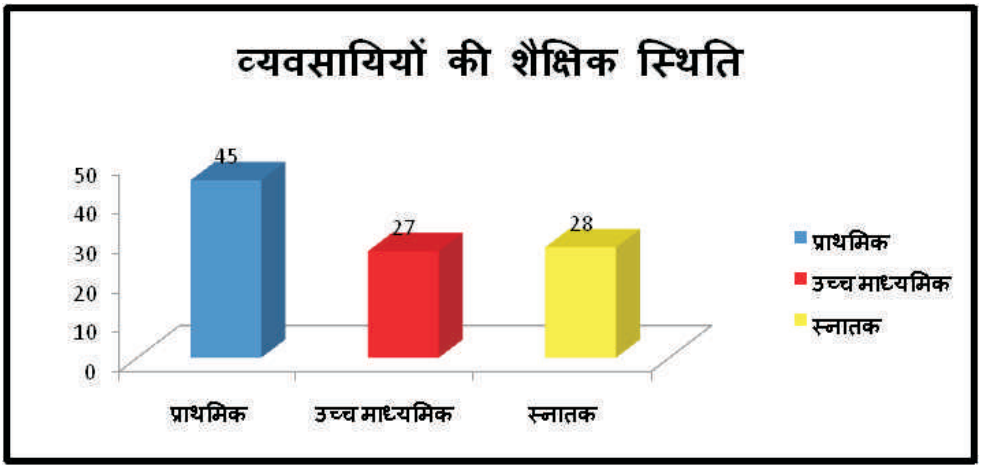
उपरोक्त ग्राफ माता वैष्णो देवी तीर्थ स्थल पर किए गए सर्वे के द्वारा व्यवसायियों की शैक्षिक स्थिति के बारे में दर्शा रहा है। जिसमें 45% ऐसे व्यवसायी हैं, जो कि प्राथमिक शिक्षित है। वही 27% ऐसे व्यवसायी हैं, जो उच्च–माध्यमिक शिक्षित हैं। जबकि 28% ऐसे व्यवसायी हैं, जो स्नातक शिक्षित हैं। निष्कर्ष के रूप में प्राथमिक शिक्षित व्यवसायी तीर्थ स्थल पर अधिक हैं।

व्यवसाय अपनाने की प्रकृति

भारत में व्यवसाय पीढ़ी दर पीढ़ी करने का स्वरुप दिखाई देता है। शिक्षा के प्रसार और व्यवसाय के विकल्प ने नए व्यवसाय के स्वरुप को जन्म दिया है। जिससे पारिवारिक व्यवसाय के स्वरुप में परिवर्तन दिखाई देता है।

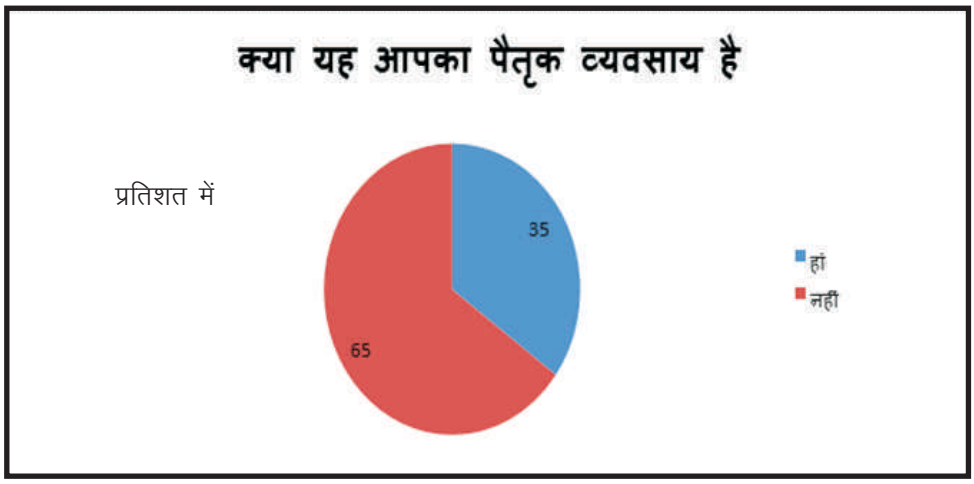
उपरोक्त ग्राफ माता वैष्णो देवी तीर्थ स्थल पर

चित्र 01 : व्यवसाय से जुड़े लोगों की शैक्षिक स्थिति।



स्रोतः शोध सर्वे पर आधारित

चित्र 02 : व्यवसाय अपनाने की प्रकृति।



स्रोतः शोध सर्वे पर आधारित

किए गए सर्वे के द्वारा पैतृक व्यवसाय के बारे में दर्शा रहा है। जिसमें 35% ऐसे लोग है, जिन्होंने बताया की यह उनका पैतृक व्यवसाय है। वहीं 65% लोगो ने यह बताया की उनका पैतृक व्यवसाय नहीं है। निष्कर्ष के रूप में कह सकते हैं नए अवसरों ने व्यवसाय का विकल्प दिया है। जिससे लोग व्यवसायी रचना में परिवर्तन हुआ है। वह किराए पर दुकान लेकर अपना व्यवसाय करते हैं एवं इसी से अपना जीवन यापन करते हैं.

व्यावसायिक स्थान / दुकान का विवरण

वैष्णव देवी तीर्थ एक श्राइन बोर्ड है जिससे यहाँ पर अधिकांश दुकान श्राइन बोर्ड की हैं, श्राइन बोर्ड बनने के

पहले यहाँ पर व्यवसायीयों की अपनी दुकाने भी हुआ करती थीं। यहाँ के व्यवसायीयों के दूकान की मालिकाना स्थिति जानने के लिए दुकान के स्वरुप को जानने का प्रयास किया गया है।

उपरोक्त ग्राफ माता वैष्णो देवी तीर्थ स्थल पर किए गए सर्वे के द्वारा व्यवसायिक दुकानदारों के बारे में आंकड़ा दर्शा रहा है। जिसमें 21% ऐसे व्यवसायी हैं, जिनका अपनी दुकान है। वही 79% व्यवसायी ऐसे हैं जिनका अपनी दुकान नहीं है, और वे किराए पर व्यवसाय करके अपना जीवन यापन कर रहे हैं।

व्यवसायियों का कोरोना काल में आजीविका का साधन

कोरोना काल ने व्यवसायी वर्ग को काफी स्तर तक प्रभावित किया है। वैष्णव देवी तीर्थ के व्यवसायी वर्ग पर भी इसका काफी प्रभाव पड़ा है।

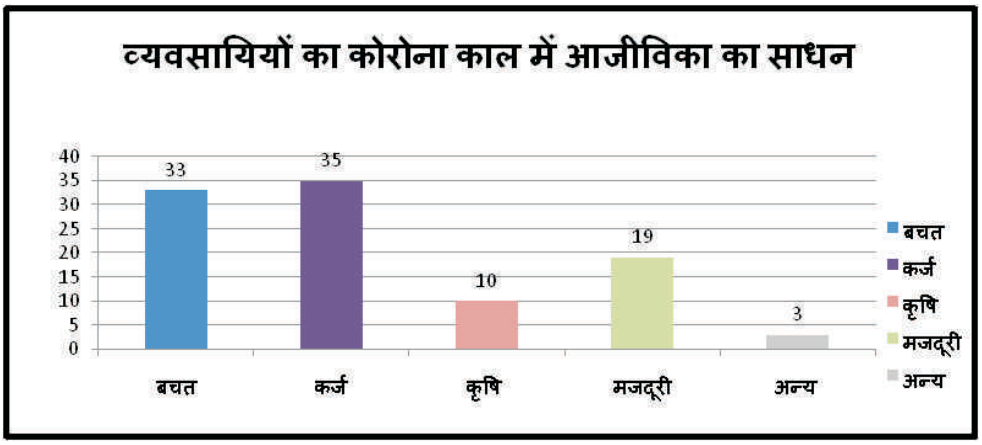
उपरोक्त ग्राफ माता वैष्णो देवी तीर्थ स्थल पर किए गए सर्वे के द्वारा व्यवसायियों के कोरोना काल में आजीविका के साधन के बारे में दर्शा रहा है कि उनका कोरोना काल में जीवन यापन कैसे हुआ। जिसमें 33% ऐसे लोग है जो कि अपने बचत किए गए पैसे से कोरोना काल में जीवन यापन किए। 35% ऐसे लोग हैं, जोकि कर्ज लेकर कोरोना काल में अपना जीवन यापन किए। 10% ऐसे लोग हैं जो कोरोना काल में कृषि पर निर्भर रहे। 19% ऐसे लोग हैं जो मजदूरी करके कोरोना काल में अपना जीवन यापन किए हैं. जबकि 3% अन्य लोग हैं जोकि सरकार द्वारा वितरित राशन का उपयोग करके जीवन यापन किए हैं।

उपसंहार

व्यवसाय किसी भी अर्थतंत्र की धमनी है। देश की सम्पन्नता और आर्थिक आवश्यकता के लिए व्यवसाय महत्वपूर्ण स्थान रखता है। प्रस्तुत शोध पत्र में वैष्णों देवी तीर्थ के व्यवसायीयों के शैक्षिक स्थिति में प्राथमिक शिक्षा पाए व्यवसायीयों की संख्या अधिक पायी गई है। पारिवारिक पृष्ठभूमि का अध्ययन करने पर ज्ञात हुआ कि अधिकांश व्यवसायीयों ने नए व्यवसाय को चुना है। श्राइन बोर्ड होने के कारण अधिकांश व्यवसायी यहाँ पर किराये की दुकान चलाते हैं। कोरोना ने पूरे देश की तरह यहाँ के व्यवसायीयों को भी प्रभावित किया है। अधिकांश व्यापारी कर्ज की स्थिति का सामना किये हैं।

तीर्थ स्थल धार्मिक पर्यटन के रूप में धार्मिक पर्यटक को आकर्षित करते हैं। इन पर्यटकों के आगमन से एक व्यवसायी वर्ग का उद्‌भव होता है।

चित्र 03 : व्यवसायियों का कोरोना काल में आजीविका का साधन।



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तहसील सिकन्दरपुर (जनपद–बलिया) में जनसंख्या वृद्धि एवं कृषिगत विकासः एक भौगोलिक अध्ययन

दुर्गेश राय

शोध सारांश

जनसंख्या वृद्धि एवं कृषिगत विकास एक दूसरे के पूरक हैं। अर्थात् तीव्र गति से बढ़ती हुई जनसंख्या के भरण पोषण हेतु कृषि का विकास अत्यन्त आवश्यक है। एक तरफ जहाँ विश्व की जनसंख्या तीव्र गति से बढ़ रही है वहीं दूसरी तरफ उस अनुपात में खाद्यान्नों का उत्पादन नहीं हो पा रहा है जिसके कारण मानव के समक्ष विविध प्रकार के खाद्यान्न सम्बन्धी संकट उत्पन्न हो रहे हैं। कहीं अल्प वर्षा एवं कहीं अति वृष्टि के कारण भी कृषि की उत्पादकता प्रभावित हो रही है, अतः तीव्र गति से बढ़ती हुई जनसंख्या एवं कृषिगत विकास के अन्तर्सम्बन्धों का अध्ययन अति आवश्यक है। आज विश्व के अनेक देश खाद्यान्न के संकट से गुजर रहे हैं एवं लोग भोजन के अभाव में मर रहे हैं, अतः मानव को जनसंख्या वृद्धि को नियंत्रित करते हुए कृषि उत्पादन में वृद्धि करनी होगी तभी जनसंख्या वृद्धि एवं कृषिगत विकास के मध्य सहसम्बन्ध स्थापित हो सकेगा एवं विश्व खाद्य संकट की समस्या से मुक्त हो सकेगा।

शब्द संक्षेप : जनसंख्या वृद्धि, कृषिगत विकास, खाद्य संकट, क्षुधा पूर्ति, जन्मदर, मृत्युदर, सामाजिक चेतना, आर्थिक संरचना, भरण पोषण।

प्रस्तावना

भारत एक कृषि प्रधान राष्ट्र है, जहाँ कि 70 से 80 प्रतिशत जनसंख्या कृषि कार्यों पर ही निर्भर है एवं यह निर्भरता निरन्तर बढ़ती जा रही है। तीव्र गति से बढ़ती हुई जनसंख्या के भरण–पोषण हेतु कृषि के माध्यम से खाद्यान्नों का उत्पादन विश्व के समक्ष एक विकट समस्या है। मानव निरन्तर खाद्यान्न संकट का समाधान ढूढ़ने में लगा हुआ है। मानव द्वारा किये जा रहे अनवरत् प्रयास के बाद भी खाद्यान्न संकट का समाधान नहीं ढूँढा जा सका है। कृषिगत संसाधनों पर दबाव निरन्तर बढ़ता जा रहा है, जिसके कारण विभिन्न प्रकार की समस्यायें उत्पन्न हो रही हैं। जनसंख्या के तीव्र गति से बढ़ने के कारण भूमि पर भी इसका दबाव बढ़ रहा है, जिससे कि जोतों का आकार घट रहा है साथ ही अत्यधिक रासायनिक उर्वरकों के प्रयोग के कारण मृदा की उर्वरा शक्ति में भी ह्रास हो रहा है। कृषि संसाधनों एवं कृषिगत उत्पादों में वृद्धि का जो स्वरूप दिखाई देना चाहिये वह दिखाई नहीं दे रहा है, इसका मूल कारण बढ़ती हुई जनसंख्या एवं संसाधनों के मध्य अन्तर्सम्बन्ध ही हैं। अतः जनसंख्या एवं संसाधनों के मध्य जब तक धनात्मक सम्बन्ध नहीं होगा अर्थात् जब तक जनसंख्या में कृषि कार्य सम्बन्धी कौशल का विकास नहीं होगा तब तक विश्व में खाद्यान्न संकट का समाधान नहीं ढूढ़ा जा सकता है।[2]

इस प्रकार प्रकृति प्रदत्त वे संसाधन जो कृषि कार्य हेतु मानव को उपलब्ध कराये गये हैं जैसे मृदा, वर्षा, मृदा की उर्वरा शक्ति, तापमान की अनुकूलता, जल श्रोत, आदि संसाधनों का परिमार्जित उपयोग करना होगा। मानव स्वयं में ही एक संसाधन है एवं विविध प्रकार के सामाजिक आर्थिक क्रियाओं का सृजनकर्ता भी है। मिट्टी, जल, भूमि, ऊर्जा संसाधनों, जीव–जन्तुओं, परिवहन, ज्ञान–विज्ञान, आदि का उपयोग करके मानव सम्पूर्ण विश्व के क्षुधा को शान्त करने में लगा हुआ है। साथ ही वर्तमान की तकनीकि

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क्रान्ति का उपयोग भी मानव इस कार्य हेतु कर रहा हैं परन्तु बढ़ती हुई जनसंख्या के कारण मानव द्वारा किये जा रहे ये सारे प्रयास नाकाम सिद्ध हो रहे हैं। इसलिए मानव जनसंख्या वृद्धि की इस भयावहता को शान्त करने के लिये जनसंख्या वृद्धि को नियंत्रित करने के साथ ही अपने उपभोग में प्रयुक्त होने वाले संसाधनों के विकास में भी लगा हुआ है। कृषिगत संसाधनों का विकास भी उसी का एक महत्वपूर्ण कारक है, जिसका विकास मानव तीव्र गति से कर रहा है। परन्तु मानव द्वारा किये जा रहे ये सारे प्रयास नाकामी सिद्ध हो रहे हैं एवं उसका लाभ जनमानस को नहीं मिल पा रहा है।[3]

अध्ययन का उद्देश्य

प्रस्तुत अध्ययन का उद्देश्य सिकन्दरपुर तहसील, जनपद बलिया में जनसंख्या वृद्धि एवं कृषिगत विकास के मध्य अन्तर्सम्बन्धों का अध्ययन करना है जिसके माध्यम से जनसंख्या वृद्धि के कारणों को प्रकाश में लाया जा सके साथ ही जनसंख्या वृद्धि के कारण अध्ययन क्षेत्र के कृषि संसाधनों पर बढ़ते दबाव को भी रेखांकित करते हुए इन दोनों चरों के मध्य सहसम्बन्ध अवस्थापन हेतु योजना प्रस्तुत की जा सके।

विधि तन्त्र

प्रस्तुत अध्ययन में प्राथमिक एवं द्वितीयक आकँड़ों को आधार बनाया गया है, साथ ही अध्ययन के निष्कर्ष को प्राप्त करने हेतु विवेचनात्मक एवं विश्लेषणात्मक विधि–तन्त्रों का प्रयोग करते हुये अध्ययन के निष्कर्ष को प्राप्त किया गया है।

अध्ययन क्षेत्र

प्रस्तुत अध्ययन क्षेत्र सिकन्दरपुर तहसील बलिया जिले की उत्तरी सीमा का निर्धारण करती है। इसका अक्षांशीय विस्तार 25°55′ उत्तरी से 26°8′ उत्तरी एवं देशान्तरीय विस्तार 83°55′ पूर्वी से 84°7′ पूर्वी के मध्य है। घाघरा नदी अध्ययन क्षेत्र की उत्तरी सीमा का निर्धारण करने वाली सबसे प्रमुख नदी है जो अध्ययन क्षेत्र की उत्तरी एवं देवरिया जनपद की दक्षिणी सीमा का निर्धारण करते हुये आगे बढ़ते हुए उत्तर प्रदेश एवं बिहार राज्य की सीमा पर गंगा नदी में मिल जाती है। सिकन्दरपुर तहसील के पूरब में बाँसडीह तहसील, दक्षिण में बलिया तहसील एवं पश्चिम सीमा पर रसड़ा तहसील तथा उत्तरी पश्चिमी सीमा पर बेल्थरारोड तहसील स्थित है। अध्ययन क्षेत्र तीन विकास खण्डों नवानगर, पन्दह एवं मनियर (आंशिक) में विभक्त है। इसमें न्याय पंचायतों की संख्या–24 एवं गाँवों की संख्या 242 है। वर्ष 2011 की जनगणना के अनुसार यहाँ की कुल जनसंख्या 3,92,801 है, जिसमें पुरूष जनसंख्या 2,00,401 एवं स्त्री जनसंख्या 1,92,400 है। ग्रामीण क्षेत्र का लिंगानुपात 917 एवं नगरीय क्षेत्र का लिंगानुपात 963 है। तहसील का लिंगानुपात 960 है। अध्यन क्षेत्र की कुल साक्षरता 71.12 प्रतिशत् है, जिसमें पुरूष साक्षरता 69.62 प्रतिशत् एवं स्त्री साक्षरता 52.25 प्रतिशत् है।

अध्ययन क्षेत्र एक कृषि प्रधान क्षेत्र है, जहाँ की कुल जनसंख्या का एक बहुत बड़ा भाग कृषि पर ही आश्रित है। तीव्र गति से बढ़ती हुई जनसंख्या के कारण संसाधनों पर निरन्तर दबाव बढ़ता जा रहा है। कृषि पर आश्रितता अधिक होने के कारण कृषिगत संसाधनों पर सर्वाधिक दबाव दृष्टिगत हो रहा है। इन्हीं तथ्यों को ध्यान में रखते हुए इस अध्ययन–क्षेत्र का चयन किया गया है। जिसके माध्यम से यहाँ के विकास की रूपरेखा प्रस्तुत की जा सके।

सारणी संख्या 01 से स्पष्ट है कि वर्ष 2011 की जनगणना के अनुसार अध्ययन क्षेत्र की जनसंख्या वृद्धि में कहीं तीव्र तो कहीं अल्पवृद्धि अंकित की गयी है। यह जनसंख्या वृद्धि की आदर्श स्थिति नहीं कही जा सकती है जिसके कारण संसाधनों पर जनसंख्या का दबाव अधिक बढ़ रहा है।[3]

अध्ययन क्षेत्र उत्तर में घाघरा नदी के बाढ़ एवं कटान से प्रभावित एक क्षेत्र है जहाँ प्रतिवर्ष जन एवं धन की व्यापक हानि होती है। कठौड़ा, डूहा बिहरा, सीसोटार, आदि न्याय पंचायते बाढ़ एवं कटान से व्यापक रूप से प्रभावित रहती है जिससे किसानों को व्यापक हानि होती है।

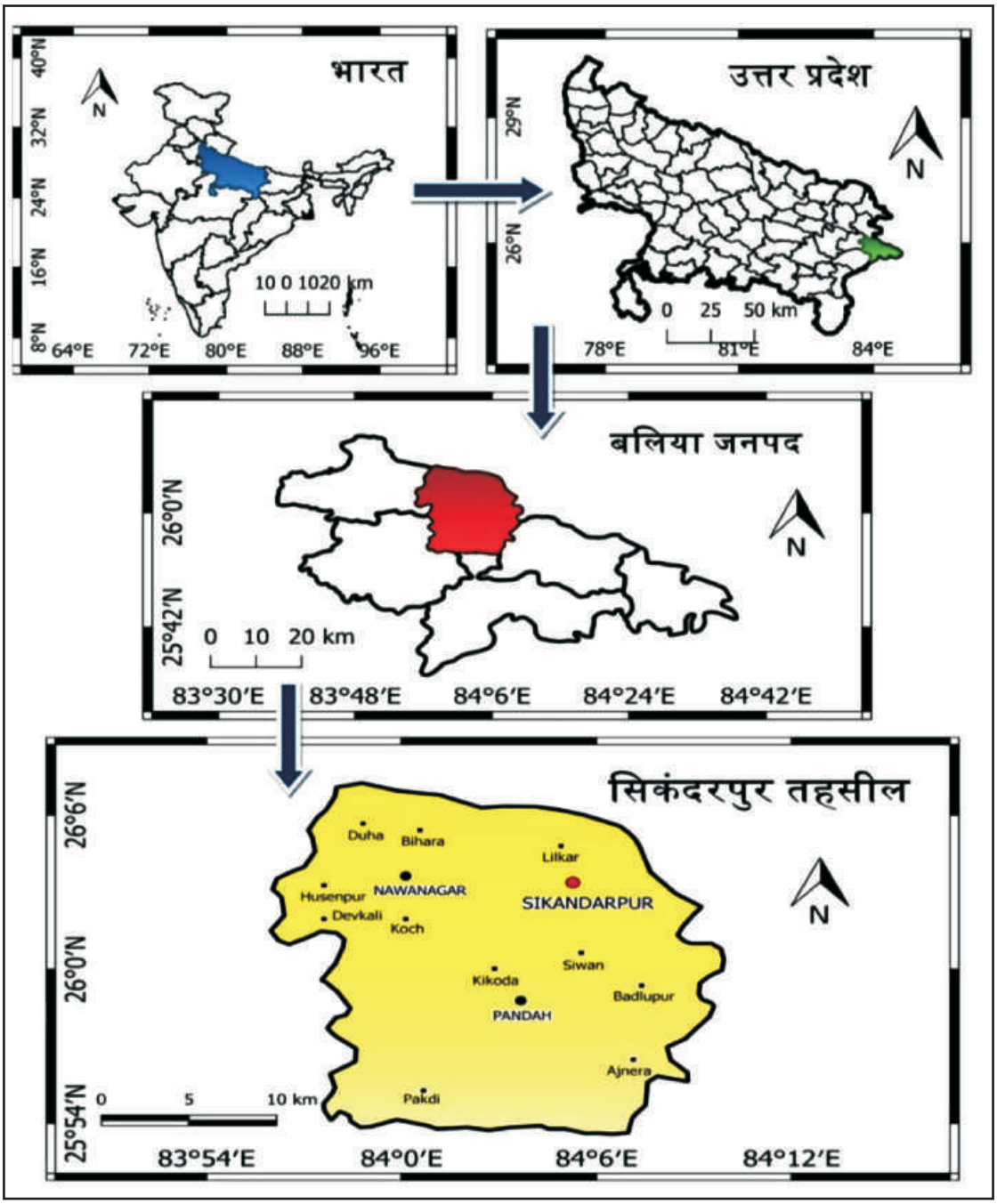
भारत
40°N
32°N
24°N
16°N
8°N
64°E
72°E
80°E
88°E
96°E
10 0 1020 km
उत्तर प्रदेश
29°N
26°N
78°E
81°E
84°E
0 25 50 km
बलिया जनपद
26°0′N
25°42′N
83°30′E
83°48′E
84°6′E
84°24′E
84°42′E
0 10 20 km
सिकंदरपुर तहसील
26°6′N
26°0′N
25°54′N
83°54′E
84°0′E
84°6′E
84°12′E
0 5 10 km
Duha
Bihara
Lilkar
Husenpur
NAWANAGAR
SIKANDARPUR
Devkali
Koch
Siwan
Kikoda
Badlupur
PANDAH
Ajnera
Pakdi
N

Fig. 01

सारणी 01 : न्याय पंचायतवार (प्रतिशत में) तहसील सिकन्दरपुर तहसील में जनसंख्या वृद्धि।

क्रम संख्या	न्याय पंचायत	जनसंख्या वृद्धि (प्रतिशत में)
1	नवानगर	19.27
2	देवकली	18.32
3	सिवानकला	21.26
4	कठौड़ा	23.25
5	बघुड़ी	17.12
6	इसारपीथा पट्टी	16.35
7	पकड़ी	24.24
8	बाछापार	23.15
9	पन्दह	20.26
10	असना	20.15
11	काजीपुर	18.32
12	बड़ागांव	22.25
13	हुसेनपुर	19.29
14	भांटी	24.25
15	सीसोटार	22.35
16	डूहाबिहरा	20.19
17	एकइल	18.12
18	खड़सरा	22.26
19	खेजुरी	24.15
20	बालूपुर	20.32
21	पूर	18.70
22	उकछी	21.15
23	हथौज	22.96
24	चड़वा बरवा	17.25

स्रोतः–जनगणना हस्त पुस्तिका जनपद–बलिया, वर्ष 2011

सारणी 02 : तहसील सिकन्दरपुर में न्याय पंचायत वार, कृषिगत संसाधनों में वृद्धि वर्ष, 2001–2011.

क्रम सं0	संसाधनों में प्रतिशत वृद्धि का वर्गान्तर	न्याय पंचायत
1	>3	सिवानकला, देवकली
2	3–6	नवागनर, कठौड़ा, बघुड़ी, इसारपीथा पट्टी, काजीपुर, भाँटी, सीसोटार, एकइल, खेजुरी, बालूपुर एवं चड़वाँ।
3	6–9	बाछापार, पकड़ी, पन्दह, असना, बड़ागांव, हुसेनपुर, डूहां बिहरा, खड़सरा, पूर, उकछी एवं हथौंज।

स्रोत– शोधार्थी द्वारा किये गये क्षेत्र सर्वेक्षण एवं कृषि कार्यालय बलिया द्वारा प्राप्त आँकड़ों के आधार पर आधारित।

सारणी संख्या 02 के माध्यम से अध्ययन क्षेत्र में न्याय पंचायत वार कृषिगत संसाधनों में वृद्धि का आँकड़ा प्रस्तुत किया गया है। आँकड़ों से स्पष्ट है कि अध्ययन क्षेत्र में कृषिगत संसाधनों में वृद्धि उस अनुपात में नहीं हो रही है जिस अनुपात में जनसंख्या बढ़ रही है। अर्थात् जनसंख्या वृद्धि की गति तीव्र है और कृषिगत संसाधनों में वृद्धि की गति अपेक्षाकृत न्यून है जो अध्ययन क्षेत्र के विकास का एक बहुत बड़ा बाधक कारक है।[4]

अतः अध्ययन क्षेत्र के सर्वांगीण विकास हेतु जनसंख्या वृद्धि को नियंत्रित करना एक सर्वप्रमुख उपाय है साथ ही कृषि ससाधनों के विकास हेतु आधारभूत संरचना को विकसित किया जाना आवश्यक है, जिसके आधार पर कृषि के विकास एवं उतपादकता में वृद्धि हेतु संरचना तैयार की जा सके। राज्य एवं केन्द्र सरकार को विभिन्न सरकारी एवं गैर सरकारी समितियों को क्रिया शोध करना होगा साथ ही कृषि हेतु व्यापक अनुदान उपलब्ध कराना होगा। साथ ही उत्तम कृषि यंत्रों, उन्नतशील बीजों, उर्वरकों, कीटनाशक दवाओं, आदि की उपलब्धता सुनिश्चित करनी होगी तभी जाकर आदर्श जनसंख्या की अवधारणा के साथ ही आदर्श कृषिगत विकास अध्ययन क्षेत्र में मूर्त रूप प्राप्त कर सकेगा और अध्ययन क्षेत्र का विकास सुनिश्चित किया जा सकेगा।

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सामाजिक–आर्थिक विकास हेतु मानव संसाधन नियोजन : तहसील कुण्डा, जनपद प्रतापगढ़ का एक प्रतीकात्मक अध्ययन

शिवा शुक्ला

शोध सारांश

मानव संसाधनों का केन्द्रीय बिन्दु है, क्योंकि यह एक साथ संसाधन, संसाधनों के उपभोक्ता तथा संसाधन विनाशक (उपभोग सम्बन्धी, समस्या का कारण) है। ''अपनी ज्ञान, शिक्षा और तकनीकी से मानव संसाधनों की खोज का उपयोग करता है और जाने–अन्जाने में संसाधनों को क्षति पहुँचाता है। वर्तमान में मानव संसाधनों का स्वरूप ही किसी क्षेत्र के विकास का स्वरूप निर्धारण करता है, अध्ययन क्षेत्र कुण्डा तहसील में जनसंख्या वृद्धि उस क्षेत्र के आर्थिक विकास, सामाजिक चेतना, सांस्कृतिक पृष्ठभूमि, एतिहासिक घटनाओं तथा राजनैतिक विचारों का सूचक है।''

शोध क्षेत्र कुण्डा तहसील की जनसंख्या में उत्तरोत्तर वृद्धि हुई तथा घटती कृषि भूमि धरातल पर भार बनती जा रही है, जिससे खाद्य समस्या, बेरोजगारी, सामाजिक आर्थिक विद्यटन, स्वास्थ्य ह्रास तथा शैक्षिक असुविधा में वृद्धि बढ़ती जा रही है। शोध पत्र का मुख्य उद्देश्य यहाँ विद्यमान ''मानव संसाधन'' का उपयोग, दुरूपयोग, शोषण, विकास, आदि के अध्ययन के साथ विश्लेषण एवं नियोजन कर, उन पर ***'सामाजिक–आर्थिक' प्रभाव*** *का अध्ययन करना है।*

शब्द संक्षेप : *मानव संसाधन, विकास, मानव विकास सूची, सामाजिक–आर्थिक विकास, समग्र विकास, नियोजन सूचकांक।*

प्रस्तावना

मानव विशिष्टता संसाधन है, मानव संसाधनों का उत्पादक है, क्योंकि वही अपनी आवश्यकता पूर्ति, कठिनाई, निवारण तथा उद्देश्यों को प्राप्त करने हेतु प्राकृतिक जगत के विभिन्न पदार्थों में व्याप्त उन तत्वों की पहचान करता है, जिनका संसाधन के रूप में प्रयोग किया जा सकता है। मानव ही इस प्रकार के संसाधनों का उपभोक्ता है, क्योंकि वह उनका उपभोग करता है। इस प्रकार प्राविधिक क्षमता से उत्पन्न मानव संसाधन **समुदाय संसाधन** है। मानव की संख्या, संस्कृति एवं अन्य विशेषताएं सबसे महत्वपूर्ण संसाधन हैं। मानव के अभाव में पृथ्वी संसाधन विहीन है, क्योंकि मनुष्य की आवश्यकताओं एवं महत्वाकांक्षाओं के संदर्भ में ही कोई वस्तु अथवा पदार्थ संसाधन का रूप लेते हैं। वास्तव में मानव संसाधन की परिभाषा की पृष्ठिभूमि में यह अभियुक्ति उपयुक्त न होगी कि मानव के अभाव में कोई भी संसाधन विद्यमान नहीं रह सकता।

अध्ययन क्षेत्र की भौगोलिक रूपरेखा

अवस्थिति एक अति महत्वपूर्ण भौगोलिक तथ्य है, जो निरन्तर एक राज्य अथवा राजनैतिक इकाई को प्रभावित करती रहती है, जैसा कि कहा गया है कि स्थिति होती है, किन्तु समय के साथ उसकी सापेक्षिक महत्ता परिवर्तित होती जाती है। पृथ्वी धरातल पर स्थिति किसी स्थान अथवा प्रदेश के भौगोलिक अध्ययन का मूल आधार तथा भौगोलिक दशाओं की सूचक होती है। अध्ययन क्षेत्र प्रतापगढ़ की कुण्डा तहसील की भौगोलिक स्थिति इस प्रकार है –

प्रस्तुत शोध पत्र के अध्ययन हेतु प्रतापगढ़, जनपद के कुण्डा तहसील को चयनित किया गया। जिसका भौगोलिक विस्तार 25°34' उत्तरी अक्षांस से 25°56' उत्तरी अक्षांश तक तथा 81°19' पूर्वी देशान्तर से 81°46' पूर्वी

डॉ. शिवा शुक्ला, डी0फिल0, इलाहाबाद विश्वविद्यालय, 592 एच/212, रबीन्द्र नगर, तेलीबाग, रायबरेली रोड, लखनऊ, ई–मेल : rolly0812@gmail.com

देशान्तर के मध्य स्थित है। तहसील में चार विकास खण्ड हैं–कुण्डा, कालाकांकर, बिहार एवं बाबांगंज। इन सभी विकास खण्डों में प्राकृतिक एवं जैविक संसाधन उपलब्ध हैं (चित्र सं0 01)।

संरचना की दृष्टि से अध्ययन क्षेत्र जनपद प्रतापगढ़ की कुण्डा तहसील भारत के नवीनतम् संरचनात्मक इकाई अर्थात् गंगा–सिन्धु मैदान से सम्बद्ध है, क्योंकि यह जनपद इस इकाई का समकालिक भाग है। गंगा–सिन्धु जो हिमालय श्रेणी एवं प्राचीन प्रायद्वीप भूखण्ड के मध्य अवस्थित है। मूलतः एक द्रोणी से निर्मित है। यह द्रोणी हिमालय के उत्थान जिसका अंतिम चरण ''क्वार्टरनी युग'' में हुआ, में उत्तर से प्रगामी भूपर्पटी तरंगों द्वारा गोण्डवानालैण्ड के भाग प्रायद्वीपीय भारत के उत्तरी किनारे पर हुए सम्पीडन के फलस्वरूप निर्मित हुई तथा गंगा–सिन्धु, ब्रह्मपुत्र, आदि विशाल नदियों एवं उसकी सहायक नदियों के अनावरण निक्षेप द्वारा आपूर्ति की गयी है। यह निक्षेप एल्यूवियम के रूप में लगभग 2–3 हजार मीटर गहराई के हैं। प्लीस्टोसीन युग में घटित अनियमित आंकलन के फलस्वरूप यहां दो प्रकार का एल्यूवियम पाया जाता है।

प्रथम खादर (नवीनतम्)

द्वितीय बाग (प्राचीनतम्)

खादर भूमि नदी बेसिन के दोनों ओर के भागों को सामान्यतः सीमांकित करती है जबकि बागर भूमि उच्च भूमि है। वर्षाकाल में यह जलमग्न नहीं होती है।

जलवायु भौगोलिजक पर्यावरण का प्रथम कारक है, जो धरातल पर समस्त माननीय क्रियाकलापों का संचालन करती है। जलवायु मानव की क्रियाशीलता को प्रभावित करती है, जिससे उसके जीवन का स्तर एवं उसकी सभ्यता निर्धारित होती है। यथा वर्षा के आगमन पर कृषक क्षेत्रों में कृषि कार्य प्रारम्भ कर देता है। यदि अचानक वर्षा नहीं होती या घोर वृष्टि या अनावृष्टि होती है तो फसलें जो कृषक जीवन के पोषक का आधार हैं, नष्ट होती हैं। परिणाम स्वरूप कृषक की स्थिति अति दयनीय हो जाती है।

अध्ययन क्षेत्र की जलवायु उपोष्ण कटिबंधीय मानसूनी जलवायु है। यह जलवायु महाद्वीपीयता से पूर्णता प्रभावित है। भारत के अन्य भागों की तरह अध्ययन क्षेत्र में भी वर्ष में दोबार प्रवाहित वायु में मौसमी परिवर्तन पाया जाता है। यह वायु प्रवहन क्रमशः उत्तरी, पूर्वी मानसूनी एवं दक्षिणी पश्चिमी मानसून के रूप में होता है। वायु की प्रकृति एवं दिशा के आधार पर इनका नामकरण **आर्द्र मानसून एवं शुष्क मानसून** समीचीन समझा गया। समस्त मौसमी तत्वों को समुचित रूप से दृष्टि में रखकर तथा उसके घटनाक्रमों के भिन्नता के आधार पर हम अध्ययन क्षेत्र को तीन विशिष्ट ऋतुओं में वर्गीकृत करते हैं।

शीत ऋतु (नवम्बर से फरवरी)

ग्रीष्म ऋतु (मार्च से मध्य जून)

वर्षा ऋतु (मध्य जून से अक्टूबर)

अध्ययन क्षेत्र मैदानी तथा कृषि प्रधान होने के कारण यहां वनस्पति कम पायी जाती है। यद्यपि प्राचीन काल में इस क्षेत्र में कुछ भूखण्ड घनें जंगलों से आवृत्त था। जो जनसंख्या वृद्धि तथा कृषि भूमि में विस्तार के कारण न्यून होते गये। फलतः घने जंगल धीरे–धीरे लुप्त होते गये, केवल बबूल, बांस, सरपत एवं कांस जैसी वनस्पतियाँ नदी तटवर्ती विखण्डित भूमियों एवं खड्ड पेटियों में मिलती है। क्षेत्र में वास्तव में जिस हरितिमा का दर्शन होता है, वह ग्रीष्म बाग एवं फलोद्यान है।

अध्ययन क्षेत्र के पश्चिम भाग में स्थित विकास खण्ड कालाकांकर, कुण्डा, बाबागंज में वनों का अभाव है। जबकि फूलोद्यान के संदर्भ में गंगा खादर पेटी में स्थित विकास खण्ड कुण्डा एवं कालाकांकर ख्याति प्राप्त है। यहां फलोंद्यान के अन्तर्गत आम, महुआ, कटहल, जामुन एवं अमरूद फल प्रमुख हैं। बाग–बगीचों के अलावा तहसील में झरबेरी, बेल, रबर, बांस, गुलर, पीपल, बरगद, लसोढ़ा एवं पलास के वृक्ष प्रमुख रूप से पाये जाते हैं।

शोध साहित्य परीक्षण

मानव संसाधन अध्ययनों में कुलिन (1932), अहमद (1941), डेविस (1953), चटर्जी (1963), गोशल (1956), वन्दना (1980), मिश्रा (1982), सिंह (1983), आदि ने विभिन्न

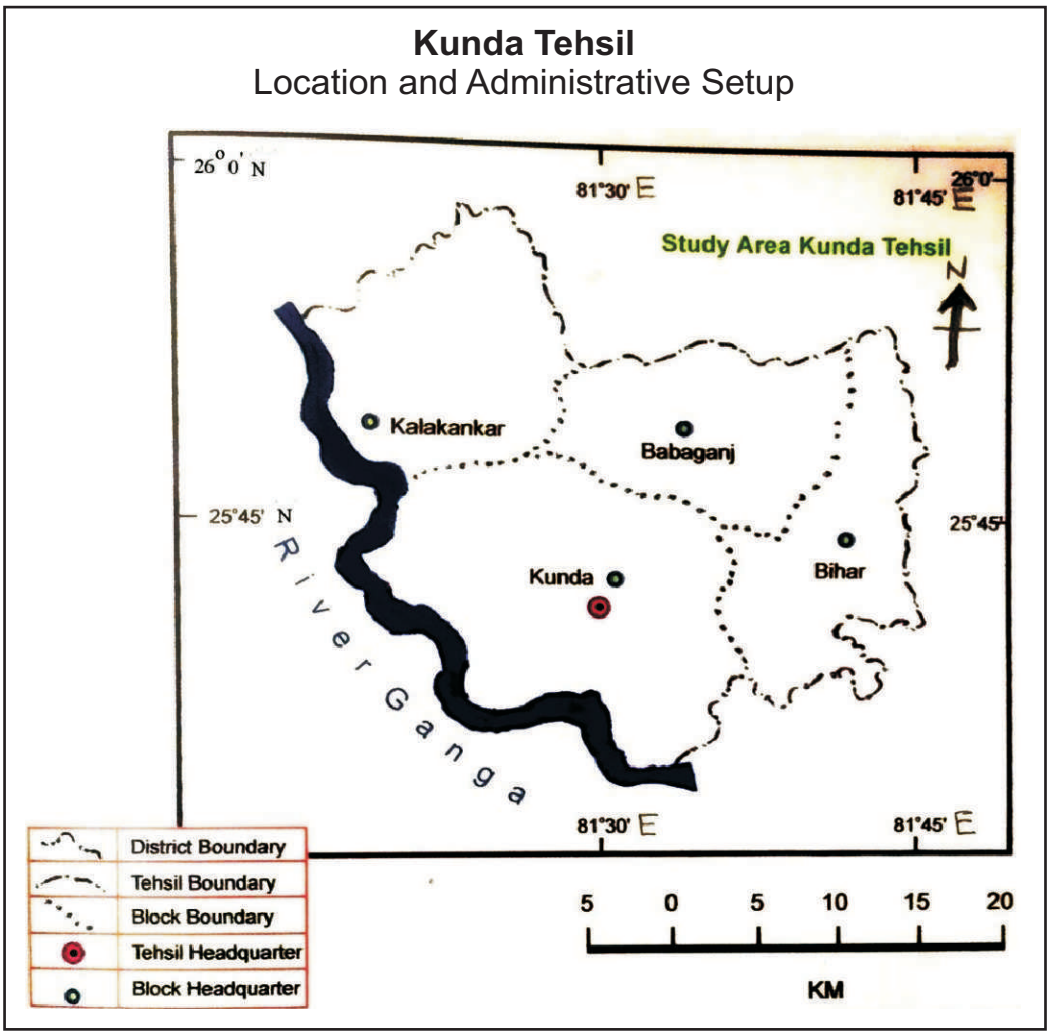

Fig. 01

भागों में जनसंख्या के वितरण उसकी संरचनात्मक विशेषता एवं समस्या और संरक्षण सम्बन्धी अध्ययन प्रस्तुत किया है।

अध्ययन के मुख्य उद्देश्य

अध्ययन क्षेत्र कुण्डा तहसील जनपद प्रतापगढ़ के मानव संसाधन आधार का तथ्यगत् विश्लेषण करना तथा विद्यमान सामाजिक आर्थिक विषमताओं का स्थानिक एवं पारिस्थैतिक अध्ययन करना आवश्यक है, क्योंकि यह क्षेत्र पिछड़ा हुआ है इसलिए इसका अध्ययन करने के लिए वहां की समस्याओं को व्यक्तिगत रूप से समझना आवश्यक है फिर भी मानव संसाधन नियोजन के विषय में किये गये अध्ययन हमारी शोध समस्या को समझने में सहायक अवश्य हैं।

प्रस्तुत शोध को निम्नलिखित बिन्दुओं को आधार बनाकर विषय का विश्लेषण किया गया है। जिसका मुख्य उद्देश्य है कि प्रतापगढ़ जनपद की कुण्डा तहसील के

सामाजिक, आर्थिक विकास एवं मानव संसाधन नियोजन हेतु मुख्य बिन्दु इस प्रकार हैं :

1. तीव्र जनसंख्या वृद्धि की समस्या (बढ़ता घनत्व, लिंगानुपात में कमी, आदि)।
2. साक्षरता की समस्या (पर्याप्त शिक्षण संस्थाओं का अभाव)।
3. स्वास्थ्य बेरोजगारी और गरीबी की समस्या।

शोध विधि तन्त्र

प्रस्तुत शोध पत्र मुख्यतः द्वितीयक आंकड़ों पर आधारित है जो "Socio-economic Review", District Statistical Abstract से और जिला ग्राम विकास संसाधन संगठन (DRDA) से एवं जिला परिषद की वार्षिक सूची (1991 से 2011) तक का तथा सम्पूर्ण मानव विकास सूचकांक (HDI) से तथा कुछ आंकड़े तहसील स्तर से भी प्राप्त किये गये हैं।

मानव विकास को मानव विकास सूचकांक (Human Development Index, HDI) के रूप में मापा जाता है, इसे मानव विकास की आधारभूत उपलब्धियों पर निर्धारित एक साधारण सम्मिश्रित सूचकांक (Composite Indicator) के रूप में मापा जाता है और विभिन्न देशों द्वारा स्वास्थ्य, शिक्षा तथा संसाधनों तक पहुँचा कर क्षेत्र में की गई उन्नति के आधार पर उन्हें श्रेणी (Rank) प्रदान करता है।

यह श्रेणी 0 से 1 तक के बीच के स्कोर पर आधारित होता है, जो एक देश मानव विकास के महत्वपूर्ण सूचकों द्वारा अपने रिर्का को प्राप्त करता है। मानव विकास सूचकांक (WNDP) द्वारा मापा जाता है। स्वास्थ्य, शिक्षा, संसाधनों तक पहुँच को मानव विकास सूचकांक (WNDP) द्वारा मापा जाता है।

- स्वास्थ्य के सूचकांक को निश्चित करने के लिए जन्म के समय जीवन–प्रत्याशा को चुना गया है। इसका अर्थ है कि लोगों को लम्बा एवं स्वस्थ जीवन व्यतीत करने का अवसर है, जितनी उच्च जीवन–प्रत्याशा होगी, उतनी ही अधिक विकास सूचकांक (HDI) होगा।
- यहाँ पर शिक्षा का अभिप्राय प्रौढ़ साक्षरता दर एवं सकल नामांकन अनुपात से है, इसका अर्थ है कि पढ़ और लिख सकने वाले वयस्कों की संख्या तथा विद्यालयों में नामांकित बच्चों की संख्या अधिक होने से सूचकांक (Index) में वृद्धि होती है।
- गरीबी, बेरोजगारी, मानव विकास सूचकांक (HDI) से सम्बन्धित है और मानव में कमियों को मापता है। इनमें कई पक्षों को सम्मिलित किया गया है यथा–40 वर्ष से कम आयु तक जीवित न रह पाने की संभावना (Feasibility) प्रौढ़ निरक्षरता दर (Adult Illiteracy Rate) स्वच्छ जल तक पहुँच न रखने वाले लोगों की संख्या और अल्पभार वाले छोटे बच्चों की संख्या, आदि। मानव विकास सूचकांक इन पैमानों द्वारा संयुक्त अवकलन करके मानव विकास की यथार्थ स्थिति प्रस्तुत करता है।

परिणाम एवं विश्लेषण

मानव संसाधनों का केन्द्रीय बिन्दु है, क्योंकि यह एक साथ संसाधन, उपभोक्ता और संसाधन विनाशक है। अपनी शिक्षा और ज्ञान और तकनीकी से मानव संसाधनों की खोज का उपयोग करता है और जाने–अन्जाने संसाधनों को क्षति पहुँचाता है। वर्तमान क्षेत्र का स्वरूप निर्धारण करता है, जिसमें जनसंख्या वृद्धि, लिंगानुपात में कमी, साक्षरता, बेरोजगारी, स्वास्थ्य, गरीबी, आदि प्रमुख हैं।

जनसंख्या वृद्धि

शोध क्षेत्र प्रदेश का समस्याग्रस्त एवं अल्पविकसित क्षेत्र है। तहसील में जनसंख्या की समस्याएं परस्पर सम्बन्धित हैं। सभी समस्याओं की जड़ में जनसंख्या वृद्धि निहित है, जो प्रत्यक्ष एवं परोक्ष रूप से अन्य समस्याओं को प्रभावित करती हैं। सारणी 01 से स्पष्ट है कि तहसील में वर्ष 1911 की तुलना में जनसंख्या का घनत्व प्रतिवर्ग किमी0 सत्र 2011 में प्रत्येक विकास खण्ड में अधिक बढ़ा है।

लिंगानुपात

जनसंख्या की वृद्धि तथा सामाजिक सांस्कृतिक संरचना के ज्ञान हेतु स्त्री पुरूष अनुपात का अध्ययन

सारणी 01 : तहसील में विकास खण्ड क्षेत्रफल कुल जनसंख्या तथा जनसंख्या घनत्व वर्ष 1991–2011

विकास खण्ड	क्षेत्रफल वर्ग किमी0	जनसंख्या	जनसंख्या का घनत्व प्रतिवर्ग किमी0
वर्ष–1991			
कालाकांकर	180.19	1,05,064	583
कुण्डा	242.99	1,26,948	522
बाबागंज	278.70	1,69,265	607
बिहार	266.04	1,54,451	587
वर्ष–2001			
कालाकांकर	181.43	1,28,363	708
कुण्डा	249.63	1,59,210	638
बाबागंज	285.16	2,15,486	756
बिहार	274.91	1,97,000	717
वर्ष–2011			
कालाकांकर	180.19	1,55,062	853
कुण्डा	242.99	2,01,591	707
बाबागंज	278.70	2,71,370	1089
बिहार	266.04	2,45,127	892

स्रोत : अर्थ एवं संख्या अधिकारी, कार्यालय प्रतापगढ़–2008

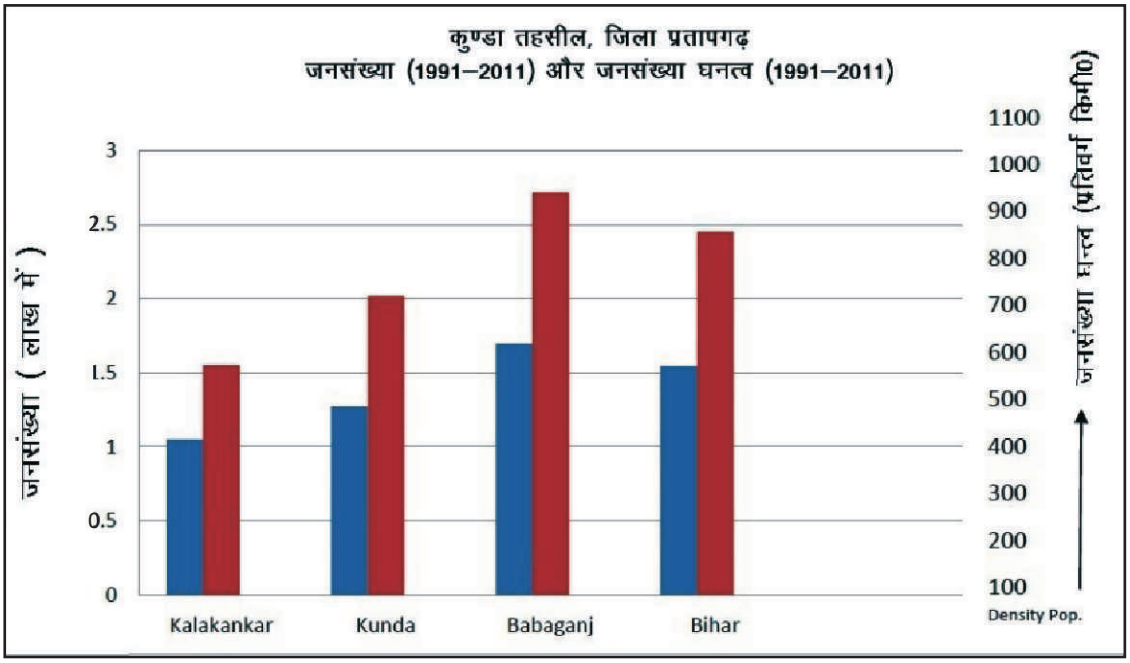
कुण्डा तहसील, जिला प्रतापगढ़
जनसंख्या (1991–2011) और जनसंख्या घनत्व (1991–2011)
जनसंख्या (लाख में)
जनसंख्या घनत्व (प्रतिवर्ग किमी0)
3
2.5
2
1.5
1
0.5
0
1100
1000
900
800
700
600
500
400
300
200
100
Density Pop.
Kalakankar
Kunda
Babaganj
Bihar

Fig. 02

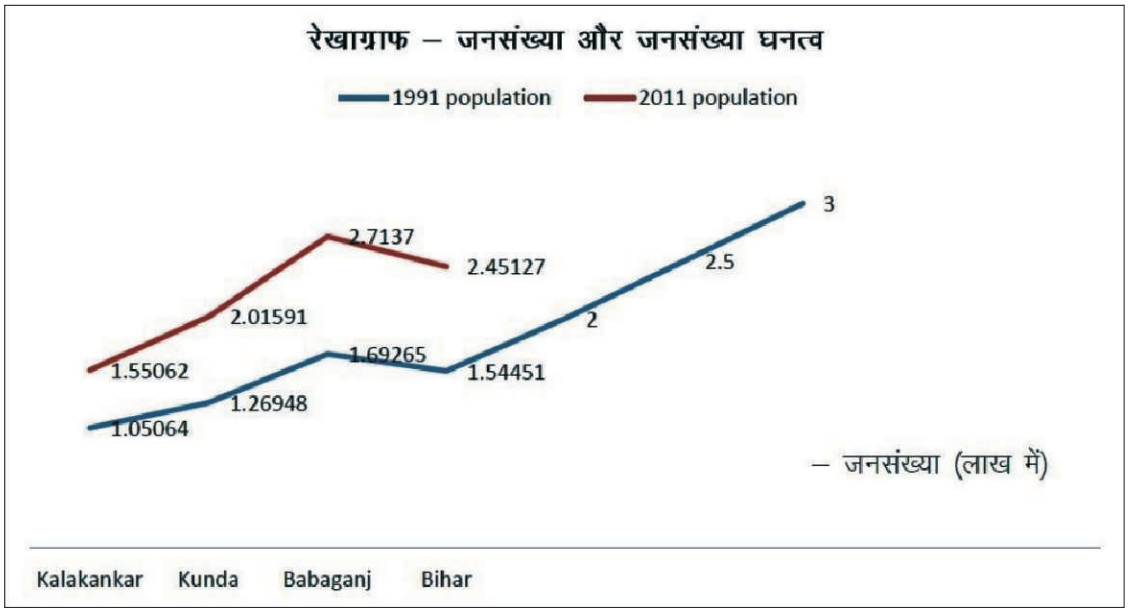
रेखाग्राफ – जनसंख्या और जनसंख्या घनत्व
1991 population
2011 population
1.55062
2.01591
2.7137
2.45127
1.05064
1.26948
1.69265
1.54451
2
2.5
3
– जनसंख्या (लाख में)
Kalakankar
Kunda
Babaganj
Bihar

Fig. 02

आवश्यक है। वास्तव में स्त्री–पुरूष अनुपात किसी क्षेत्र विशेष में प्रचलित सामाजिक–आर्थिक दशाओं का सूचक होता है एवं क्षेत्र विश्लेषण का एक महत्वपूर्ण उपकरण है। स्त्री–पुरूष अनुपात का प्रभाव जनसंख्या वृद्धि, विवाह दर, व्यवसायिक संरचना, आदि जननांगकीय तत्वों पर प्रगाढ़ रूप से पड़ता है तथा लिंगानुपात का ज्ञान, रोजगार एवं उपभोग प्रतिरूप, सामाजिक आवश्यकताओं एवं किसी समुदाय की मनौवैज्ञानिक विशेषताओं को समझने में सहायक सिद्ध होता है। क्षेत्रीय आधार पर स्त्री–पुरूष अनुपात में पायी जाने वाली विभिन्नता ''सामाजिक–आर्थिक प्रगति'' में असंतुलन का कारण बनती है, फलतः यह एक सूचक भी है।

सारणी 02 से स्पष्ट है कि तहसील में दशकीय जनसंख्या वृद्धि हुई है परन्तु विकास खण्ड कालाकांकर, कुण्डा तथा बाबागंज में प्रति हजार पुरूषों पर स्त्रियों का अनुपात बढ़ा है, वहीं विकास खण्ड बिहार में घटकर 1,032 से 1,009 पर आ गया। इन तथ्यों से स्पष्ट होता है कि

सारणी 02 : तहसील में स्त्री–पुरूष अनुपात 1991–2011

विकास खण्ड	सम्पूर्ण जनसंख्या	पुरूष जनसंख्या	पुरूष जन्म में % वृद्धि	स्त्री जनसंख्या	स्त्री जन्म में % वृद्धि	प्रतिहजार पु0 के अनुपात में स्त्री की सं.
वर्ष–1991						
कालाकांकर	105064	54319	51.70	50745	48.29	934
कुण्डा	126948	62952	49.58	63996	50.41	1016
बाबागंज	197436	100448	50.87	96988	49.12	965
बिहार	154451	75976	49.19	78475	58.80	1032
वर्ष–2001						
कालाकांकर	128363	65075	50.70	63288	49.30	972
कुण्डा	159210	78849	46.53	80361	50.47	1019
बाबागंज	215486	109024	50.59	106462	46.40	976
बिहार	197000	98034	49.79	98966	50.24	1009
वर्ष–2011						
कालाकांकर	155062	78610	50.69	76452	49.30	973
कुण्डा	201591	99838	49.52	101753	50.47	1019
बाबागंज	271370	137501	50.59	134269	49.40	976
बिहार	245127	121983	49.76	123144	50.23	1009

स्रोत– जिला सांख्यिकीय पत्रिका, प्रतापगढ़–2018

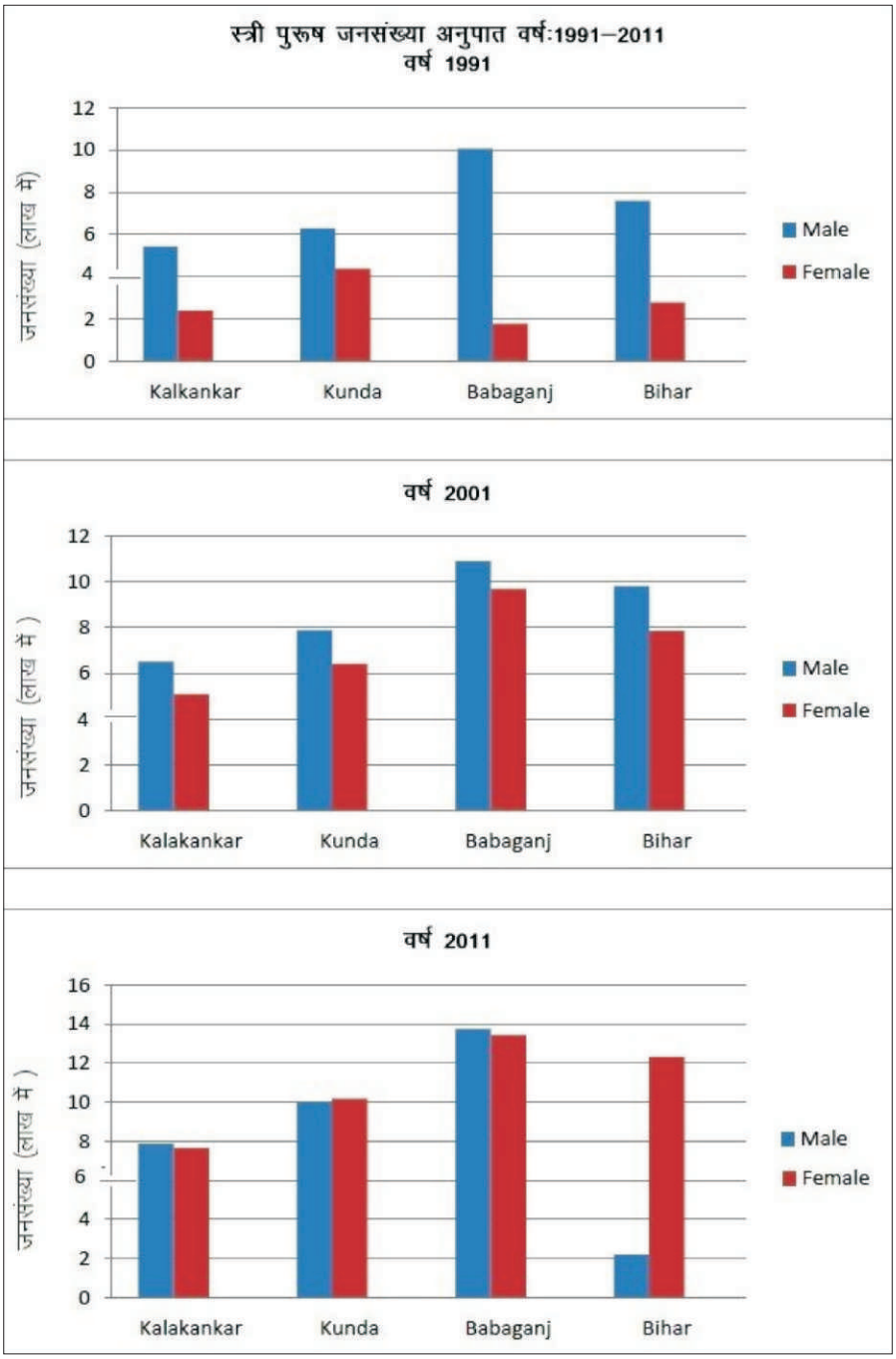
स्त्री पुरूष जनसंख्या अनुपात वर्ष:1991–2011
वर्ष 1991
जनसंख्या (लाख में)
12
10
8
6
4
2
0
Kalkankar
Kunda
Babaganj
Bihar
Male
Female
वर्ष 2001
जनसंख्या (लाख में)
12
10
8
6
4
2
0
Kalakankar
Kunda
Babaganj
Bihar
Male
Female
वर्ष 2011
जनसंख्या (लाख में)
16
14
12
10
8
6
4
2
0
Kalakankar
Kunda
Babaganj
Bihar
Male
Female

Fig. 03

साक्षरता

मानव संसाधन राष्ट्रीय निधि का एक महत्वपूर्ण आधार है। मानवीय कुशलता एवं ज्ञान के विकास हेतु साक्षरता एक अनिवार्य तत्व है। शिक्षा के स्तर से ही किसी क्षेत्र की जनसंख्या के वास्तविक गुणों के सम्बन्ध में ज्ञान होता है, साक्षरता की कमी किसी भी क्षेत्र **''सामाजिक विकास, आर्थिक प्रगति एवं राजनैतिक परिपक्वता''** पर अवरोध उत्पन्न करती है। आर्थिक विकास में निम्न साक्षरता दर हमेशा बाधक रही है। अतः साक्षरता **''समग्र विकास''** के मापन के रूप में है। असाक्षर मनुष्य विविध प्रकार के संसाधनों की वृद्धि एवं उनका समुचित उपयोग करने में असमर्थ होता है, जबकि आज के वैज्ञानिक एवं तकनीकी युग में शिक्षा मानव के आत्म निर्भर बनाने के साथ–साथ आर्थिक प्रगति हेतु आवश्यक एवं आने वाले भविष्य का निर्णायक है। जनसंख्या वृद्धि एवं कृषित भूमि के ह्रास से उत्पन्न आर्थिक समस्याओं का निदान तकनीकी शिक्षा द्वारा संभव है। अतः तहसील की अधिकांश जनसंख्या जहाँ कृषि कार्य में संलग्न है, वहाँ कृषकों की प्रगति एवं भूमि संसाधनों को विकसित करके ''खाद्यानों को आत्मनिर्भरता'' हेतु शिक्षा का वास्तविक आधार व्यवसायिक एवं तकनीकी होना अति आवश्यक है। शोध क्षेत्र कुण्डा तहसील में वर्ष 1991 में साक्षरता का प्रतिशत 33.06 था, वर्ष 2011 में यह बढ़कर 67.12 प्रतिशत हो गया। साक्षरता का प्रतिशत विभिन्न प्रयासों के माध्यम से बढ़ा तो है परन्तु यह न्यूनतम है जिसका मुख्य कारण है पर्याप्त शिक्षण संस्थाओं का अभाव तथा स्त्री शिक्षण में कमी जो कि सभी अन्य समस्याओं का मूल है। जैसे–बेरोजगारी, प्राथमिक कर्मकारों का अधिकार, स्वास्थ्य सेवाओं का अधिकार, स्वास्थ्य सेवाओं की कमी, पौष्टिक भोजन तथा गरीबी की समस्या, आदि।

सारणी 03 : तहसील में स्त्री–पुरूष साक्षरता तथा साक्षरता का प्रतिशत वर्ष–2011

विकास खण्ड	साक्षर व्यक्ति			साक्षरता का प्रतिशत		
	पुरूष	स्त्री	कुल जनसं0	पुरूष	स्त्री	कुल जनसं0
कालाकांकर	59924	44350	104078	76.23	58.01	67.12
कुण्डा	77185	59139	138574	77.31	58.12	68.14
बाबागंज	107003	76393	181488	77.82	56.90	66.78
बिहार	95293	64269	161367	78.12	52.19	65.83

स्रोत–जिला सांख्यिकी पत्रिका, प्रतापगढ़–2018

परिणाम

मानव स्वयं एक संसाधन है। वह अपनी आवश्यकता की पूर्ति एवं कठिनाइयों के निवारण हेतु सभी पदार्थों एवं वस्तुओं को अपने ज्ञान–विज्ञान, प्रोद्योगिकी एवं निपुणता के साथ संसाधन बना लेता है इसलिए संसाधनों की दृष्टि में मानव का स्थान सर्वोपरि है। मानव के अभाव में पृथ्वी पर संसाधनों की कल्पना नहीं की जा सकती है, क्योंकि मानवीय ज्ञान ही सर्वोपरि संसाधन है। अतः मानव आदि संसाधन होते हुए अन्य संसाधनों का जनक एवं उपभोक्ता है। मानव की बौद्धिक कुशलता के माध्यम से

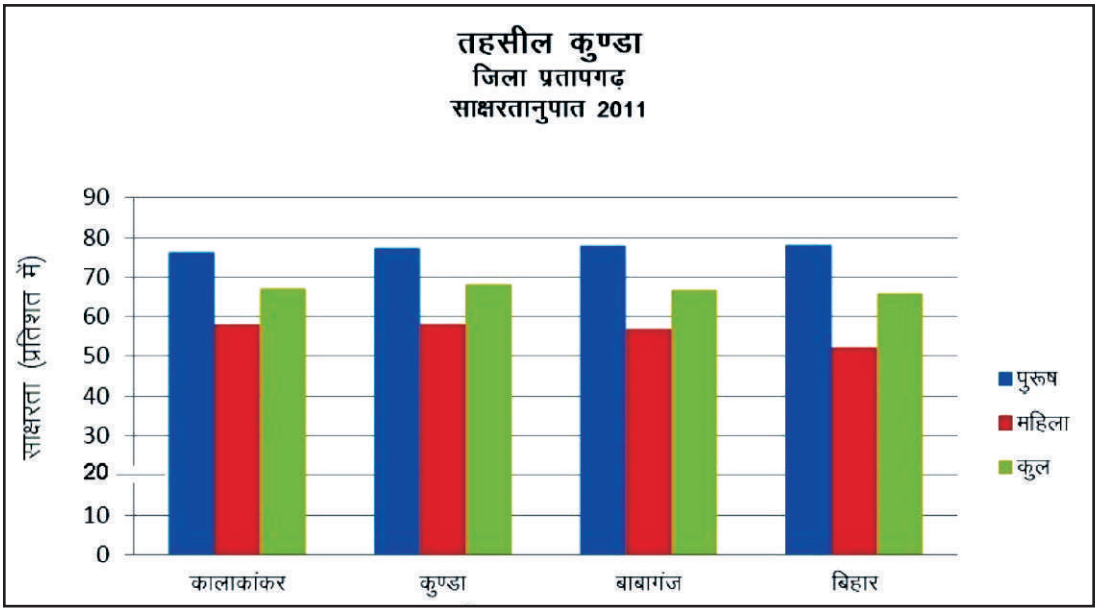

Fig. 04

विश्व की अनेक वस्तुएं जिनका अस्तित्व संसाधन के रूप में नहीं था। संसाधन के अन्तर्गत सम्मिलित होती गयी, उनकी संसाधन में वृद्धि हो रही है। किसी क्षेत्र की जनसंख्या तथा संसाधन के मध्य सम्बन्ध वहाँ उत्पादित खाद्यान्नों की मात्रा एवं आपूर्ति तथा लोगों के जीवन स्तर में परिलक्षित होती हैं। मानव की संसाधनता में क्षेत्रीय विविधता मिलती है, जिसके आधार पर विभिन्न स्तर पर **''संसाधन प्रदेशों''** का जन्म होता है, इस प्रकार क्षेत्रीय विकास संसाधन के समुचित उपयोग पर आधारित है। अतः **''मानव संसाधन नियोजन''** समुचित क्षेत्रीय विकास के लिए आवश्यक है।

मानव संसाधन शोध क्षेत्र का प्रमुख संसाधन है, परन्तु अधिक जनसंख्या के कारण यह समस्या के रूप में परिवर्तित होता जा रहा है, इसलिए **''मानव संसाधन नियोजन एवं संरक्षण''** के विभिन्न उपाय परस्पर सम्बन्धित हैं जो कि शोध क्षेत्र के सभी विकास खण्ड में लागू होता है।

- व्याप्त तीव्र जनसंख्या वृद्धि को रोकने हेतु परिवार नियोजन के प्रभावी बनाया जाय।
- लिंग अनुपात की समस्या के निदान के लिए शिशु लिंग परीक्षण पर पूरी तरह प्रतिबन्ध लगाया जाय।
- कृषि योग्य बंजर, ऊसर एवं परती भूमि को कृषि कार्यों हेतु उपयोग में लाया जाता है।
- सभी को शिक्षा के लिए प्रौढ़ शिक्षा में शिशु शिक्षा में आयी, अनियमितता व भ्रष्टाचार को रोका जाय एवं प्रौढ़ शिक्षा को अनिवार्य बनाया जाय।
- तहसील में बालक–बालिकाओं के विद्यालयों की कमी को दूर करने के लिए पर्याप्त विद्यालय खोले जाए तथा तकनीकी शिक्षा को विशेष महत्व दिया जाय।
- बेरोजगारी की समस्या के लिए लघु–उद्योगों को अधिक विकसित किया जाय।
- स्वास्थ्य हेतु जनसंख्या वृद्धि को ध्यान में रखते हुए चिकित्सालय एवं स्वास्थ्य केन्द्रों में व्याप्त

आवश्यकताओं को दूर किया जाय।

- तहसील के पिछड़े तथा ग्रामीण भागों में भोजन की पौष्टिकता को बनाये रखने के उपाय बतायें तथा दालों के उत्पादन को प्रोत्साहित किया जाय।
- तहसील में लोगों को सफाई स्वास्थ्य शिक्षा इनके व्यावहारिक महत्व को बताने वाले सामयिक कार्यक्रम चलाए जायें, जिससे उनमें गुणात्मक सुधार हो।

निष्कर्ष

शोध क्षेत्र में सामाजिक–आर्थिक विकास हेतु मानव संसाधन विकास के लिए लघु और प्रादेशिक स्तर पर विभिन्न योजनाएं चलायी जा रही हैं, जिसमें **सामाजिक–आर्थिक एवं स्थानिक असमानताओं तथा गरीबी** दूर करने की बात की गयी है किन्तु इसमें संसाधन उपयोग और वातावरण प्रबन्धन को समुचित स्थान दिया गया है। सामाजिक–आर्थिक समस्याएं सिर्फ असमानताओं, गरीबी, संसाधनों के समुचित उपयोग से सम्बन्धित नहीं है वरन् निम्न कृषि उत्पादकता, स्थिर या घटती कृषि उत्पादकता, कुछ क्षेत्रों में संसाधनों (भूमि, जल, वन, खनिज) की कमी, स्वास्थ्य सुविधाओं का अभाव, कुटीर उद्योग, रोजगार के अवसरों में कमी भी कई समस्याओं के मूल में हैं।

सामाजिक–आर्थिक विकास की संकल्पना को संसाधन क्षेत्रों की विकास योजना के रूप में परिभाषित किया जा सकता है, जिसके अन्तर्गत सिंचाई की सुविधाओं में वृद्धि विद्युतीकरण, कृषि हेतु उन्नत तकनीकी इत्यादि पर सिर्फ विशेष ध्यान दिया जाना चाहिए। सामाजिक–आर्थिक विकास एक प्रक्रिया है, जिसका उद्देश्य नगरीय क्षेत्रों के बाहर रहने वाले व्यक्तियों का कल्याण, ग्रामीण और नगरीय क्षेत्रों के मध्य होने वाले **''अग्रगामी एवं पश्चगामी अन्तर्सम्बन्ध''** के माध्यम से करना है।

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गलवान घाटी विवाद के विशेष संदर्भ में भारत–चीन सम्बन्धों का विश्लेषणात्मक अध्ययन

अजय कुमार सिंह एवं संध्या सिंह

शोध सारांश

लद्दाख प्रान्त में गलवान नदी के पास की पहाड़ियों के बीच स्थित क्षेत्र को गलवान घाटी के नाम से जाना जाता है। उक्त क्षेत्र भारत एवं चीन के मध्य विवाद व संघर्ष का केन्द्र बना हुआ है। गलवान घाटी की भू–सामरिक एवं भू–राजनीतिक विशिष्टता के कारण चीन भारतीय सुरक्षा के समक्ष नित नई समस्याएँ उत्पन्न कर उसे बलपूर्वक हथियाने की कुचेष्टा कर रहा है। यह बात सर्वविदित है कि भारत–चीन के रिश्ते 1962 से ही नाजुक दौर में हैं। 1962 के जंग में भारत की पराजय हुई। कालान्तर में 1965 एवं 1975 में भी दोनों देशों के बीच हिंसक झड़पें हुईं। इन तारीखों के बाद जून 2017 में डोकलाम विवाद एवं 15–16 जून, 2020 की रात गलवान घाटी में एल0ए0सी0 पर भारत व चीन के सुरक्षा बलों के मध्य हुई इस झड़प में भारतीय सेना के एक कर्नल सहित 20 जवान शहीद हुए। इससे दोनों देशों के बीच तनाव और बढ़ गया। दोनों देश अपने इलाके में अतिक्रमण करने का एक–दूसरे पर आरोप लगा रहे हैं। यद्यपि दोनों देशों के प्रतिनिधियों द्वारा इसके समाधान हेतु विभिन्न स्तरों पर द्विपक्षीय वार्ता निरन्तर जारी है लेकिन आवश्यकता इस बात की है कि भारत को अपने राष्ट्रीय हितों को दृष्टिगत रखते हुए, चीन के साथ सीमा विवाद को सुलझाने के लिए एक मुश्त समझौते की पृष्ठभूमि तैयार करनी चाहिए जिससे सभी मुद्दे स्वतः हल हो जाएँ।

प्रस्तावना

भारत और चीन वर्तमान विश्व की दो उभरती हुई महाशक्तियाँ हैं। इनके मध्य लगभग चार हजार किलोमीटर लम्बी सीमा रेखा है। विगत वर्ष जहाँ सम्पूर्ण विश्व कोविड–19 जैसी वैश्विक आपदा का सामना कर रहा था वहीं दूसरी ओर गलवान घाटी में मई 2020 में चीनी घुसपैठ से राजनैतिक, कूटनीतिक और सैन्य विशेषज्ञ सभी हैरान थे। यद्यपि भारत के साथ सरहद पर बीजिंग की ये हरकतें अपवाद नहीं हैं।

शायद चीनी आज भी प्राचीन काल के अपने जनरल सुनत्जू की रणनीति पर चल रहे हैं कि "हर युद्ध छलावे पर आधारित होता है।" 15/16 जून, 2020 की रात पी0एल0ए0 द्वारा मध्य युगीन बर्बरता के साथ नुकीले कील लगे डंडे, पत्थरों से भारतीय सेना के ऊपर जानलेवा हमला किया गया। उल्लेखनीय है कि यह घटना दोनों तरफ के कमाण्डरों की बातचीत में पीछे हटने पर रजामंदी के बावजूद हुई। इस घटना की और कई वजहें बताई जा रही हैं। भारतीय सेना ने लद्दाख जैसे दूर–दराज के इलाके में सड़कें और पुल बनाये हैं। इससे दूसरी ओर निगाहें टेढ़ी हो गईं। यह माना जा रहा है कि चीन की एकमात्र महाशक्ति बनने की ख्वाहिश काफी पुरानी है, जिस पर वह लगातार बढ़ रहा है।

उद्देश्य

प्रस्तुत शोध का उद्देश्य गलवान घाटी के भू–राजनीतिक एवं भू–स्त्रातेजिक महत्व को दृष्टिगत रखते हुए भारत व चीन के मध्य विद्यमान सीमा सम्बन्धी मुद्दों एवं सीमावर्ती क्षेत्रों में भू–भाग सम्बन्धी दावों से उत्पन्न समस्याओं तथा भारत–चीन सम्बन्धों का विश्लेषणात्मक अध्ययन करना है।

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विधि तंत्र

प्रस्तुत अध्ययन क्षेत्र के भू–राजनीतिक एवं भू–स्त्रातेजिक महत्व से संबंधित जानकारी द्वितीयक आकड़ों एवं स्त्रोतों – राष्ट्रीय एवं अन्तर्राष्ट्रीय प्रकाशनों से प्रकाशित पत्र–पत्रिकाओं एवं लेखों, आदि से प्राप्त किये गये हैं।

लद्दाख की भौगोलिक स्थिति

लद्दाख भारत का एक केन्द्र शासित प्रदेश है। लद्दाख का क्षेत्रफल 97,776 वर्ग किलोमीटर है इसके उत्तर में चीन तथा पूर्व में तिब्बत की सीमाएँ हैं। सीमावर्ती स्थिति के कारण सामरिक दृष्टि से इसका बड़ा महत्व है। लद्दाख जम्मू–कश्मीर राज्य के पूर्व में स्थित एक ऊँचा पठार है। यह हिमालय और काराकोरम पर्वत श्रृंखला और सिन्धु नदी की ऊपरी घाटी में फैला है। सिन्धु नदी लद्दाख की जीवन रेखा है। लद्दाख के ज्यादातर ऐतिहासिक और वर्तमान स्थान सिन्धु किनारे ही बसे हैं। लद्दाख में 857 वर्ग किलोमीटर लंबी सीमा में से केवल 368 वर्ग किलोमीटर अन्तर्राष्ट्रीय सीमा है और शेष 489 वर्ग किलोमीटर वास्तविक नियंत्रण रेखा है।

गलवान घाटी की अवस्थिति

गलवान घाटी की खोज यूरोपीय खोजकर्ताओं के सहायक भारतीय मूल के गुलाम रसूल गलवान द्वारा की गयी। रसूल गलवान अपनी पुस्तक 'सवेन्ट ऑफ साहिब्स' में लिखा है कि वह कर्रा गलवान का पुत्र है। जो कि इस पुस्तक के अनुसार काले डकैत होते थे। कर्रा गलवान धनी डोंगरा राजाओं को लूटता था और अपने लोगों की मदद और रक्षा करता था। वह अपने समुदाय का मसीहा था। अंततः डोंगरा राजाओं ने कर्रा गलवान को मरवा डाला और इनका परिवार लेह में स्थायी रूप से बस गया। गलवान के नाम पर ही गलवान घाटी का नाम पड़ा। इस घाटी की सीमायें पश्चिम में भारतीय लद्दाख प्रान्त तथा पूर्व में चीन अधिकृत अक्साई चिन तक फैली हुई हैं जिस पर चीन ने अवैध रूप से कब्जा जमा रखा है। लगभग 80 किलोमीटर लम्बी गलवान नदी कराकोरम पर्वत श्रृंखला के अन्तर्गत अक्साई चिन में स्थित अपने उद्गम स्थल से निकलकर भारतीय लद्दाख प्रान्त के पूर्वी भाग से गुजरते हुए श्योक नदी में आकर मिल जाती है। गलवान घाटी का पूर्वी हिस्सा चीन के सिक्यांग तिब्बत राजमार्ग के बेहद करीब है तथा व्यापक रूप से सियाचीन ग्लेशियर से लगा हुआ है। इन्हीं सामरिक विशेषताओं के कारण चीन भी गलवान घाटी को अपने नियंत्रण में लेना चाहता है।

चीन–तिब्बत विवाद एवं भारत

भारत के हिमालयी क्षेत्र में चीन की तिब्बत के प्रति अपनाई जा रही आक्रामक गतिविधियों से चिंतित भारत सरकार ने अपने उत्तरी सीमान्त की सुरक्षा को ध्यान में रखकर जून, 1949 में सिक्किम व अगस्त 1949 में भूटान के साथ संधि सम्पन्न करके उनकी सुरक्षा का दायित्व स्वयं ले लिया तथा नवम्बर 1950 में नेपाल के साथ मैत्री–संधि करके चीन द्वारा उत्पन्न संभावित खतरों के विरुद्ध उत्तरी सीमान्त की अपनी सुरक्षा सुदृढ़ करने की कोशिश की। उधर चीन द्वारा की जा रही आक्रामक गतिविधियों के विरुद्ध तिब्बत ने भारत, अमेरिका, ब्रिटेन व नेपाल, आदि देशों में मिशन भेजने का प्रयत्न तो किया परन्तु चीन ने, इसे गैर कानूनी व चीन विरोधी गतिविधि मानकर सभी को इससे दूर रहने की सलाह दी।[1]

तिब्बत पर चीनी आक्रामक अभियान की पृष्ठभूमि में अन्तर्राष्ट्रीय सहयोग न मिल पाने के पश्चात अंततः चीन व तिब्बत के मध्य 17 सूत्रीय समझौता 23 मई, 1951 को सम्पन्न हुआ जिसमें तिब्बत के चीन में विलय की मान्यता दे दी परन्तु इस तथाकथित समझौते को दलाईलामा की तिब्बत सरकार अवैधानिक व षडयंत्र करार देती है, मान्यता है कि जिस प्रतिनिधि मंडल के साथ चीन ने समझौता किया उसके पास ऐसा अधिकार नहीं था। उक्त तथाकथित समझौते की आड़ में चीन की सेनाओं ने विभिन्न दिशाओं से तिब्बत में प्रवेश करके न केवल अपना नियंत्रण स्थापित कर लिया अपितु चीनी परिवारों को तिब्बत में बसाने का सुनियोजित कार्य भी प्रारम्भ कर दिया। तिब्बत के चीन में विलय हो जाने से भारत और चीन के मध्य का एक अंतस्थ राज्य समाप्त हो गया और भारत की सीमाएँ चीन की सीमाओं से स्पर्श करने लगीं जिससे भारत–चीन के मध्य प्रत्यक्ष सीमा समस्याओं का उत्पन्न होना स्वाभाविक था।

जम्मू–कश्मीर से लद्दाख का पृथक होना

जम्मू–कश्मीर से लद्दाख के बीच की सांस्कृतिक व भौगोलिक साम्यता उनके एक ही राजनीतिक डोर में बंधे

रहने की धारणा को मजबूत बनाती है। किन्तु यह भी एक तथ्य है कि जम्मू–कश्मीर की सरकारों का लद्दाख के प्रति हमेशा उपेक्षित रुख ही रहा है जिससे इस क्षेत्र के भौतिक–सामाजिक ढ़ॉचे का विकास आशानुरूप नहीं हुआ। साथ ही चीन की सीमा से लगा हुआ क्षेत्र होने के कारण लद्दाख राष्ट्रीय सुरक्षा की दृष्टि से भी बहुत महत्व रखता है। इसके अतिरिक्त लद्दाखवासियों की भी यह वर्षों पुरानी माँग रही है कि उनके क्षेत्र को जम्मू–कश्मीर से पृथक कर एक नई इकाई के रूप में गठित किया जाए। ऐसे में जम्मू–कश्मीर से लद्दाख का पृथक किया जाना वहाँ के निवासियों की इच्छापूर्ति और भारत के सुरक्षा हितों के अनुरूप ही जान पड़ता है।[2]

चीन की दीर्घकालिक महत्वाकांक्षा

जापान को पीछे कर चीन विश्व की दूसरी बड़ी अर्थव्यवस्था बन गया है। वर्तमान विश्व में चीन का एक मात्र निर्णायक प्रतियोगी अमेरिका है। चीन की आर्थिक एवं सैन्य शक्ति निरन्तर बढ़ती जा रही है। अपने आर्थिक एवं सामाजिक हितों तथा महत्वाकांक्षाओं की पूर्ति के लिए चीन किसी भी हद तक जा सकता है।

लद्दाख में वास्तविक नियंत्रण रेखा पर पी0एल0ए0 की घुसपैठ

नव निर्मित केन्द्र शासित प्रदेश लद्दाख का पूर्वी किनारा जिसे भारत 'पश्चिमी क्षेत्र' कहता है। यहाँ भारतीय सेना चीन की पी0एल0ए0 (पीपल्स लिबरेशन आर्मी) के खिलाफ आमने–सामने डटी है। पी0एल0ए0 ने मई, 2020 में दशकों की अपनी सबसे पक्की घुसपैठों में से एक को अंजाम दिया है। चीन, पूर्वी लद्दाख में 800 किमी0 लम्बी वास्तविक नियंत्रण रेखा पर हाल के वर्षों में चीन ने सबसे बड़ी घुसपैठों में से एक को अंजाम दिया है। एल0ए0सी0 के इर्द–गिर्द विभिन्न जगहों पर डेरा डालकर बैठे चीनी सैनिकों की संख्या एक हजार से ज्यादा हो सकती है और उनके पीछे फौजी दस्ते, बख्तरबंद और तोपखाने भी हो सकते हैं। लगभग उतनी ही तादात में भारतीय सैनिक भी आमने–सामने डटे हुए हैं।[3]

सरकारी अफसर मानते हैं कि यह चीनी घुसपैठ 5 अगस्त 2019 को जम्मू कश्मीर और लद्दाख के दो केन्द्र शासित प्रदेशों के गठन का सीधा नतीजा है। इस समीकरण में लद्दाख, खासकर भू–क्षेत्र का वह तिकोना टुकड़ा जिससे भारतीय सेना 'सब सेक्टर नार्थ' कहती है बेहद अहम् हो जाता है। यह पाकिस्तान के कब्जे वाले गिलगित बाल्टिस्तान और अक्साई चिन–यानि लद्दाख के धुर पूर्वी किनारे के बंजर के बीच है। विश्लेषकों का कहना है कि चीनी घुसपैठ भारत को विचलित और असंतुलित करने की कहीं ज्यादा बड़ी रणनीति का हिस्सा है, वह भी उस इलाके में जिसकी भू–रणनीतिक अहमियत बढ़ना तय है, क्योंकि सरकार यहा अपने हवाई और सड़क बुनियादी ढॉचे का विस्तार कर रही है, जिसके बूते सैन्य टुकड़ियाँ अब तक पहुॅच से बाहर रहे सरहदी इलाकों में भी गश्त कर सकेगी।[4]

किर्गिजस्तान में भारत के पूर्व राजदूत पी0 स्तोब्दन आगाह करते हैं कि "लद्दाख भारत के लिए लक्ष्मण रेखा है। हम यहां चीनियों को आने देना गंवारा नहीं कर सकते। वे यहां आ गए तो वे ऐसे इलाके में दाखिल हो जाएंगे जो तीन नदियों – श्योक, गलवान और चंग चेन्मो की बदौलत पानी से भरपूर इलाका है।" स्तोब्दन जैसे विश्लेषकों का मानना है कि जम्मू–कश्मीर के बंटवारे से भू–राजनैतिक स्थितियाँ बदल गई हैं। भारत ने अपने दावे पर खुलकर आवाज उठाई है। वे कहते हैं कि "जब तक लद्दाख जम्मू–कश्मीर का हिस्सा था, तब तक चीन खास तवज्जो नहीं दे रहा था। 5 अगस्त, 2019 को 370 के निरस्त होने के बाद चीनी कह रहे हैं कि अब लद्दाख एक अलग इकाई है और हमारी उसमें हिस्सेदारी है। इससे पहले कि भारत अक्साई चिन का अन्तर्राष्ट्रीयकरण करे, चीन कुछ कदम उठाना चाहता है।"[5]

भारत के विकल्प

भारतीय राजनयक के लिए वर्तमान स्थिति एक नाजुक और जोखिम भरी चुनौती है। चीनी सेना के आधुनिकीकरण और रह–रहकर उकसाने की गतिविधियाँ भारत के लिए चुनौती पेश करती हैं। उसे कम करके नहीं आँकना चाहिए। हमें चुनौती को स्वीकार करना चाहिए। भारत को अनुसंधान एवं विकास विशेष पर ध्यान देकर अपने गुणात्मक उत्पाद को बढ़ाना होगा। अमेरिका अब भारत को अपने सबसे करीबी देशों में मानता है जिसका लाभ उठाना चाहिए। भारत को जापान, ताइवान, वियतनाम, दक्षिण

कोरिया, आस्ट्रेलिया और अन्य क्षेत्रीय देशों से रिश्ते भी सुधारने चाहिए। जिस प्रकार चीन, पाकिस्तान को नाभिकीय हथियारों की तकनीक देने से जुड़ी भारतीय चिंताओं की परवाह नहीं करता उसी प्रकार हमें भी दूसरे देशों से रिश्ते बनाने में चीन की प्रतिक्रियाओं को लेकर परेशान नहीं होना चाहिए। भारत को सरहद की रक्षा करनी है, मगर पूरी सावधानी से कदम उठाना है क्योंकि कई जोखिम हैं। सबसे अच्छा विकल्प कूटनीतिक है। यद्यपि जंग कितना ही छोटा हो उसमें किसी का भला नहीं है।

यदि चीन एल0ए0सी0 पर अपने आक्रामक रुख के साथ कायम रहता है तो मोदी सरकार के पास उससे निपटने के ढ़ेर सारे विकल्प उपलब्ध हैं जिनका वह इस्तेमाल कर सकती है। मोदी सरकार सैन्य बल के इस्तेमाल पर तो विश्वास करती है लेकिन केवल एल0ए0सी0 पर यथास्थिति बहाल करने के लिए। सेना का मानना है कि दोनों तरफ से जानें गईं हैं। इससे संकेत दिए गए कि संघर्ष एकतरफा नहीं रहा और भविष्य में भी सरकार उसी अनुपात में जबाबी कार्रवाई करने को मजबूर होगी। प्रधानमंत्री मोदी ने 17 जून को अपने संदेश में इस बात का संकेत भी दिया। उन्होंने शहादत देने वाले सैनिकों के लिए कहा कि "वे मारते मारते शहीद हुए हैं।"[6] देश का राजनैतिक प्रतिष्ठान सरहद पर यथास्थिति में किसी तरह के बदलाव को तैयार नहीं है और यह बात सेना को बता दी गई है। एक वरिष्ठ सैन्य योजनाकार के अनुसार भारतीय सेना के सामने तीन उद्देश्य हैं। वे कहते हैं कि, "हमारा पहला उद्देश्य उन्हें एल0ए0सी0 के साथ–साथ मई 2020 के पूर्व की स्थिति में वापस लाने और चुशुल के सामने मोल्दो सीमा पर 6 जून की बैठक में हुए समझौते का सम्मान एवं पालन करने को तैयार करना है। हमें अपनी सीमा पर बुनियादी ढॉचा निर्माण जारी रखने की आवश्यकता है और अंत में, हमें घुसपैठ की इन घटनाओं का अध्ययन करना और एल0ए0सी0 पर सतर्क रहना होगा।"[7]

उपसंहार

चीन की लद्दाख में घुसपैठ निश्चित ही भारत के लिए चिन्ताजनक है। यद्यपि भारत और चीन के बीच सीमा के प्रश्न पर आरम्भ से ही व्यापक मतभेद कायम है किन्तु दोनों पक्ष वार्ता जारी रखने के पक्ष में हैं। यदि भारत और चीन का सीमा समझौता हो जाए तो निःसंदेह अन्तर्राष्ट्रीय राजनीति पर उसका गम्भीर प्रभाव होगा और इसके व्यापक एवं दूरगामी परिणाम होंगे। भारत को चीन के साथ सीमा विवाद सुलझाने एवं रणनीतिक स्तर पर चीन को घेरने की कोशिश करनी चाहिए। ऐसे में भारत को अपनी चीन सम्बन्धी नीति पर पुनर्विचार कर नए विकल्पों की तलाश करनी चाहिए। साथ ही भारत को अपनी सैन्य तैयारियों का भी पुनर्निरीक्षण करने की आवश्यकता है।

सामरिक तौर पर भारत के लिए एल0ए0सी0 पर संतुलन और दबदबे को बहाल करना महत्वपूर्ण है। यह स्पष्ट है कि दोनों पक्ष टकराव को बढ़ाने को तैयार नहीं हैं और युद्ध तो बिल्कुल भी नहीं चाहते। भारत को चीन सीमा से लगे राज्यों में सैन्य साजो–सामान के तीव्र आवागमन में सक्षम आधारभूत संरचनाओं जैसे– सड़क, रेलवे पटरियाँ और पुल तथा हवाई पट्टियों, आदि को तेजी से विकसित करना चाहिए। इसके साथ ही भारत को तीनों सेनाओं की रक्षा आवश्यकताओं की पूर्ति के लिए आयात एवं स्वदेशी उत्पादन तंत्र को मजबूत बनाना होगा। बहरहाल, चीन को काबू में करने के लिए भारत को कूटनीतिक सैन्य और आर्थिक विकल्पों का इस्तेमाल सोच–समझकर करना चाहिए। भारत को अपने राष्ट्रीय हितों को दृष्टिगत रखते हुए चीन के साथ सीमा विवाद को सुलझाने के लिए एकमुश्त समझौते की पृष्ठभूमि तैयार करनी चाहिए जिससे सभी मुद्दे स्वतः हल हो जाएँ।

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