Rural Infrastructure Development Level and its Constraints in Chambal-Yamuna Plain of Western Uttar Pradesh

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Abstract: The accessibility to rural-infrastructural services is strongly constraint by physiographic factors of the region. Inadequate accessibility affects the scenario for socio-economic development of a region. Hence the Level of accessibility to services is determinant of level of development of a region. In the present study the development level of Socio-economic infrastructure of the villages of the semi-arid Yamuna-Chambal plain has been analyzed. It has been observed that the expansion of gully and ravenous feature are obstructing the connectivity and development level of infrastructure here. Studied blocks are highly affected by land degradation. As a result of that undulating surface has isolated the habitats of this region. Few portion of the study area is having comparatively better infrastructure facilities. These zones are delimited with the area associated to administrative canters and expanded on arable patches. This study would help to understanding the physiographic correlates of socio-economic development of a rural area.

Keywords: Accessibility, Rural-Infrastructure, Land Degradation

1. Introduction

India's economic growth and development is predicated to a large extent upon the development of its rural area. Majority of the population lives in villages that are engaged primarily in agriculture, directly or indirectly. The importance of rural infrastructure is demonstrated by the positive influence that an increase in its stock has on the endorsement of socioeconomic growth. Its availability affects productivity and capacity to earn income, which is of concern in rural agriculture(Fakayodeet, al; 2008). It also incidentally, provides basic amenities that improve the quality of life and decline in the incidence of absolute poverty. Rural infrastructural development leads to interaction with the outside world and movement of people which results in the gradual removal of many superstitions and taboos. This, in turn, tends to weaken many of the attitudinal barriers to growth and modernity (Malenbaum 1962). Among all types of rural infrastructure; rural transport is probably the most crucial for the livelihoods of the rural poor. An inefficient transport system can act as a significant constraint on agriculture in rural areas, both by raising the costs and effectiveness of inputs in the production process and by delaying the sale of harvested crops (Shenggen; 2004)

In India Development of rural areas is slow due to improper and inadequate provision of infrastructure with compare to urban areas. Physiography and land cover affects the allocation of infrastructural services like road link, educational and economic institutions etc. 'These Services are often available in only a few settlements, but are used by a larger number of settlements, resulting in economic transaction across a greater geographical area. These spatial aspects influence access of rural population to services and affect the prospects for agricultural and economic development of a region (Wanmali and Islam, 1995). Therefore Level of accessibility to services is determinant of level of development of a region.

2. Study Area

The geographic expansion of the study area is 25° 26' 30"and 78° 26'46" to 26° 50' 58"N and 79° 18' 13"E longitude. Major streams of this area are Yamuna, Chambal and Kunwari. This area is covered by Badhpura and Chakarnagar blocks of district Etawah of Uttar Pradesh. Region is known for its sub-humid climate with extreme temperature (mean daily maximum 42°C) and rainfall condition in peak seasons of monsoon. The physiography of studied area is facing tectonic upheaval that intensifying by human interferences. These upheavals lead the encroachment of gully and ravine on alluvium of this part. The expansion of gullies and ravenous land is posing serious problems to the sustainable development of both ecological and economic environment.

3. Objectives

The objectives of this paper are to identify the socioeconomic infrastructural development level and its association with geomorphic unit of the region.

4. Methodology

4.1 Land cover classes have been identified by Supervise classification of LANDSAT-ETM images of 2000 and topographic sheets of referenced area. ERDAS Imagine and Arc GIS softwares have been used for the same.

4.2 For measuring the infrastructural development level, a composite index of various infrastructural variables has been calculated. For it variables has been weighted according to their relative importance. Than "Z" score of these values has been calculated. That is the composite values of different variables. The data is taken from PCA directory of census of India 2001. It calculated in following manner-

$z = X - \bar{x}/SD$

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5. Results and Discussion

The study area is the part of Lower Chambal Valley of Uttar Pradesh that is severely affected by gully erosion. These gullies develop along both sides of streams. It caused when run-off concentrates and flows at a velocity sufficient to detach and transport soil particles. There are three major streams in the study area that have a long series of ravenous and gullied features. The head ward erosion and soil creep action expending them on valuable fertile land. The expansion of gullies and ravenous land is posing serious problems to the socio-economic development planning.

5.1 Land Cover Scenario of the Study Area

On the bases of LANDSAT-ETM images of the region, around half of the total area is lies under degradation category (39% stable and 11% active degraded land). These Badlands sites are extended along both sides of streams of the region. In middle of the region the head ward erosion in gullies and ravines of Chambal combined themselves with degraded sites of Yamuna. Natural vegetation cover is spread over dissected sites of badlands in form of patches. It spread mainly in form of shrubs and bushes.

Very few patches have been covered by dense forest. Almost all the dense vegetation cover is spread in Stable degraded land. There are six reserved forests and two protected forest in the study area. Around 9% area of the region is covered by water bodies of three major perennial rivers (Fig 1.0 and 2.0). Yamuna and Chambal are big rivers; those are not easily navigable particularly in rainy season.

5.2 Land Degradation and Social Infrastructure Development Level

On the basis of composite index, social and economic infrastructures are having good condition in non-degraded land and area around city and block head-quarters. In the western part of the study area (Badpura block) all the villages in north of Yamuna river are showing healthy social-infrastructural level. There is district head-quarter in top middle of this block. So these villages have good accessibility to educational institutions (schools and collages) and health care facilities (PHC, Allopathic hospitals, MCW). Due to less land degradation and nearness to city, they have easy accesses to roads. The villages around junction of state highway 29 and Bah-





Sources: Computed from LANDSAT Image classification

Chakarnagar road are also having good level of social infrastructure. The similar fashion has been repeated by the villages in around Chakarnagar town, in the eastern part of the study area. Chakarnagar is block headquarter that have most of basic facilities (Upper primary school, PHC, Allopathic Hospital, MCW's canters). It is settled on the confluence of Bakewer-Sindos (North to South) and Bah-Bhareh (West to East) link-roads (Fig 3.0).

Chakarnagar-Bakewar road links it with NH 2.Therefore villages around it have good accessibility to these facilities compare to inhabitants of Far East and south east part. Few villages in *pachnada*¹ area, where left bank of Chambal have very less degraded land are also showing better social infrastructural development level.

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¹The confluence of Yamuna and Chambal up to the confluence of Sindh and Yamuna locally known as Pachnada



Figure 3



Figure 4

The southern part of Chambal River that is far from block head quarter and have intense ravine, gully erosion on its land is showing very poor condition of infrastructure. In the western part the area at the left bank of Chambal is severally affected by land degradation. On other hand these inhabitants are at far more distance from urban and administrative centres. That's why they have comparatively poor level of social infrastructure.

5.3 Land Degradation and Economic Infrastructure Development Level

There are three main clusters that have comparatively good economic infrastructure level. One is around district head quarter another one is in around Chakarnagar block headquarter and last one is mid western Yamuna-Chambal plain of Badpura block (Fig 4.0). These clusters have good arable land. The mid-western plain also has good irrigated land. Many villages of this part are also reportedly using electricity for agricultural purpose. They are directly connected with Bah-Udi road (West to East). Thus comparatively have better road connectivity. The north Yamuna plain is also having good arable land. There is limited land degradation problem. Area has better accesses to market. Irrigation facility is better than all the part of the study area.

The eastern Chambal-Yamuna plain also has good arable land with comparatively better irrigation facility. Around 65 percent villages of this belt have been reportedly using electricity for agricultural purpose. Because of nearness with block head quarter, these inhabitants also have better connectivity and accesses to economic institutions and market.

6. Conclusion

The study shows that the rural infrastructure development level is very poor in part of severely degradation affected areas. The areas around administrative centres are showing comparatively better level. It is revealed that the study area is having very weak socio-economic condition. Agriculture is not able to provide sufficient support to people depends on it. Due to heavy soil erosion in the region, villages are nether well connected with each other nor with nearest market or urban canters. Due to poor road connectivity, mobility of the people is negatively affected that resultant in low female education level, poor health status , less opportunities of market oriented jobs for these people, and unawareness and less participation in innovative government's policies for development of their region.

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