

CHANGING PATTERN OF CROP LAND - USE IN KHAGARIA DISTRICT: A GEOGRAPHICAL REVIEW

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Abstract:

Integrated land management policies to ensure the protection of our country's natural, ecological, and cultural assets as well as sustainable development of its resources are required. Creation of an "land resource inventory" is a top priority for sustainable land management. This paper seeks an answer to question how it can be achieved land management that meets national needs and expectations by adopting the principles of "Sustainability" and "Integrated Approach." At this point, the study adopts a holistic perspective as it examines the entire land asset of Khagaria, Dist- Bihar.

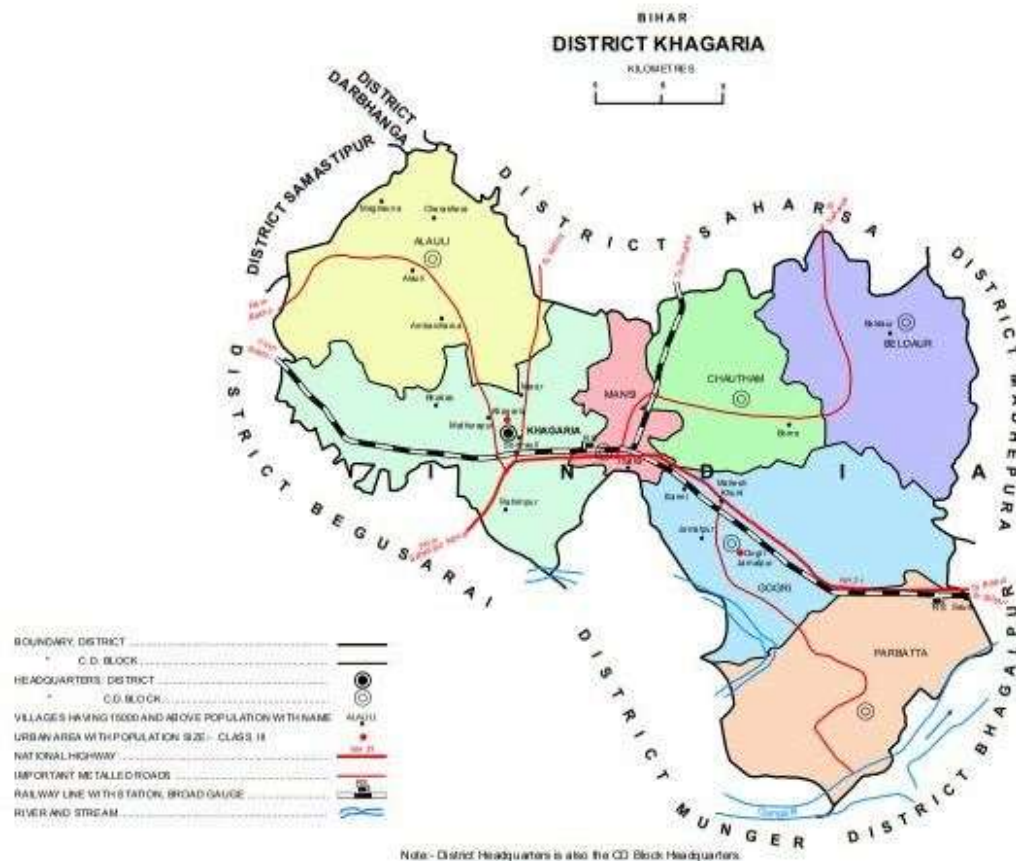
Keywords: Land Management, Agricultural Land Use, Land use Pattern, Spatial Data Infrastructure, Sustainability.

Physical Features

Khagaria district is located on global map between 25°15' and 25°44' North latitude and 86°17' and 86°52' East longitude. The district occupies an area of 1,486 square kilometers. The rank of the district in comparison to other districts of Bihar in terms of area is 32nd. The district is surrounded by Saharsa district in the north, Munger and some part of Begusarai district in the south, Madhepura and Bhagalpur district in the east, Begusarai and some part of Samastipur and Darbhanga districts in the west.

Natural divisions

The enormous tract of present Khagaria district was flat alluvial plain and marshy and swampy land before the construction of embankments on the Ganga, the Bagmati, the Burhi Gandak and the Kosi. These embankments are karachi badlaghat embankment, Badla- Nagarpara embankment, Burhi Gandak protection embankment and Gogri- Narayanpur embankment. At present, the major part of the alluvial plain consists of this district is mainly a saucer shaped



depression. The center of which was inundated during the rains by the over flow of the rivers and for the rest of the year was full of marshy hollows. The inundation has decreased after construction of embankments but still a large part in the north eastern part of the district, contained in west by Gogari-Maheshkhunt – Saharsa Road, in the north by the Koshi and in the south by the Ganga is completely inundated during rainy season except for the National Highway and the New Delhi – Gauhati Railway line .

Rivers

The most important rivers traversing the district are the Ganga, the Burhi Gandak, the Bagmati, the Kamla and the Ghaghri (the main stream of Koshi). The Ganga forms the southern boundary of the district in its entire length. This river has severe shifting tendencies resulting in a enormous tract of diara land, on the northern side and several hamlets of the present Munger district have resettled on the north of the Ganga due to erosion caused by the shifting of the river. Due to vast tract of diara land, during rainy season, at some places, the breadth of the river runs into miles. The Burhi Gandak, runs a Zig-Zag course through the district of Begusarai and enters Khagaria for a short while, running by the side of the town of Khagaria, and flows in to the 26 Ganga. It forms the western boundary of the Khagaria town and a protection embankment built along the eastern side of this river, protects Khagaria town from the floods of Burhi Gandak. The Bagmati enters the district from the western side, through the district of Begusarai. It then pursues a winding but generally easterly direction, till it flows into the Tilijuga or the Kamla near Chautham. The Tilijuga or the Kamla enters the district from Darbhanga, near Mohraghat, It then flows south east to Chautham, merges into the Bagmati, and the united stream flows into the district of Bhagalpur under the name of the Ghaghri, which is known as one of the main branches of the Koshi.

Climatic condition

In summer the climate of the district is hot and dry but winter months are quite cool and pleasant. Winter comes towards the middle of October after the rains are over. The temperature begins falling and January is the coldest month of the year with mercury falling to about 10°C. The blowing of westerly wind accompanied by dust storms about the middle of March marks the beginning of hot weather. The mercury starts shooting upward and May is the hottest month of the year when the maximum temperature goes up to 45°C. The summer continues till the end of June when the onset of rains brings the much awaited relief and the temperature falls, though the humidity is still high the rise in humidity often makes the heat only more oppressive during the rainy season which lasts till the end of September. From November to February the district has a pleasant climate. The district also gets some winter rain. Rainfall As per the data available with the Directorate of Statistics and Evaluation of the State, the average annual rainfall in the district varies between 989.5 and 1,542.2 mm during 2006-09. Maximum rainfall occurs during the month of June to September when the district receives almost 80 percent of its average total rainfall. The district receives minimum rainfall during the month of December. Weather conditions become hot and humid during the rainy season. The average number of rainy days in district varies between 38 and 50 during 2006-09. Actual Rainfall and Average No. of Rainy Days figures are as follows:- 27 Source- Directorate of Statistics and Evaluation.

Land use Pattern

Agriculture is the main occupation of the people of the district and also the main source of livelihood of the people. Rainfall still controls the agricultural economy of Khagaria district. Conditions have, however, improved to some extent to meet the situation caused by the failure of monsoon. The district is marked by the intensive cultivation of its rich uplands. Maize, paddy, wheat, oil seed and vegetables are the major crops grown in the district. As far as the land use pattern is concerned, wheat is the prominent rabi crop in the district. Due to floods and water logging, the paddy production is very low, except in the southern part. Maize is grown abundantly almost through out the district, while banana cultivation as a cash crop, has grown into prominence in last two decades. Banana cultivation is done mostly in Choutham, Gogari and Parbatta blocks.

Land Use Pattern (Khagaria)

Block Wise Land Use Of The Total Reported Area (in Hectares) 2012-13.

Sl. No.	Name of C.B.D.	Net Sown Area	Current Fallow Land	Old fallow Land	Orchards Groves	Unculturable Land	Culturable waste land	Area not available for cultivation	Pasture and grazing land	Forest	Block Total
1	Alauli	15739.27	1983.77	642.83	913.35	770.82	1198.41	2856.40	1233.31	2108.85	27447.00
2	Khagaria	14739.27	3306.26	399.61	2307.25	1241.63	637.47	123.69	1070.37	2235.89	26236.00
3	Mansi	3895.96	488.46	198.48	203.02	348.20	194.70	40.76	125.90	1066.52	7001.00
4	Chauthan	8547.33	1467.94	1030.57	541.84	660.48	423.21	906.62	734.85	2084.15	16397.00
5	Beldaur	12861.75	1169.25	2093.06	190.56	1704.33	1022.90	1304.93	1303.38	1205.84	22356.00
6	Gogri	13111.58	2867.27	1092.09	1910.07	2403.90	700.50	1144.30	820.15	981.14	25031.00

Source: - Dist. Statistical Office , Khagaria , 2012-2013

Apart from these mango and litchi orchards are abundant in this district and are found almost through out the entire area. The study of old gazetteers shows that these orchards have been in existence since long.

Irrigational facilities

Irrigation plays a very important role in agriculture. It is often said that agriculture is a gamble in the hands of monsoon. This is only because of inadequate and uncertain irrigational facilities. Crop harvest can be raised to a great extent through assured irrigation. Earlier in the district only tube-wells, surface percolation wells and diesel pumps were some of the sources through which irrigation was possible. In addition to the above now the Government is paying adequate attention to the improvement and expansion of irrigational facilities in the district through various medium and minor irrigational schemes. After independence, considerable attention has been paid to implementation of various irrigational projects. A number of Medium Irrigation schemes, Minor Irrigation schemes, Open borings, irrigation wells and tube wells have been introduced in the district during the different plan periods. The government has tried to create irrigation facilities through state tube wells and lift irrigation schemes. There are around 150 state tube wells and 20 lift irrigation schemes but 75 percent of the tube wells and 80 percent of the lift irrigation schemes are non functional because of poor maintenance. Despite the abundance of rivers in the district, there does not exist any system of canal irrigation.

Objectives:-

The main objectives of the presents research paper are to examine the spatial distribution of crops, live stock & other agricultural activities. The second major objective is to ascertain the spatial concentration of agricultural phenomena. The third objective is to make a comprehensive planning for that development in the agricultural of the district.

Methodology:-

The present research work based on the observational description and observational rational methods in order to decipher the theme of the research. Various statistical and cartographic methods has applied where ever needed. The present research study based on both primary and secondary data. The primary data collected through personal observation, interview, questionnaires schedule etc. while the secondary data

collected from concerned district or block headquarters. Map and diagrams, graphs etc. have been widely used in this research papers. Hypothesis:- There is immense population pressure on the agricultural land utilization, in most of the blocks agricultural practices resemble with subsistence pattern irrigational facilities are not satisfactory, Land tillers feel suffocation and the nature of agriculture is rarely commercial.

Discussion:-

Land use pattern refers the distribution of interaction of natural and man-made resources which lie on the earth surface. Agricultural land use: The area under agricultural land use accounts to 108398.70 hectares that stands for 72.96% of the total geographical area of the district. It includes net sown area, current fallow land, other(Old) fallow and orchards & groves. the total area the district of Khagaria under net sown area in 2011-12 was 81512.22 hec. that stands for 54.86% of the total geographical area of the district. The area under current fallow land is 13517.39 hec. That stands for 9.10% of the total geographical area of the district. Other (old) fallow land covers 6295.46 hec. That stands for 4.24% of the total geographical area of the district. Again, Orchards and groves cover 7073.63 hec. of land that stands for 4.76% of the total geographical area of the district. Total Non- Ag.Land Use: The total area of non-agricultural use consists unculturable waste land, culturable waste land, area not available for cultivation, pasture and grazing land and forest. All these sub-categories jointly covers 27.04% of the total geographical area of the district while culturable waste land covers 3.39% area nto available for cultivation covers 5.30% pasture and grazing land covers 4.13% and forest coves 8.08% of the geographical area of the district. Agriculture is possible only in net sown area. This is the only resource on which man lives on directly or indirectly. The area under net sown area ranged from 55% to 65% of the total geographical area of the district between 1990-91 to 2010-11 as is sown in the above mentioned table. In 1990-91, the total area under net sown area was 82101.09 hec. that stands for 55.26% of the total geographical area of the district while in 2000-01, it increased to 60.24% and in 2010-11 net sown area increased to 63.76% of the total geographical area of the district. During the period of twenty years, the average percentage of net sown during the period of twenty years, the average percentage of net sown area remained 59.75% of the total geographical area of the district The above mentioned table shows the land devoted to different crops in the district. Out of the total agricultural area 73.38% (91321.3 hec.) land is devoted to the cereal crop that comprises rice, wheat, maize, Barley etc. Food cash crops cover 11.51% (14325.4 hec) cultivable land in the district which consists sugarcane, potato, vegetables, fruits, spice, oilseeds etc. Pluses, gram, arhar, mung, urad, peas, khesari etc. are grown, Mallets that includes marua, kodo, sawan, jowar, Bajra, Kauni etc. covers 2.53% cultivable lands comprising 3145.45 hec. Fodders includes oat, jenera, napier etc, These crops are grown on 2834.39 hec. of cultivable land and it covers 2.28% of the total agricultural area. Fibers crops include Sanai, Pat, Jute etc. 4.45% (5647.95hec) of the total agricultural area. A Non-food cash crop that includes tobacco, betel leaf etc. covers 1814.67 hec. Cultivable land that stands for 1.46% of the total cultivable land. Only 1.18% cultivable land is devoted to other crops kerao, bokla, suthn, lulthi, etc. Land Use Planning Flood disaster appears every year that proves a curse in the study area. Mass poverty and conservatism of the people particularly of farmers in the district are no better than a curse. The farmers are practically illiterate and often fail to understand the modern agrotechnologies as well as the significance of intensive and commercial farming. A comprehensive

planning for the development in the agriculture of Khagaria district is required. Planning should be based on the careful preparation of local land use survey. In rural areas a sound land use plan is a basic part of agricultural policy. Land use planning has the following main objectives: To grow more crops in quality and quantity, To extend soil management, To expand the area of cultivation by using barren and cultivable land, sowing current fallow and other fallow and by maintaining balance in various uses of land, To give more stability to desirable land use to make all round development or integrated rural development through better use of land and by undertaking other economic and welfare measure. The observations and planning may be grouped under four major categories.

(i) Field Managements: The district is the playground of flood brought by rivers of the district. the terrain and the slope determine the size and shape of the field. lower is the slope larger would be the field and vice-versa is a universal truth. Generally in the study area fields are fragmented, disintegrated and over-subdivided due the law of inheritance. so the size of the field should be kept according to physical conditions omitting social causes. Consolidation of land-holdings should be enforced and co-operative or collective farming if possible, should be practiced for better yield of crops.

(ii) Crop Management: Intensive cultivation will yield good result. the management includes the extension of crops to most of the available lands but also to evolve cropping pattern suitable Scientific method of cultivation should be encouraged to bring other improvement in changing crop pattern. Scientific methods, fertilizers, pesticides, improved seeds should be introduced in the district through block officer and co-operative societies.

(iii) Resource Management: Irrigation controls agriculture Inadequate supply of water for irrigation is the main cause for low intensity of cultivation, minimum area under bhadaï, rabi and garma crops. The primary source of irrigation in the area is canal and tube well, but they are neither satisfactory nor proper, the first necessity is to provide adequate power & supply; then wells and tube wells will irrigate more and more fields. The cattle wealth requires improvements.

(iv) Market Management: The proper market management requires two things facilities the government or semi-government agencies in supply of seeds, fertilizers, pesticides and even food stuff etc, on reasonable price and the marketing produce on good price. The farmers should be encouraged to grow cash crops or commercial crops. There should be network of agricultural marketing agencies, which should provide suitable price of agricultural produce. Planning for agro-industrial development: planning related to the industrial development of study region includes both the invigoration of the sick and old industries and opening of the new one. Following steps should also be taken in the form of industrial development plan of the districts, under reference:- (a) Agro and forest based industries such as rice, flour, oil milling, gur making, wooden furniture making be promoted in every village having a population of 1,000 persons or more. (b) Small scale and cottage or village industries such as iron grills, steel furniture, rolling mills, etc. be encouraged and set up at least at every block headquarters. (c) One big centre each of dairy and poultry be set up at sub divisional headquarters with its subunits at every blocks headquarters to meet the requirements of milk and eggs of the inhabitants. (d) Financial assistance be provided to the young and needy antreprenures for the construction of a granary house where the farmers can store their grains for

selling them at proper time; a cold storage for keeping the potatoes, green vegetables, perishable goods etc. Thus, it is clear from the above discussions that the agro based industries at each and every block headquarters would go a long way to diversify the agriculture in its wake. Only then the prospect of agriculture in the district will bright and it will bring happiness for the people in the district will bright and it will bright and it will bring happiness for the people in the district of Khagaria. Conclusion & Suggestions: During field survey so many suggestions have been collected among which some important suggestions for improving the cropping pattern of the district are as follow:

- ❖ The haphazard allocation of area to different crops by the individual farmers is not suitable for the better agricultural production hence it is urgently required to be mended.
- ❖ For the proper monitoring agricultural production District planning officers should be appointed in the whole district who will plan for the betterment of crops and also for their commercialization.
- ❖ An agricultural mechanization should be set up, where the size of holding is too big where the average farmer is unable to manage with hard labor.
- ❖ Transport facility for the improvement of agricultural production acts as artery and veins in human body. Thus, better is the transport facility better would be the agricultural production.

Future Directions

People's participation in decision-making processes relevant to society. This would turn the direction of working from being a Data Provider to Service Provider by giving end-to-end solutions. As part of this, food security, water security, environmental monitoring and infrastructure development are going to be the main stay of applications with focus on rural development. On the other hand, the ecosystem responses and management to disaster and climate change would also stands as important activities as it would ultimately impact the overall development. In view of these, following programs would take more relevance in the context of optimizing natural resources supply and demand, vulnerability and adaptability of ecosystems to change.

- Natural Resources database development & monitoring
- Food security (Cropping System and patterns, Non timber forest products, fodder, fish stock etc)
- Water security (Surface water management, ground water budgeting and , water quality)
- Natural and human-induced disasters (early warning, pre-cursors, hazard zonation)
- Infrastructure Development, Urban & rural planning,
- Protection of ecosystem & biodiversity
- Climate Variability and Change (biogeochemical cycles , aerosol transport, energy and water balance)
- Popularize and disseminate remote sensing based products
- Develop innovative applications of dynamic spatial simulation techniques.
- Developing and customizing applications/information for grass root-level users on issues related to the last mile problem.

In this context, the earth observation sensors addresses characterization and monitoring land and natural resources, river, cartography and large scale mapping, disaster monitoring and mitigation.

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