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## D. ECONOMIC GEOGRAPHY

### D.1 Agricultural Geography

**157. Dutta, M. and A. K. Bhagabati**, "HYV Rice Farming in Assam: Spatio-temporal patterns, problems and prospects", *Geographical Review of India*, 71(1), 2009: 32-43.

The paper has analysed the spatio-temporal pattern of HYV rice farming in Assam. The state came under the influence of Green revolution in late 60's. HVY seeds cultivation is preferred in the state as the availability of arable land has reached the plateau. In all the three rice seasons i.e. Ahu (autumn), Sali (winter) and Boro (summer) HYV seeds are grown.

The authors have based the study on secondary data obtained from Directorate of Agriculture, Assam and Titabor Rice Research Centre. The study covers time period of 1980 to 2004.

Between 1980-83 and 2001-04 the area under rice has increased by 11 percent whereas HYV rice area has increased by 79 percent with highest positive increase in Barpeta and negative in Dehmiji and Jorhat. The proportion of HYV rice to total rice area is above 70 percent in Dhubri and Hailakandi. Dhemaji has the lowest proportion of rice area under HYV rice. All other districts have 40 to 70 percent rice area under HYV seeds. Productivity of rice has increased from 1120 kg per hectare in 1980-81 to 1476 kg per hectare in 2003-04. Emphasis is also laid on preserving traditional rice varieties not only as a safeguard against the degeneration of HYV but also to earn good returns as it has its unique flavor and taste.

**158. Das, Ujjaini**, "Decaying East Kolkata Wetlands: A danger to the city", *Geographical Review of India*, 71(1), 2009: 69-77.

Wetlands are one of the most significant resources on earth. Their benefits are numerous ranging from maintenance of micro climate to protection from cyclones to treatment of sewage, to providing of fresh air to pisciculture and vegetable production. But in spite of

their being so beneficial they are under the threat of extinction with the increase in human occupancy of these lands. The paper has discussed this threat to wetlands and their decay in east Kolkatta.

The study is based on both primary and secondary data. Toposheets, satellite images, archival data are secondary sources used. Primary data include data from questionnaire survey of 250 HHs from 11 wetland areas in the region.

More than half of the area of the wetlands is being lost to different land uses. With the decline in the area the sewage pressure on remaining area has increased. This has led to their congestion and consequent flooding in the city. On one side the depth of water table is declining on the other its high contamination from pollutants like lead and chromium make it unusable. The flora and fauna has also declined. Supply of oxygen is also affected. The heat island effect is supposed to affect the microclimate of the region and increase the probability of cyclones hitting the city. The employment opportunities based on wetlands have declined drastically. People are shifting to other occupations which are susceptible in nature.

**159. Khan, Nizamuddin, Md. A. H. Rahman and Nooruzzaman,** "Spatial pattern of agricultural development in Murshidabad (WB)", *Indian Journal of Regional Science*, 41(1), 2009: 72-78.

The paper has analysed the level of agricultural development in terms of modern technological diffusion block wise in Murshidabad district of West Bengal. Agriculture is the source of livelihood of around 85 percent population in the district and this makes the exercise important.

Data on eight indicators viz. crop productivity, net sown area, cropping intensity, irrigated area, use of fertilizers, area under HYV seeds, number of agricultural labourers and commercial and gramin banks is used from District Statistical Handbook, Statistical Abstract of Murshidabad district. The standardized Z score is calculated for each variable using formula,  $Z_i = (X_i - \bar{X}) / SD$ , where  $Z_i$  is the standard score of  $i^{\text{th}}$  variable,  $X_i$  original value of individual observation,  $\bar{X}$  mean of variable and SD denotes standard deviation. The results of individual variables are aggregated by composite standard score,  $CSS = \sum Z_{ij} / N$ , where  $Z_{ij}$  is Z score of an indicator j in block i and N is the number of indicators. The Z score values are divided into three categories separately for all variables as well as combined value.

The level of agricultural development is high in 8 districts with value less than +0.50. The highest agricultural development is in Raninagar block. The development is medium in 10 with value ranges from +0.50 to -0.75 and low in 8 districts with value greater than -0.75. Raghunathganj block is at the lowest in the agricultural development index.

**160. Akmanchi, Anand, Mankad Mudit, Vivek Gaikwad, Pradyumna Joshi and Manoj Chavan, "Agro-climatic zonation of Maharashtra state using GIS", *Transactions*, 31(1), 2009: 25-36.**

The authors have attempted the agro-climatic zonation of Maharashtra using GIS. This will ensure proper planning and development of the agriculture as per the zonal condition.

Long period weekly rainfall and potential evapo-transpiration data of 47 stations in Maharashtra are used. Six variables viz. mean available effective rainy period, the coefficient of variation of effective rainy period, mean week of commencement time of sowing rains, mean wet weeks and dry weeks within the effective rainy weeks and percentage crop failure years are derived from the data. A point map was generated in GIS. The data of agro-climatic variables is attached to each station location. Each variable was interpolated to the geographical extent of the state using kriging.

Arid zone lies in the rain shadow area to the east of Sahyadris. Here aridity index is greater than 50 percent. Semi arid zone lies to the east of Western Ghats. Dry sub humid area covers the largest area of the state lying in Marathwada. Sub humid region lies to the immediate east of Sahyadris and in Vidarbha. Humid region is located in the west between shoreline and the Ghat's crest line and in the eastern Maharashtra covering Gondiya, Bhandara and Chandrapur.

**161. Bandyopadhyay, Sumana, "Perceptions of urban wetland conservation: A discriminant function analysis", *Indian Journal of Regional Science*, 41(2), 2009: 73-81.**

Resource conservation depends on the perception of its stakeholders regarding its importance. In this context the paper has identified the conservation attitude of the direct and indirect stakeholders towards the wetlands of Kolkatta.

Evaluation of wetlands is done by asking people about their willingness to pay for conservation of wetlands. In all 220 households (HHs) selected through random sample are interviewed. Correlation between willingness to pay and socio-economic and environmental variables is done for both rural and urban locations. The response of rural and urban HHs is differentiated using discriminant analysis. In this the difference in HHs in terms of HH size, years in education, income, willingness to pay and awareness is computed.

Most of the people are willing to make a very meager annual payment towards the conservation of wetland. The urban households in spite of their being better educated and having more disposable income are willing to forgo less income than rural households. That is why the correlation of income and willingness to pay is significant of rural households. The rural households' willingness to pay is guided by livelihood benefits rather than conservation attitude. The level of education, family size, income and willingness to pay have emerged as important discriminants between rural and urban households. The rural households in spite of having lower levels of education and income and higher family size are willing to pay more for conservation and preservation of wetlands.

**162. Singh, Abha Lakshmi and Khundrakpam Moirangleima,** "Threats to wetlands in the valley region of Manipur, *Indian Journal of Regional Science*, 41(2), 2009: 118-126.

Wetlands are the areas of great human relevance. They accrue ecological, economical and social benefits to the mankind. But in the present times they are under severe threat both natural and anthropogenic. This paper focuses on the analysis of this threat to wetlands of Manipur.

The study is based on primary survey conducted in 2005 and 2006. In all 962 households living surrounding 9 lakes falling in 21 villages were interviewed.

The main conclusion from the study is that the wetlands which play an important role in the ecological, economic and social security of the region are under severe threat due to natural (eutrophication, siltation and weed infestation) and anthropogenic factors (encroachment, pollution and overexploitation and construction of dams). Integrated planning of catchment areas of lakes and water management are suggested.

**163. Singh, R. B. P. and Usha Verma,** "Managing Food Security in Bihar through Cultural Practices", *The Geographer*, 56(2), 2009: 52-60.

The paper has identified the adaptations in food habits in Bihar through various socio-cultural and religious practices to keep up with the availability of food grains.

Bihar is predominantly an agrarian economy. Land and water are amply available to do agriculture activity. But being a nature based activity it is frequently affected by problems of flood and drought leading to failure of crops. The food grain distribution system is also found to be weak. But people have tried to overcome these problems by devising various practices. The first half of the year from January to July is a post Aghari and post Rabi season, therefore there is ample availability of food grains. This period of a year is marked by various socio-cultural celebrations. Even marriages are arranged during this time. On the other hand the period from July to November is an Aghari cropping season. This period is marked by complete absence of any celebrations so that people can concentrate on agriculture and the availability of labourers is ensured. The other reason for no celebrations during this time is the shortage of food grains itself. Therefore to cope up with that the period from September to November has many religious festivals celebrated through fasting. Celebration of Navratras, Teej, Jeetiya, Chhath and Kartik through fasting is the result of reduced food availability. People have thus devised unique ways of maintaining food security at the individual level. The authors are highly appreciative of these practices and exhort to revive and maintain them in present times.

**164. Khan, Nizamuddin, Mohammad Muqet Khan and Anis ur Rehman,** "Livestock Husbandry, Rural Workforce and Employment Generation: A case study", *The Geographer*, 56(2), 2009: 77-87.

The paper has analysed the change in livestock rearing pattern and the role of livestock husbandry in rural employment generation by taking case study of Bulandsahar district of Uttar Pradesh.

The study is based on questionnaire survey conducted in 2008-09. Hundred and fifty livestock rearers were interviewed from 5 inhabited villages in the district selected on the basis of their population, accessibility to urban area and market centres. Simple statistical methods are used for data analysis.

As per land size it is small and medium farmers who are majorly dependent on animal husbandry. For large farmers the land holdings are economically viable and are engaged in other pursuits as well which lessen the need of dependence on animal husbandry. Out of 150 HHs 70 percent are engaged in rearing, followed by collection and processing and marketing and distribution. Buffalo is the most preferred animal for animal husbandry. Its meat and milk are in great demand. Cattles on the other hand are showing negative trend. Mechanization of agriculture, religious sanctions on the slaughtering and low fat content milk have made cattle rearing less desired. Goats and sheep's are favourite with poor households. Caste wise analysis shows that that OBCs have high share of employment in livestock husbandry, followed by high castes and SCs. High castes are mainly engaged in cattle rearing. Cattle rearing are also dominant occupation among SCs followed by OBCs. OBCs have high share in distribution, marketing and processing compared to all other castes.

**165. Suryawanshi, D. S. and Satish Jadhav, "Spatial Analysis of Crop Concentration in Nandurbar District (Maharashtra)", *The Geographer*, 56(2), 2009: 114-120.**

The paper has identified the areas of concentration of 8 different crops grown in Nandurbar district.

The study is based on crop wise data pertaining to year 2001 and is collected from socio-economic abstract of Nandurbar district. Index of concentration for each crop is computed using formula,  $X = (s/t)/(S/T)$ , where, X is the index of concentration, s is the area under 'a' crop of 'a' tehsil, t is the gross cropped area of 'a' tehsil, S is the area under 'a' crop in the district, T is the gross cropped area of the district.

Area under Jowar is concentrated in north eastern part of the district. It is low in south and south west. Cotton concentration is in south east and all other areas have low concentration. Rice is concentrated in south west. North-west have moderate and all other areas have low concentration. The concentration of area under dadar decreases from south west to north east. Concentration of tur and bajra is low to moderate. Central part has moderate and southern and north eastern part have low concentration of Tur. Maize concentration declined from south to north in the district. Bajara has high concentration in central part. Concentration of Mug is moderate in south eastern part of the district.

**166. Sharma, V. N. and Manvi,** "Environmental impact of agro-based industries: A case study of Gorakhpur Division (UP)", *Transactions*, 31(2), 2009: 181-189.

The paper has analysed the environmental impact of agro based industries in Gorakhpur division comprising 4 districts viz. Gorakhpur, Maharajganj, Deoria and Kushinagar by considering people perception of change in quality of the environment.

The study is based on primary survey. Five agro based industries viz. sugarcane, flour, rice, saw and edible oil are considered. Four units of sugarcane and 20 units each of other four industries are selected in such a way that 21 units fall in each district. Thus in all 84 units are selected. Ten people are interviewed from within 200 m from each units giving total of 840 respondents.

Sugarcane industry has most adverse impact on environment followed by edible, oil, flour and saw mill. Pollution of air is mainly due to dust while that of water by liquid waste getting mixes with fresh water without treatment. The highest level of pollution is in Gorakhpur followed by Maharajganj, Kushinagar and Deoria. The average pollution level in the region as perceived by people is 28 percent.

**167. Rai, V.K. and Singh, Neelu,** "Development of Ground Water for Irrigation: A case Study of Varanasi District, U.P.", *National Geographical Journal of India*, 55(1), 2009: 59-72.

The present paper deals with the development of ground water for irrigation in Varanasi district of Utter Pradesh. Varanasi district a part of Indo-Gangetic Plains of Utter Pradesh. It comprises the total area of about 1526.78 sq. Km. Topographically the area is plain to semi-plain. Many perennial rivers, Ganga, Gomati, and Varuna Drain in the area. Ground water in the area occurs in a number of isolated hydro-geological settings at different depths consisting five, to course sand and gravel deposits. There are 63 numbers of hydrograph station and 17 numbers of peizometers in the district for monitoring the ground water level. Data collected by GWD, up from these stations for pre and post monsoon seasons indicate fall in ground water table in a period of 5 years.

The study reveals that the ground water plays an important role in the development of irrigation in the study area. The share of ground water irrigation is about 90 percent of total irrigated area.

In the recent years there is rapid growth in the development of ground water irrigation through state tube-wells, private tube-wells and pumping sets. The total number of private tube-wells and pumping sets has been increased from 9648 and 5559 in 2001 -2002 to 9933 and 6593 in 2005-2006 respectively. The share of ground water irrigation has increased by the 3.26 percentage point at the decreased cost of canal irrigation by 2.10 percent. Percentage point during the study period, with the haphazard development of ground water irrigation means and irrigational use of water has led to many problems like water logging, soil salinity and alkalinity and over exploitation of ground water. These problems can be solved by conjunctive use of surface and ground water.

**168. Chandel, R.S.,** "Cultivable Waste Lands and Possibilities of its Reclamation: A Case of Rae Bareli District", *National Geographical Journal of India*, 55(3), 2009: 47-54.

In the present study an attempt has been made to assess the nature and types of existing cultivable waste lands and to provide a fruitful discussion for the possibilities of its reclamation.

Data of 2008-09 have been procured from revenue office of district Rae Bareli and personal observation at block level. The primary data were generated by conducting interaction and interviews with the local people in various villages of the region. The areal strength together with the percentage of each selected category has been worked out and mapped at block level. The water lands cover more than 33 percent of the total area of the district. Out of this fallow lands occupy about 20 percent which is more than 59 percent of the total water lands of the district. There are two types of fallow lands in the region, old and new. The old fallows occupy about 2.19 percent and new fallow occupy 17.55 percent of the total area of the district. The pasture lands cover 2.58 percent of the total waste land area of the district. The land affected by the salinity/ alkalinity is the main category of waterlands in the district and occupies 5 percent of the total waste land. Water logged and marshy land occupies 13.40 percent of the total waste lands in the district. Ravenous lands occupy 0.58 percent of total waste lands in the district. Sand Accumulation Land occupies 0.02 percent of total waste lands.

Large number of suggestions are listed in the paper. They suggest

better water management techniques to be implemented, as water is the most important factor contributing to cultivable waste lands specially fallow lands. Anti-erosion schemes, stripped cropping and growing of shade crops like Sanai, Udad, Moong and Dhaicha mixed with Bajra and Jawar and proper rotation can be practiced. Soil and soil moisture conservation, small scale engineering structures and vegetative measures like gully-plugging, check dams, terracing, water harvesting structure vegetative barriers should be done. Scheme should be formulated by the Government to prevent the further extension of these ravine lands and also to reclaim the existing area affected. Salt tolerant grasses can be grown successfully on the some of the lands affected by salinity and alkalinity. Land affected by salinity/ alkalinity can be reclaimed by using gypsum or pyrite and provision of surface and sub-surface drainage.

**169. Zaman, Kaneej and Rahman, Hifzur,** " Identification of productivity Regions in Ganga-Yamuna Boab: A Regional Approach for Agricultural development" *National Geographical Journal of India*, 55(3), 2009: 55-64.

In this paper an attempt has been made to determine the levels of the crop productivity in the district of Ganga-Yamuna Doab, Uttar Pradesh. Its major objectives are, to compute the productivity indices considering the major crops in the study region, to delineate the agricultural crop productivity region, and to make a diagnostic planning model for agricultural development in the region.

The present analysis is based on the secondary sources of data collected for the year 1998-2003. The productivity indices were computed by considering the cereal crops, cash crops and oil seeds. Yang Crop Yield Index (1965) was applied taking the data for four years moving averages 1998-2003. The method considers the yield of selected crops in the component aerial unit and compares it with the average yield of crops in the entire regions of Ganga-Yamuna Doab. In the calculation of crop yield index, a value in percentage is obtained by dividing the yield per hectare of the crop in the district by the average yield of the crop in the entire region. The value obtained is multiplied by 100, which gives the final value as the index no., by considering the area devoted to each crop as weight and multiplying this with percentage index, the results obtained are added and then by dividing the sum of the results by the total

cropped area of the selected crops, the average.

The productivity of the cereals and each crops show the high and medium concentrations in upper and central parts of Doab. The productivity of the oilseeds and pulse show a high concentration in middle and lower parts of Doab. In these districts use of high yielding varieties, machineries and fertilizers is relatively very high.

**170. Mishra, Aneesha Kumar and Sharma, P.R.** ,“Spatial Characteristics of Commercial Land Use of the Alwar City, Rajsthan”, *National Geographical Journal of India*, 55(4), 2009: 1-12.

The present paper is an attempt to study the histogenetic evaluation of commercial land use to find out distribution of different types of commercial land uses and their location. It evaluates changes in commercial land use. It tries to bring out spatial characteristics of commercial land use. It is a case study of Alwar city based on both primary and secondary data. Secondary data were collected at municipal level from various government offices including municipal council and PWD, district statistical office and government museum. The primary data, a comprehensive field survey was carried out along the major roads and streets of the commercial area to examine and to identify components of commercial land use such as location, structure of commercial buildings and commercial nodes. The data was also drawn from formal interviews with shopkeepers and citizens.

Commercially, Alwar city caters not only the needs of its own population but also of surrounding region too. Commercial land use of the city has been grouped into four major types- wholesale, retail, small shopping Centre and neighbourhood shopping centre. Major related commercial areas are concentrated in highly densely populated areas of old city while wholesale and specialised markets have been established in less populated and accessible areas, east of railway station. Small shopping centres and neighbourhood shopping centre have also come up in newly developed residential areas following linear pattern along roads. Spatial distribution of commercial land use in Alwar reveals that the major retail areas around the old city are still dominating.

The growth occurred in commercial land use can be attributed to establishment of large whole sale and specialised markets and warehouses and godowns. Increase in population has now been

generating several problems, chaos congestion, traffic jam etc. On the other basis of internal differentiation, their variety and volumes' of goods they deal with pace of structural transformation, the commercial areas are well differentiated and owe their own place in commercial areas of Alwar city. The historical city of Alwar has been passing through a transitional phase. New changes in commercial land use have appeared in some location, while rest of the city is being improvised.

**171. Ali, Julfikar Md. and Mustaquim Md.,** "Role of Farm Mechanization in Agricultural Crop Productivity in the State of West Bengal, India: A Geographical Study", *Regional Symbiosis*, 17, 2009: 11-28.

Agriculture still occupies a place of pride in Indian economy, despite rapid industrialization during the last couple of decades. The main objective of the present study are (1) to analyze the regional variation of mechanization of agriculture, (2) to estimate the productivity indices of cereals, pulses, oil seeds fibers, potatoes and productivity index of overall crops and their regional variations (3) to examine the role of farm mechanization on the agricultural crop productivity and (4) to propose a diagnostic planning frame work for balanced regional agricultural development.

The present analysis is based on the secondary data collected from statistical abstract 2003-04 and census of India 2001. Productivity indices of cereals, pulses, oilseeds, fibers and potato has been estimated based on Yang's method of crop yield index, which represents the yield of crop in the district compared with the average of the crop grown in the study area. Productivity index of all crops have been estimated as multiplying the productivity index of crop by the area devoted to that particular crop and result of each crop is added together and result is divided by sum of the area. A composite indexing technique has been adopted to show the composite figure of farm mechanization of a component areal unit in a quantified form. The casual relationship between farm mechanization and crop productivity has been examined using Karl Pearson's technique of product moment coefficient of correlation, nature and extent of their relationship has been tested by the applying student's 't' test technique.

Regional variation has been presented by using computer based

choroplething technique of GIS- Arc View- Version 3.2a.

(1) It reveals wide regional disparities of both farm mechanization and crop productivity.

(2) Puruliya district stood at the top position in the use of farm equipments, while Jalpaiguri district stood at bottom position.

(3) Hilly tracts of the districts show level of both farm mechanization and crop productivity.

(4) Bardhaman is the only district comes under the high productivity region of each crop & scored index of overall crop productivity due to intensive use of farming equipments.

(5) Puruliya has been identified as the most problematic district in the state, as it comes under region of low level of crop productivity. The area has rocky terrain of Chhotanagpur plateau. Fifty percent of the rainfall flows away as runoff, acidic in nature with pH value varying between 5.5 and 7.2, little organic matter and erosion of soil resulting in huge deposition of fertile soil in the valley region.

(6) The use of diesel pump set, thrasher, tractor, HYV seeds and electric pump sets have an effective role on higher productivity of crop in the state.

**172. Das, Debashis and Pal, Lakshman, "Problems Due to Application of Chemical Fertilizers in Agriculture: A Search for Alternative Measures", *Regional Symbiosis*, 17, 2009: 51-65.**

The objective of the present study is to observe the nature of socio-economic characteristics of farmers who apply chemical fertilizers in their farms, to illustrate the effects of chemical fertilizers on agricultural landscape and to suggest alternative measures to alleviate the problems.

The primary data were collected by canvassing farm level schedules (fifty farms) in each village (five village). The interviewed farmers belong to large (more than 10 acres), medium (7.5-10 acres), low medium, (5-7.5 acres), and small (2.5-5 acres) categories. The data were processed statistically to convert into several indicators, which are displayed into simple frequency tables and then their interrelationship, effects are observed by computing correlation coefficient and matrixes. The application of chemical fertilizer poses several problems by which the resources are polluted, environment is degraded, ecosystem is distorted and biotic lives endangered. The amount of fertilizer applied in agriculture is not fully consumed by

the plant; the left out amount is drained and gets mixed with surface and ground water resources. The nitrogenous elements enter in the body and create health problems. The cadmium fluoride of phosphate and potash also create health hazards which after pass into the babies and children.

The chemical fertilizers are made of fossil fuel, carbon, hydrogen based chemical compounds. Chemical fertilizers release various toxic gasses into atmosphere, reaching ozone layers of stratosphere contributing to their depletion and to solve the above-mentioned problems, the study suggests to use different kinds of organic manures, to improve health of the soil by developing air and water holding capacities. Scientific management of chemical fertilizer needs to be adopted.

**173. Ghosh, Bidyut Kumar,** "Factors Affecting Farmer's Decision to Cultivate High Value Crops: A Case Study of Burdwan District of West Bengal", *Indian Association of Social Science Institutions, Quarterly*, 2009: 148-159.

The agro-climatic conditions of the West Bengal favours the cultivation of a variety of vegetables, fruits, flowers, spices, aromatic and medicinal and other important cash crops like jute and potatoes. The objectives of this paper are to study the status of the agricultural diversification among the sample farmers. The participation of rural households in agricultural diversification towards high value crops on different farm categories and the factors that enable the rural households to harness potentials of high value crops.

The paper tries to establish the hypothesis that the enhancement of irrigation intensity, access to institutional credit, better support of government extension services, easier access to market etc., exert a significant bearing on the level of crop diversification and thus on agricultural productivity.

The study is based on the primary data collected by a field survey from the Purbasthali and Kalna blocks of Burdwan district in West Bengal during the year of 2005-06. The pattern of diversification is studied by examining the share of high value crops in the gross cropped area of the sample farmers and the trends therein. The farmer's decision to diversifying their cropping pattern towards high-value agriculture has been examined with the help of the logit analysis. A logit regression has been used to identify the

factors which influence a household's decisions to grow high-value crops and thus raise the productivity of agriculture. The sample of 185 farmers has been collected from the two blocks (Purbasthali I&II) of Burdwan district. Five villages- Baryea, Majida, Naopara, Dhamas and Ukhra of these two blocks have been surveyed.

The enhancement of irrigation intensity access to institutional credit, better support of government extension services, easier access to market etc. are found to have significant bearing on the level of crop diversification and thus have tremendous potential to increase the agricultural productivity. The diversification of cropping pattern towards the high-value crop is found to be associated positively with the size of land holdings. The regression coefficient of the land holdings on farm diversification is found to be positive (0.564) and significant at 10% level of the significance. The dominance of small and marginal farmers of the state in recent years stands as a constraint for diversifying the cropping pattern.

Land reform measures in the state have resulted in the marginalisation of operational holdings. This has led to an increase in agricultural productivity in the first phase of Operation Barga especially in the 1980s. The present agriculture system of the region has reached at situation where the land reform programmes are not providing any further back-up support to the small and marginal farmers for raising their productivity. Lack of funds is the main obstacle for the small farmers to diversify the cropping patterns and also to raise their production and productivity. Lack of rural marketing infrastructure is acting as important impediments in realising the potential of high-value agriculture. The road network is not upto the market in the most of the regions of the state.

Efforts are needed to strengthen credit institutions, irrigation facilities, better support service and modern agriculture techniques.

**174. Sankhian, Anurag and Pratap, Dinesh,** "Economic Evaluation and Constraints of Tea Cultivation in Kangra Valley: Himanchal Pradesh", *Annals of the Association of National Geographers, India*, 29(2), 2009: 91-99.

The present study has attempted a preliminary economic evolution of tea cultivation in the Kangra Valley taking into consideration components like total income, variation in income among different category of tea cultivators, expenditure, input by

family and hired labour etc. A quantitative assessment is also made about the constraints and the problems faced by the planters of the valley. The study was conducted during 2006-2007.

Primary as well as secondary data were used for the study. Using the size of operational holding, the planters were categorized into three groups viz., small, medium and large with operational holdings upto 1.5 hectares, 1.5 to 2.5 hectares and more than 2.5 hectares. Primary data were collected through random sampling method from 160 tea planters comprising 110 small, 25 medium and 25 large tea planters. Secondary data have been collected from various government and non- government publications simple mathematical and statistical tools viz., averages percentages, chi-square and student 't' test have been applied in order to verify qualitative information.

It is concluded that tea cultivation is an important and regular source of the income for the tea planters of the Kangra Valley; however profit margins are not so attractive. A decreasing trend in income in last five years is cause of worry. Tea cultivation provides opportunities for gainful self-employment for tea planters and hired labourers. Tea cultivation can play a vital role in economic upliftment and sustainable development of the Kangra valley provided the constraints are removed.

**175. Siddiqui, Shamsul H., Anwar, Tanfique, and Uzzaman, Kashif, "Agricultural Situation in the Kosi Command Area of North Bihar Plain" *The Geographer*, 56(1), 2009: 40-45.**

Paper aim to examine the growth pattern of different crops in the Kosi Command Area of North Bihar Plains with the adoption of new technology. Data have been collected from primary and secondary data source both, published from the Directorate of Statistics and Evolution, Government of Bihar, Patna and Kosi Command Area Development Agency Report. The compound growth yields were compounded for various crops of the study area during the period of 1997 to 2007. The study indicates that the new agricultural technology has led to a manifold increase in food grain production in the Kosi Command Area of North Bihar Plain, but this technology has been a mixed blessing, as the high oil prices directly shoot up the cost of crop production and the neglect of agriculture, faulty policy mitigate and their implementation over the past decade in Kosi Command Area has impacted agriculture

adversely due to which the agriculture sector is not showing a sound growth as compare to the other sector of economy.

**176. Shah, Zulfikar Ali and Hanafi, yashir, Saeed, "Problems of Food Accessibility in Jammu and Kashmir", *The Geographer*, 56(1), 2009: 93-103.**

In this paper an attempt is made to analyse food accessibility at district level by various indicators in the Jammu and Kashmir. District has been taken as the unit of the study. Secondary source of data has been used like published and published data obtained from the official bulletin of the district and the state of Jammu and Kashmir, statistical abstract publication of State Planning Institute and Census of India, New Delhi. Five indicators of food accessibility have been selected- purchasing power, employment, literacy rate, survivor and urbanisation. In this study, appropriate statistical techniques are used to calculate the distric-wise-z score and comparative score as well. GIS techniques have also been used to represent indicators on the district level map of Jammu and Kashmir.

It is concluded from the above discussion and the analysis of composite z-score at district level that Srinagar and Jammu are the districts where the highest food security prevails. The district like Kupwara, Budgam, Poonch with lowest composite z-score are falling the same type of problems in all the parameters taking into account individually and so the food security and food accessibility is not sufficient. To overcome the problem of the food insecurity in this region the emphasis should be given on employment generation programme in such a way that the poor section of the society could be benefited by the development at the household level in rural area as well as special attention should be paid to animal husbandry, poultry farming, horticulture, bee-keeping, pisciculture and sericulture.

**177. Sebu, Soyhunlo and Yaden, Sangayu' "Slash and Burn (Jhum) Cultivation and Its Impact on Climate with Special Reference to AO Naga Tribe of Mokokchung District, Nagaland", *Hill Geographer*, 15, 2009: 20-37.**

The paper highlights the deleterious impact of slash and burn cultivation in Mukokchung District, Nagaland, it also aims at possible remedies that could add to the sustainability of this age

old farming practice by the hill people of the district.

This method of cultivation is widely blamed for destroying forests, erosion of soil and increasing carbon dioxide (jhuming). Population pressure, poverty, lack of alternative income earning opportunities has led to reducing fallowing time required for natural restoration of soil nutrients. The use of modern scientific practices has not achieved much success, as most external input technologies are not suitable for high altitude conditions. With the initiative of Government, NGOs' and the Village Council under Mokokchung district, many villages have recently adopted conservation strategies to safeguard their flora and fauna by conserving bio-diversity and bird sanctuary.

**178. Anwaruzzaman, A.K.M., "Gorgon Cultivation in the Wetlands of Malda District-Economy and Effects", *Hill Geographer*, 15, 2009: 61-69.**

The study aims at assessing diverse threats to the wetlands with special reference to the threats posed by increasing cultivation of Gorgon plant.

Both Primary and secondary data have been used for the purpose. Extensive fieldwork has been conducted to assess the economy of Gorgon cultivation and to ascertain the threats due to cultivation of this plant. Visit to wetlands and interviewing cultivators as well as suppliers of insecticides and pesticides constitute the content of primary data. Recent introduction of an aquatic plant named gorgon has been a threat to the wetlands of Malda District. Economically, the crop is considered to be profitable, but in the process, the wetland is being destroyed. Intensive use of chemical fertilizers as well as insecticides and pesticides for bumper production of the crop are major threats.

Cultivation of Gorgon plant in the wetlands could be replaced gradually by pisciculture which protects and enriches the ecology of wetlands.

**179. Sen (Majumdar), Susmita,** "Spatio-temporal Variation of Agriculture and its Regionalization in Bardhaman District, West Bengal", *Geographical Review of India*, 71 (4), 2009: 382-390.

The analysis of spatial and temporal variations in landuse distribution, cropping pattern, crop concentration, crop combination, agricultural productivity, agricultural efficiency, agricultural regionalisation, are important parameters of measuring agricultural development. Bardhaman is the only district in West Bengal which is developed both in agriculture and industry. The present paper analyses the spatio-temporal variations in such aspects of agriculture as crop combination, crop diversification, agricultural productivity and efficiency in Bardhaman district during 1996-2007. The chief objective of the paper is to attempt agricultural regionalisation on the basis of parameters mentioned above.

The base map for the study has been prepared by using Remote Sensing software, Erads Imagery 8.4 on UTM projection and WGS 84 datum (zone 45) with a root mean square error ranging from 0.01 to 0.03. Then the registered map has been included in GIS environment (Arc View GIS 3.2 a) to prepare maps. For delineating regions of high, medium, low agricultural productivity, Kendall's composite Index Method has been used while Weaver's method is used for crop combination, Pattanayak's Harphindal Index method for measuring crop diversification, and Bhatia's method for measuring agricultural efficiency have been used.

The main findings of the paper are as follows. Although Bardhaman district is said to be agriculturally developed district of West Bengal, it has spatial inequalities due to lack of irrigation network, mechanization, poor use of fertilizers. The district has prominent spatial variations in its agriculture which emerge in the use of each of the parameters mentioned above. The district could be divided into two areas. Less developed in agricultural sector of the western part is industrially advanced. The eastern and central part which are comparatively more developed in agricultural sector but lag behind with respect to human and non-agricultural sector development.