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# RELATING AGRICULTURAL OCCUPATION WITH CARCINOMA USING GIS AND REMOTE SENSING - A CASE STUDY OF RANCHI AND KHUNTI DISTRICS OF JHARKHAND

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**Abstract—** A study was carried out with hospital data of registered Cancer Patients from a tertiary Health Centre in Ranchi District. The data pertained to three years 2008, 2013 and 2015. This data was further classified into two categories that of patients from Rural and Urban areas based on the address information provided by them. Satellite image of LANDSAT satellite was downloaded pertaining to the three years. Patient location was marked on this image. A buffer of 5 km was generated about this location and the study area was subsetted. NDVI was performed on the satellite image. The NDVI helped in the identification of agricultural landuse in the study area. Information of cropspecific pesticides was added to the image. The juxtaposition of Cancer registry data, its geospatiallocation , the identified agriculture land use and the carcinogenic pesticides information on the data used in various crop season in the study area helped show some trends. The carcinoma spread in the rural areas was on the increase. The occupation of the people in rural areas is mostly agriculture in the district. A rise in the incidence of cancer in these regions may have numerous causes. A comparison with the number of registered cancer patients from urban locations show that there is a rising trend of cancer patients from rural areas.

**Keywords-** Cancer registry data, LANDSAT satellite data, Geographic Information system (GIS), Remote sensingNormalised Differential Vegetation Index (NDVI), Subset, Land use and Land cover (LU/LC)

## 1. Introduction:

The use of remote sensing and GIS data in cancer studies is gaining prominenceWeichenthal, S.; Moase, C. and Chan, P.(1998),HuxholdWE,LevinsohnAG (1995), Albert DP, Gesler WM, Levergood B. (2000), Data is collected and information is obtained from medical records provided by hospitals and doctors. A cancer registry is a data collection system that tracks cancer cases that have been diagnosed or treated in a specific institution or geographic area. The data is collected in two ways. Population Based Cancer Registries (PBCRs) Hospital Based Cancer Registries (HBCRs).
The present study deals with the cancer data and the geolocation of the patient in Jharkhand. The study tries to link the data with probable cause of carcinoma from agricultural point of viewRitz, B.R at.al (2009), To begin with the LU/LC map was generated for the entire Jharkhand state to identify the agriculture land. The data collected was classified into rural and urban areas. Care was taken to note down

the occupation of the patient. There are also studies related pesticides in use of agriculture which may be carcinogenic Zacharia, James Tano (2011)
Those patients whose prime occupation was agriculture were considered while the patient hailing from Ranchi municipal limit were excluded.

## 2. Study Area:

Ranchi is the state capital of Jharkhand. The states as a whole have been divided into seven agroecological regions and Ranchi and Kunti Districts are a part of the Hazaribagh and Ranchi plateau region. The total area of the districts are 7593 sq. km. More than 60% of the population is rural based and their livelihood depends solely on agriculture and allied activities. About 82% of the households have holdings of less than two hectares with the average holding size being 1.18 ha. Only 0.84% of the households have land holdings greater than 10 hectares.

### 2.1 Methodology

The cancer data in the present study was collected from prominent hospital specially meant as a tertiary health centre for cancer Fig.1. The patients' registration was collected for the 2008, 2013 and 2015 as per their register. The satellite data that was used was also pertaining to the same years.

In the study area in a typical rural setting, the homesteads are found in clusters which may be called as *Tola*. These *Tolas* may be typically at a buffer distance from the agriculture fields of the inhabitants. Therefore,a buffer has been generated from the patient location at 5km range.

Land use/Land cover has been generated based on the satellite image. The spatial extent of the data was classified to get the land use and land cover information of the three subsequent years of study.

The NDVI (normalized difference vegetation index) map of the study area was generated to identify the agricultural crops and the area related to Rabi, Kharif and Zaid crops.
Besides this, the survey of the crops in different seasons, Rabi, Zaid and Kharif was done and the pesticides used on them was categorized.

The following was the Methodology flowchart of study Fig.2:

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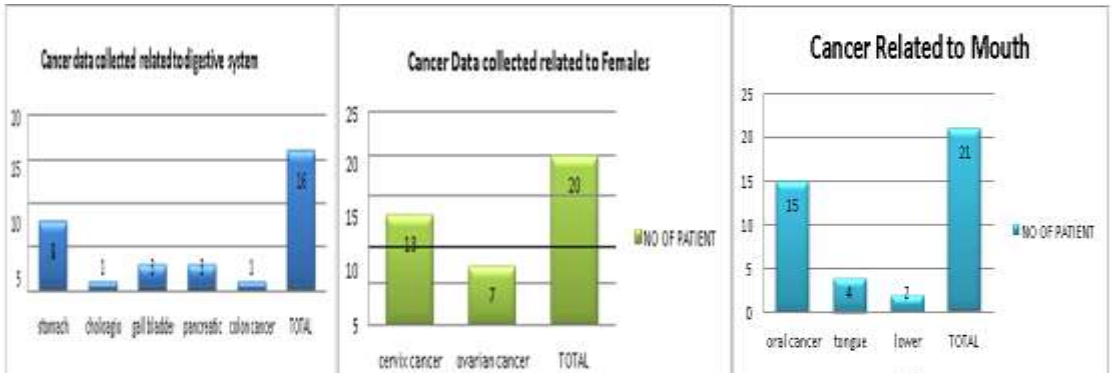


Fig.1 Data collected for the present study (Data Source:Curie-Abdur Razzaque Ansari cancer institute (A unit of health care global enterprises Ltd.) Irba Ranchi-835238 )

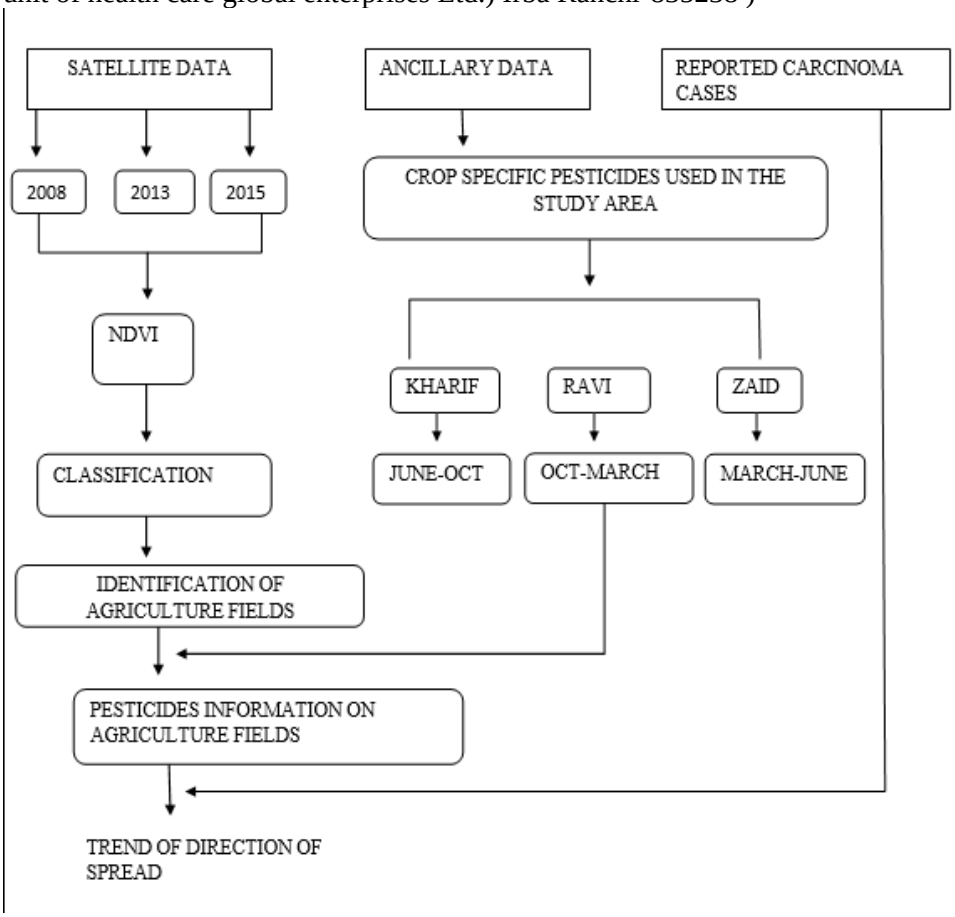


Fig. 2Methodology followed in the present study

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## 3. Results and Discussion

The following results and conclusions were drawn:
According to Census of India the occupation of the people of the study area is agriculture. It is not necessary for carcinoma to be expressed or shown hand, eyes or nose. It can be expressed anywhere. We had not considered municipal limit data.
Trend from agriculture fields towards registration data, the trend is spreading. Cause of spread of carcinoma is a medical issue however, in the study area the main occupation of the population according to the Census of India is agriculture. One cause could probably be the exposure to carcinogenic pesticides to the people directly or indirectly engaged in agricultural of practices causing carcinoma to the people. From 2008 to 2015 percentage of carcinoma in the rural area has increased in the eight years study. Carcinoma has registered a increase in rural area (2008-58.90, 2013-51.16 and 2015-67.12%) and has a mixed trend in the urban areas (2008-41.09,2013-48.83 and 2015-32.87). Fig 3.

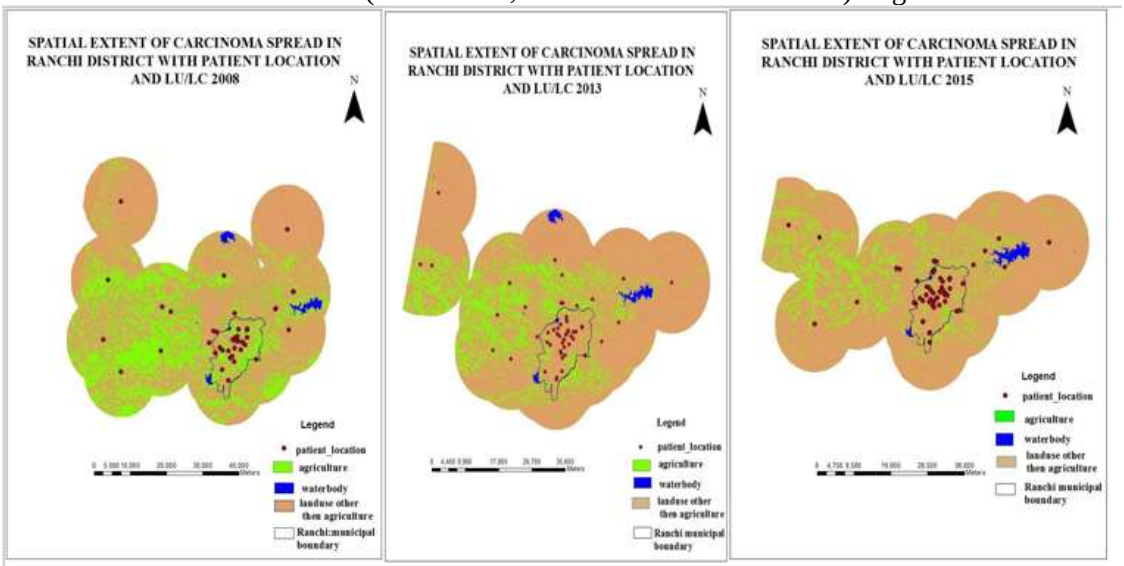


Fig.3 Patient Geo location data on Carcinoma spread . The area of spread has gradually increased from 2008 to 2015

According to the data gathered on pesticides used for kharif, Rabi and Zaid crops. Approximately 40.74 % pesticides were used by the farmers were found to be carcinogenic. Further study may be carried out in the field of pesticide to make them safe for the farmers. traditional methods may be tested in the manufacture of pesticides. In the field to improve the quality of pesticides. Paucity of time has limited to the data pertaining to only one hospital.

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