# REGIONAL DISPARITY IN LEVEL OF AGRICULTURAL DEVELOPMENT: A VILLAGE LEVEL ANALYSIS FOR LANJIGARH BLOCK OF KALAHANDI DISTRICT, ODISHA

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***Abstract:*** Agriculture is one of the oldest and most important occupations. It the backbone of the Indian economy and it plays a major role in the overall socio-economic development. Therefore agricultural planning is highly essential for the agricultural development. But the major question arises how to identify the region with less agricultural development or high agricultural development. In most of the literature it is studied that the level of agricultural development is studied at the block level, but in this paper, an attempt is taken to study the spatial variation of agricultural development at a village level. The village level census data is taken into consideration to identify the backward villages with less agricultural development. Selected agricultural indicators and Composite Index method are used to calculate the level of agricultural development.

**Index Terms-  Level of Agricultural Development, Indicators, Composite Index**

## I. INTRODUCTION

Agriculture is the backbone of the Indian economy. More than 65% of the population depend upon agriculture for their livelihood. It plays a major role in the economic development, such as providing food to the nation, extending exports, contribution to the economy, generating market for industrialization (Johnson and Mellor 1961). Poor agricultural condition is often a major problem with serious implication for sustainable resource use and living standard of rural households. This will affect the future as well as create differentiation in the level of agricultural development.

Agricultural development is defined as the development of land for higher agricultural productivity by using higher degree of inputs. It is a multi-dimensional concept which explains about the type of land, land productivity, cropping pattern, cropping intensity, usage of different type of fertilisers, seeds, insecticides (Mohammad,1980). The agricultural productivity is also a measure of the levels of economic development of the region and brings about an improvement in the standard of living of the people. Singh et al (2012) study reveals that agricultural development study is very important in agricultural planning. Bhatia (1979) wrote on regional disparities in agricultural income and productivity in which after providing evidence for the existence of such disparities and enquiring the possible causes for these, a plea is made for their reduction by appropriate policy measures.

In the present analysis agricultural indicators are used to study the level of agricultural development in the study area. Keeping in view the importance of these indicators eight indicators from agricultural development are taken into consideration to understand the spatial pattern of overall agricultural development of the study area. The present study aims at identifying the inter- village regional disparity and imbalances in the levels of agricultural development. Further it attempts to identify the geographical and other important factors which in turn would account for such imbalances in spatial pattern.

## II.   OBJECTIVES OF THE STUDY

a.       To know the aggregate picture of agricultural development in the study area based on the selected agricultural indicators.

b.       To highlight the variation of level of agricultural development in the study area.

## III.   STUDY AREA

Lanjigarh block of Kalahandi district, Odisha is taken as the study area. It is the second largest block among the thirteen blocks of Kalahandi district in terms of geographical area i.e. 987.15 sq.km. The block occupies in the western part of Kalahandi district and

extends between 19° 33' 56.2" N to 20° 04' 34.4" N latitude and 83° 08' 52.4" E to 83° 33' 26.5" E longitude. Figure 1 shows the location map of the study area.
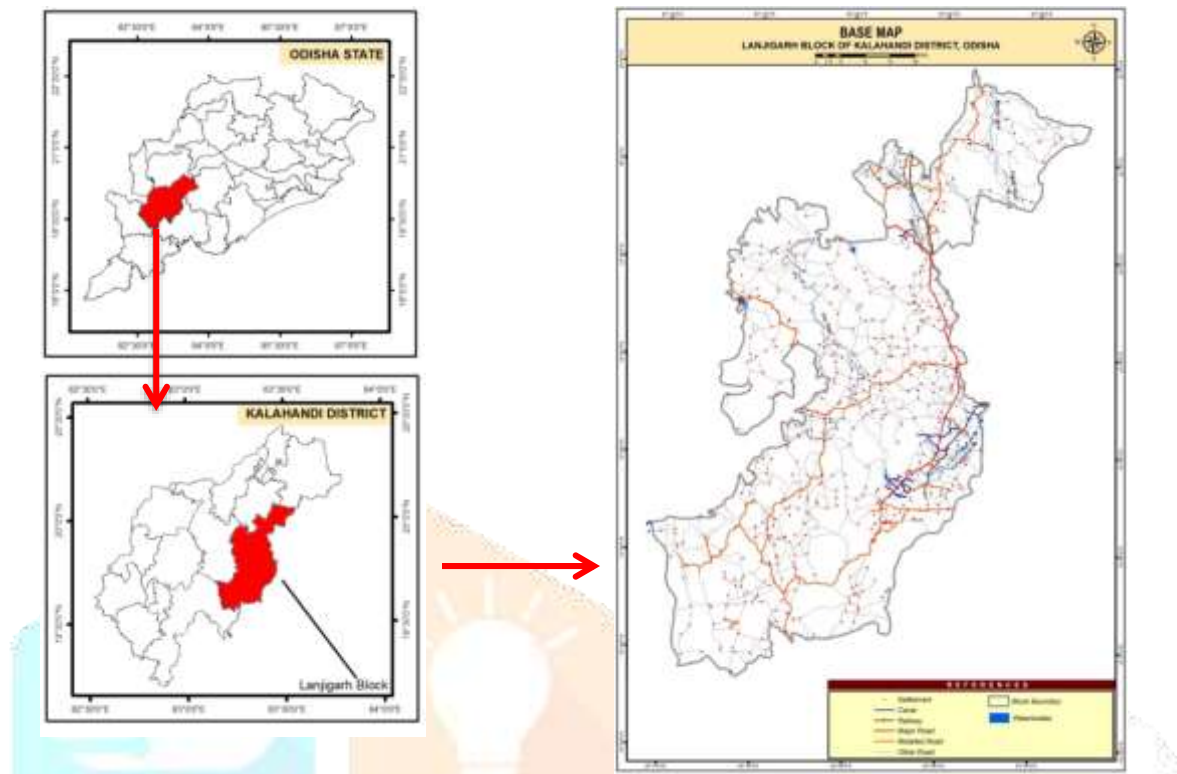


Figure 1: Location map of the Study area

## IV.   DATEBASE AND METHODOLOGY

The study has been entirely based on secondary data and sources are Census of India 2011 and District Statistical Handbook-2011 of Kalahandi district. In this study attempt has been taken to analyse the data at the micro level i.e. village level.

## V.   METHOD OF ANALYSIS

There are several methods of estimation of level of agricultural development. In this analysis, the procedure adopted by Iyengar and Sudarshan (1982) is used to classify regions using multivariate data. This procedure is widely used to provide composite index for spatial differentiation in the level of development. In the present analysis the index value is calculated for the given list of development indicators and finally the composite index is calculated. In the below given formula, Index Value represents the value of the i-th variable and is positively associated with development of villages and

$$\text{Index Value } (X_i) = \frac{X_i - Min(X_i)}{Max(X_i) - Min(X_i)} \quad \textbf{(i)}$$

If $X_i$ is negatively associated with development of villages, then

$$\text{Index Value } (X_i) = \frac{Max(X_i) - (X_i)}{Max(X_i) - Min(X_i)} \quad \textbf{(ii)}$$

The index values ranges between 0 to 1 and on the basis of index values the data are categorised into five different classes. The Index values that are above 0.80 is considered as very high developed region, 0.60 to 0.80 is considered as high developed region, 0.40 to 0.60 is considered as medium, 0.20 to 0.40 is considered as low and below 0.20 is considered as very low developed region. Further, the index value of each indicator is used to calculate the composite index. Composite index is the simple average of all the

indices. It may be possible that among the selected indicator one is more important than other. Therefore composite index is used to give appropriate weightage to each indicator.

**Composite Index = (X1+X2+X3+X4+...........X28)/ 28**                              **(iii)**

After calculating the composite index, the values are arranged in the ascending order and the higher values are assigned the very highly developed regions and the lowest value is assigned the very low developed region. The composite index values are categorised in the same range of class as used for index values i.e. above 0.80 is very high developed region and below 0.20 is considered as very low developed region.

## VI.    SELECTED AGRICULTURAL DEVELOPMENT INDICATORS

The significance of agricultural indicator in the study area is mainly due to the fact that it is major occupation and contributes significantly to the income of the people. Therefore, selection of appropriate indicators is a very important step for categorizing the villages with regard to overall development. In these analysis eight indicators (table 1) pertaining to the agricultural development of the study region is considered.

Table 1: Selected Agricultural Development Indicators

| Units | Indicators |
|---|---|
| X1 | Percentage of net sown area to total land area |
| X2 | Percentage of Cultivable land to total land area |
| X3 | Percentage of Net Irrigated Area  to total net sown area |
| X4 | Per Cultivator as Net Sown Area |
| X5 | Percentage of Culturable area to total land area |
| X6 | Land Use Intensity |
| X7 | Percentage of Canal Area to total net sown area |
| X8 | Primary Agricultural Co-Op. Credit Societies per 1000 Cultivators |

## VII. RESULT AND DISCUSSION

Mostly the indicators those are highly necessary for agricultural development is taken into consideration. Using the above given formula (i, ii & iii) the index values and the composite index is calculated and the values are categorised in five classes (Very high, High, Medium, Low and Very Low).

### 1: Percentage of net sown area to total land area

Net sown area is the key factor for the agricultural development in any region. It is very important to study and analyze the distribution of net sown area. In the study are, the total net sown area is 9020.16 hectare which covers 13.65 percent of the total geographical area. The net sown area as percent of total land area is shown in figure 2 and table 2.

Table 2: Percentage of net sown area to total land area

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 12 | 28 | 74 | 40 | 329 |
| **% of Villages** | 2.48 | 5.80 | 15.32 | 8.28 | 68.12 |

### 2: Percentage of Cultivable land to total land area

The cultivated area/land consists of net sown area and current fallows. In Lanjigarh block the total cultivated land is 12217 hectare which accounts 18.49 percent of the total land area. The distribution of cultivable land to total land area is shown in figure 3 and table 3.

Table 3: Percentage of cultivable land to total land area

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 24 | 62 | 46 | 34 | 317 |
| **% of Villages** | 4.98 | 12.86 | 9.54 | 7.05 | 65.77 |

### 3: Percentage of Net Irrigated Area to total net sown area

The total net sown area in Lanjigarh block is 9020.16 hectare whereas the total net irrigated area is 710.8 hectare. The net irrigated area accounts 7.88 percent of the total net sown area. The distribution of net irrigated area to total net sown area is shown in figure 4 and table 4.

Table 4: Percentage of net irrigated area to total net sown area

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| Index Value | **Above 0.80** | **0.60 - 0.80** | **0.40 - 0.60** | **0.20 - 0.40** | **Below 0.20** |
| No of Villages | 7 | 3 | 1 | 11 | 461 |
| % of Villages | 1.45 | 0.62 | 0.21 | 2.28 | 95.45 |

### 4: Per Cultivator as Net Sown Area

The total net sown area in Lanjigarh block is 9020.16 hectare and the total number of cultivators in the block is 8652. So on an average the net sown area for each cultivator is 1.04 hectare. The statistical analysis is done for all the villages and the distribution of per cultivator as net sown area is shown in figure 5 and table 5.

Table 5: Per Cultivator to total net sown area

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 1 | | 1 | 5 | 476 |
| **% of Villages** | 0.21 | 0.00 | 0.21 | 1.04 | 98.55 |

### 5: Percentage of Culturable area to total land area

Culturable area can be defined as the sum total of cultivated area and Culturable waste (Manish.G., et.al. 2013). In Lanjigarh block the total Culturable area is 23467.23 hectares which constitutes 35.52 percent of the total land area. The distribution of Culturable area to the total land area is shown in figure 6 and table 6. This indicator is very important in term of development of the waste land that may be suitable for cultivation.

Table 6: Percentage of culturable area to the land area

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 59 | 107 | 65 | 60 | 192 |
| **% of Villages** | 12.22 | 22.15 | 13.46 | 12.42 | 39.75 |

## 6: Landuse Intensity

Landuse Intensity is defined as the ratio between total cultivated area to total culturable area and expressed as percentage (Manish, G., et.al. 2013). Intensity of cultivation reflects the efficiency of agricultural land use. In the present context, landuse intensity is explained by the formula given below.

**Landuse Intensity = (Total Cultivated Area/ Total Culturable Area)* 100**

The distribution of landuse intensity is shown in figure 7 and table 7.

Table 7: Landuse Intensity

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 123 | 38 | 21 | 25 | 276 |
| **% of Villages** | 25.47 | 7.87 | 4.35 | 5.18 | 57.14 |

## 7: Percentage of Canal Area to total net sown area

In Lanjigarh block the total net sown area is 9020.16 hectare whereas the total canal area is 680.9 hectare. The percentage of canal area to the net sown area is one of the important indicators in the level of agricultural development. In the block surface water is the main source of irrigation. Adequate irrigation facilities have not been developed in this block. The distribution of percentage of canal area to total net sown area is shown in figure 8 and table 8.

Table 8: Percentage of Canal Area to total net sown area

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 7 | 2 | 1 | 11 | 462 |
| **% of Villages** | 1.44 | 0.41 | 0.20 | 2.27 | 95.65 |

## 8: Primary Agricultural Co-Op. Credit Societies per 1000 Cultivators

In Lanjigarh block there are only 4 agricultural co-operative credit societies and there are 8652 cultivators in the block. In the block there are only 0.46 percent of co-operative credit societies per 1000 cultivators. In the block the distribution of the agricultural co-operative credit societies is very less. It has been shown in figure 9 and table 9.

Table 9: Primary Agricultural Co-Op. Credit Societies per 1000 Cultivators

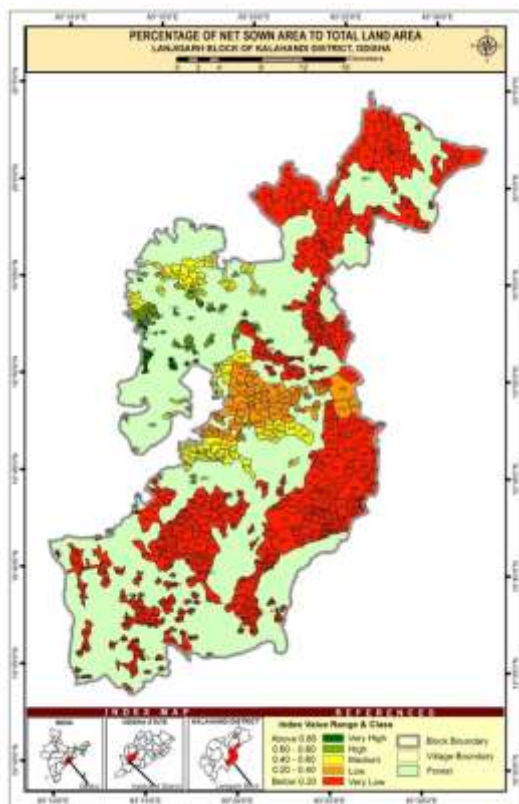| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| **Index Value** | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| **No of Villages** | 2 | 0 | 0 | 1 | 480 |
| **% of Villages** | 0.41 | 0.00 | 0.00 | 0.21 | 99.38 |

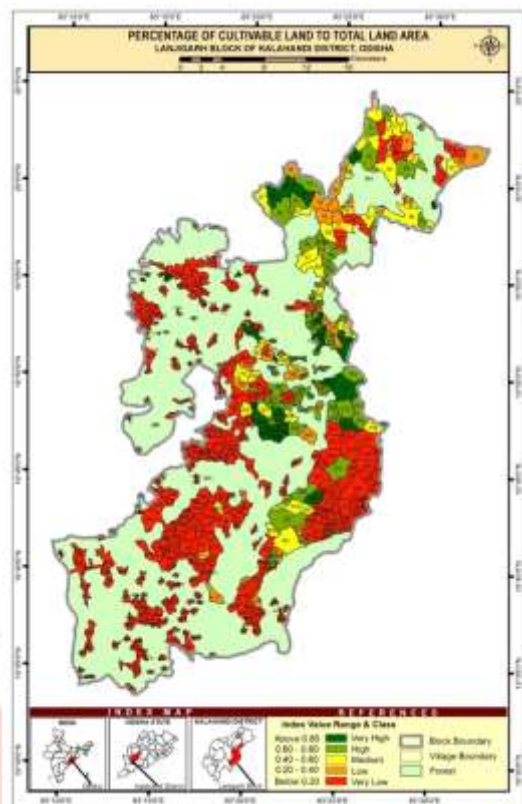Fig 2: Percentage of net sown area to total land area



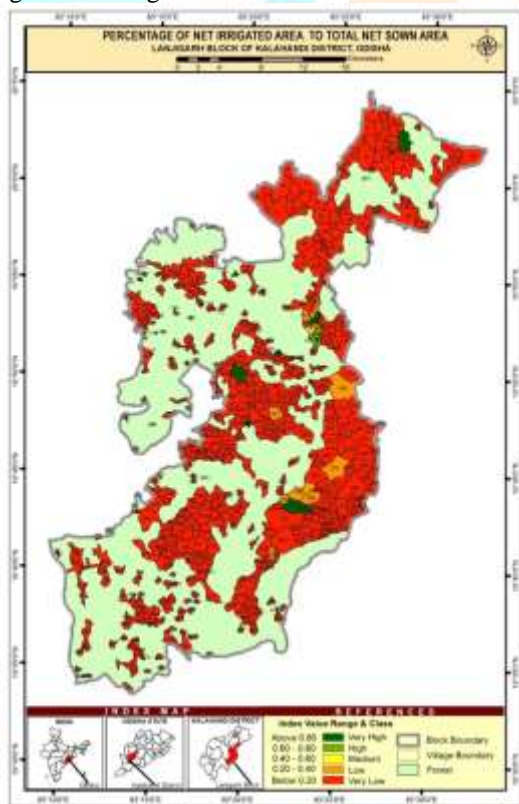Fig 3: Percentage of Cultivable land to total land area



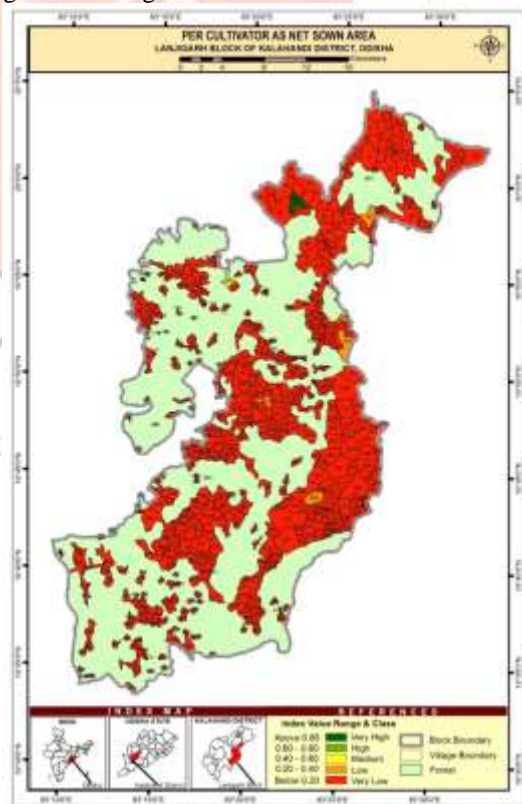Fig 4: Percentage of Net Irrigated Area to total net sown area



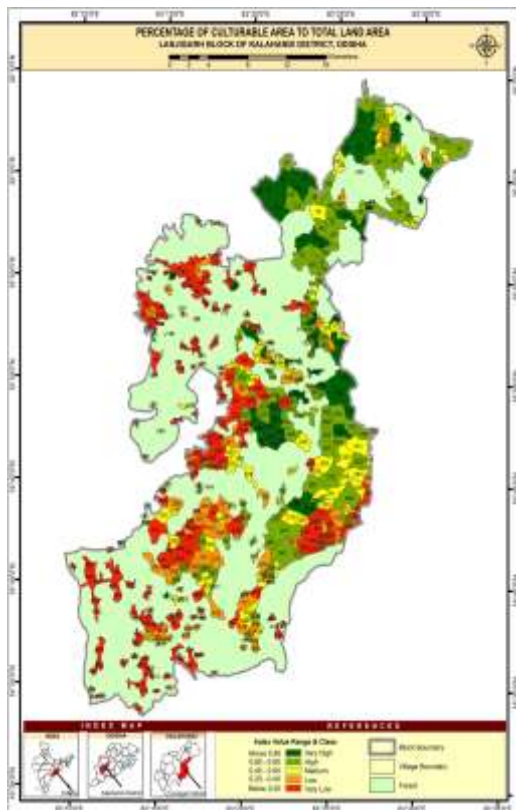Fig 5: Per Cultivator as Net Sown Area

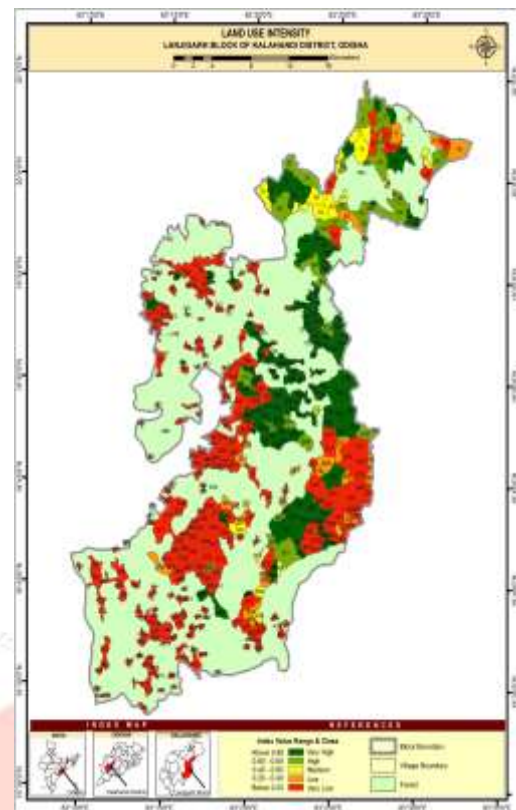Fig 6: Percentage of Culturable area to total land area
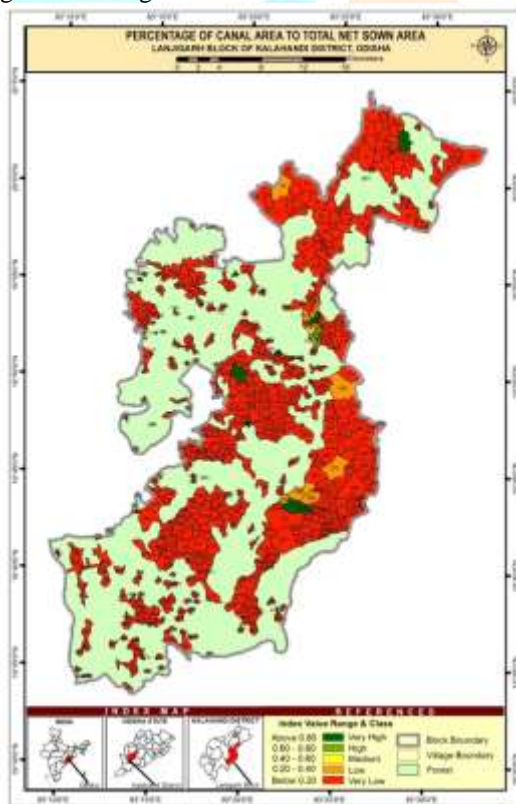


Fig 7: Landuse Intensity



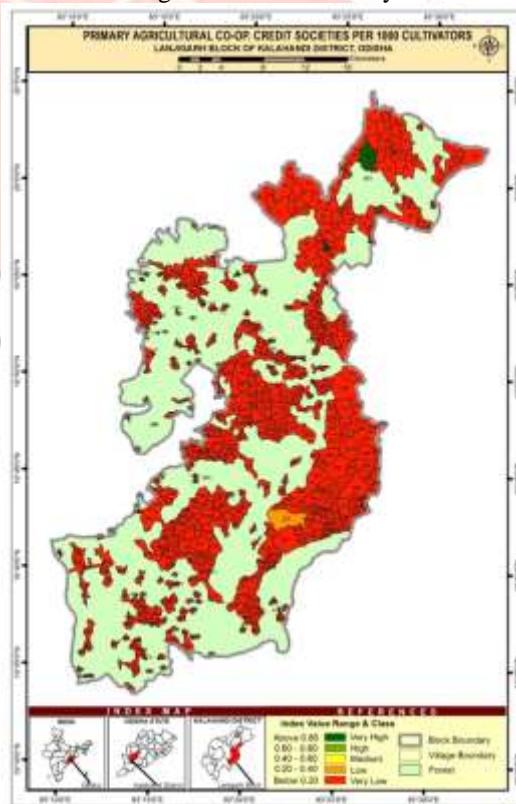Fig 8: Percentage of Canal Area to total net sown area



Fig 9: Primary Agricultural Co-Op. Credit Societies per 1000 Cultivators

## VIII.    LEVEL OF AGRICULTURAL DEVELOPMENT

In order to find out the overall level of agricultural development, the composite index is calculated by adding all the index value of each variables and the result is divided by the total number of agricultural indicators used in the analysis. Further, the composite index value is categorized into five major classes i.e. very high, high, medium, low and very low. The distribution of level of agricultural development is shown in figure 10 and table 10

### Very High Development (Above 0.80)

There are no villages in the category of very high agricultural development.

### High Development: (0.60 – 0.80)

There are no villages in the category of high agricultural development.

### Medium Development: (0.40 – 0.60)

There are 21 villages with medium level of agricultural development and the block accounts 4.35 percent of the total villages. It is shown in map 6.30 that in the central part of the block there is medium level of development. Very few villages are there in the northern part of the block.

### Low Development: (0.20 – 0.40)

In Lanjigarh block there are 131 villages with low level of agricultural development. The block accounts 27.12 percent of the total villages. It is seen that most of the villages in the northern part of the block and few villages in the central part of the block is under low level of agricultural development.

### Very Low Development: (Below 0.20)

There are 331 villages with very low level of agricultural development. The block accounts 68.53 percent of the total villages and it is seen that in the central and southern part of the block is dominated by very low level of agricultural development.

Table 10: Level of Agricultural Development

| Category | Very High | High | Medium | Low | Very Low |
|---|---|---|---|---|---|
| Index Value | Above 0.80 | 0.60 - 0.80 | 0.40 - 0.60 | 0.20 - 0.40 | Below 0.20 |
| No of Villages | 0 | 0 | 21 | 131 | 331 |
| % of Villages | 0.00 | 0.00 | 4.35 | 27.12 | 68.53 |

## IX. CONCLUSION

Agriculture is the major occupation of Lanjigarh people. In the analysis of agricultural development it is found that there are huge variations across the study area. Mostly the important indicators related to agriculture are taken into consideration. It is observed that there are no villages with very high and high level of agricultural development. Most of the villages in the study region come under very low level of agricultural development. There are 331 villages and the block accounts 68.53 percent of the total villages with very low level of agricultural development. In the present study agricultural development is so low that it does not contribute much in the socio-economic development of the study region. The major reasons responsible for the low agricultural development are:

- ➢ The net irrigated area is low in the study area due to which it affects the agricultural production.
- ➢ The ratio between the cultivators to the net sown area is very less due to which there will be less agricultural production.
- ➢ The irrigation facility in the study area is very poor.
- ➢ The percentage of Canal area in the study area is very less as compared to the total agricultural land.
- ➢ Lack of knowledge on the major agricultural inputs like fertilisers, insecticides, pesticides, modern agricultural tools and its usage, lack of agricultural information related to Govt. Schemes etc.
- ➢ The people are not aware of various policies and programmes undertaken by the government for their improvement due to lack of education and extension services.

Suggestive measures should be taken by the experts to address those issues and remove the backwardness of the villages. Following are few measures or strategies that may be adapted to enhance the agricultural development in the study region.

1.       Agriculture is the major occupation of the Lanjigarh people and adequate availability of agricultural inputs has been constraint. Therefore more importance should be given to the major agricultural inputs such as improved seeds, fertilizers, insecticides and pesticides.

2. The farmers should be able to get more information related to financial institutions, agricultural marketing, agricultural loans and subsidies and modern agricultural tools and equipments. This would increase the productivity and encourage agriculture as a major occupation.

3. The Irrigation status in the block needs to be improved by implementing different major and minor irrigation projects.

4. Mostly in the rural area the Govt. schemes, policies and programmes are not known to the people and this is mainly due to lack education and extension services. Therefore proper measures should be taken so that the information should be reached door –to- door.

5. The number of agricultural co-operatives societies is very less and this needs to be increased.

6. Political factors play a major role in allocation of resources and also their implementation. So proper monitoring and management of resources is very important.
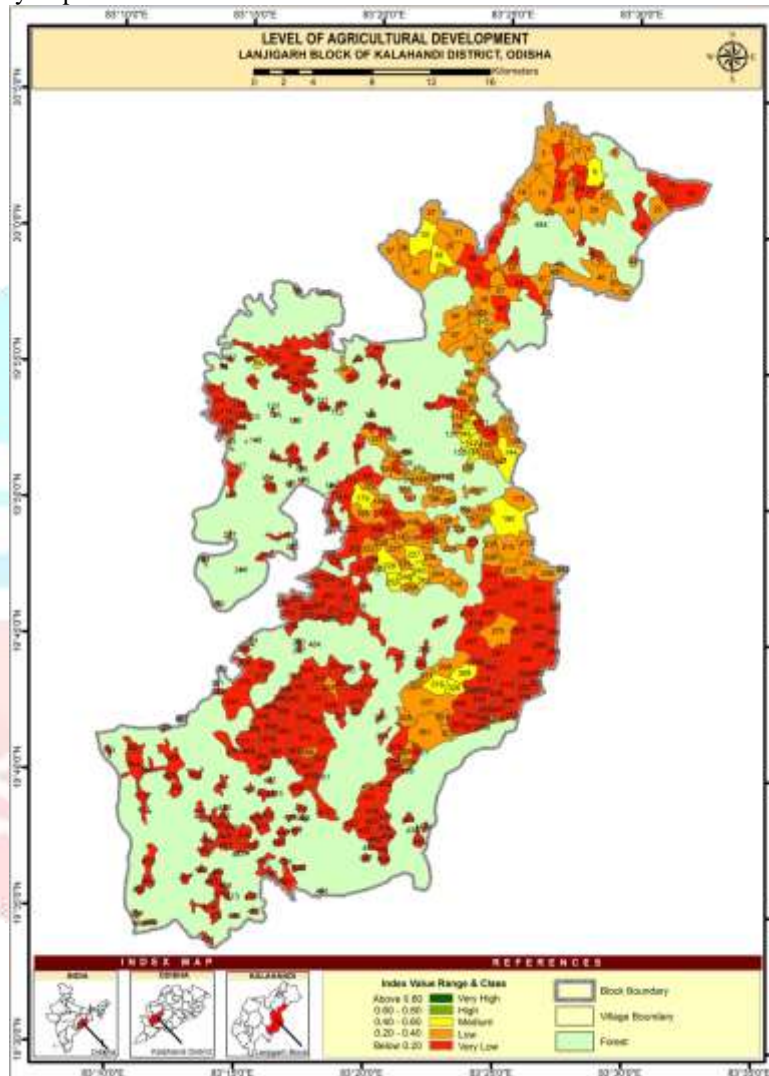


Fig 10: Level of Agricultural Development

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