GEOGRAPHICAL ANALYSIS

RESEARCH ARTICLE

Regional disparity in agricultural development: A block level analysis for Kongu uplands, Tamilnadu, India

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Abstract

The progress of agriculture is precondition for overall development of Indian economy. It pays meaningfully to the export incomes and affects the performance of other divisions of the economy through forward and backward links. The current paper investigates block and regional level disparity in agriculture development in Kongu Uplands on several of agricultural variables. It uses UNDP methodology to standardize various indicators for agricultural achievement in the study area. A composite index has been constructed at the block level and also regional level. The relative variations and changes in ranks of various blocks have been calculated. The agricultural development in the Kongu Upland is moderate with index value of 0.503. The outcomes inspired more determined effort on the side of the policy-makers is wanted if the development policy has to be made truly inclusive.

Keywords: Agricultural development; Kongu uplands; UNDP; composite index; policy makers

Introduction

Agricultural development is also a multi-dimensional concept. It development is a base for the economic development of any region. It is a one of the indicators of regional development and interior productions. Agricultural progress is necessary to provide food for growing non-agricultural labour force, raw materials for industrial sectors and saving and tax revenue to support development of the other economy, to obtain overseas exchange and to provide a growing market for internal productions. The agriculture sector is the backbone of Indian economy which provides the basic ingredients to mankind and now raw material for industrialisation. Agriculture is a base for employment opportunities for rural people on a huge scale. The spatial patterns of agricultural distribution and development are associated with different socio-economic and cultural factors. Agricultural activities largely depend on the resources of their close natural endowments which can be altered only at a heavy cost. Therefore, understanding the spatial differences in the level of agricultural development and creating their relationships with abiotic and biotic variables are necessary. The techniques of mapping of spatial characteristics of the level of agricultural disparity provide a sensible base for future arrangement of agricultural planning. It can be used as an active way for delimiting the regions, where even agrarian mechanisation could not bring about significant

changes and modification in crop structure and agricultural production which may thereby be termed as areas of weakness. A good scientific enquiry and evaluation of different dimension of development is highly necessary in order to have a clear picture of the nature of agricultural development. The significance of agricultural sector in the Kongu Uplands is justified by the fact that approximately 40 percent of study area work forces are engaged in the agricultural activities. In addition to this 20 percent of people are also engaged in cultivation activities. In total, more than half of people in the Kongu Uplands is engaged in agricultural and allied activities. In particular references of Kongu Uplands, half of the people are inhabited in rural areas. So, determining the agricultural development is important and vital. The agricultural development in the Kongu Upland is moderate with index value of 0.503. The outcomes inspire a more determined effort on the side of the policy makers is wanted if the development policy has to be made truly inclusive.

Study Area

Kongu Uplands geographically lies between 10°10' - 12°10' North and 76°40' – 78°25'East which covers an area of 26,000 sq. km. which is almost one fifth of the total geographical area of Tamil Nadu. The Uplands is drained by the river systems of Cauvery and its tributaries of Bhavani, Noyyal and Amaravati. More than 70 percent of the Uplands are meant to agriculture especially in its central plain regions. The people in this region earn a considerable share of their livelihood through agricultural and industrial activities. Administratively, the western boundary of the study area shares its boundary with state of Kerala. The region comprises of eight districts viz. Coimbatore, Tiruppur, Erode, Karur, Salem, Namakkal Tiruchirappalli and Dindigul. The districts of Coimbatore, Tiruppur and Erode completely covers in the study area while Karur, Salem, Tiruchirappalli, Dindigul and Namakkal shares only a small portion to the study area. There are 37 taluks and 81 blocks that falls in the Kongu Uplands.

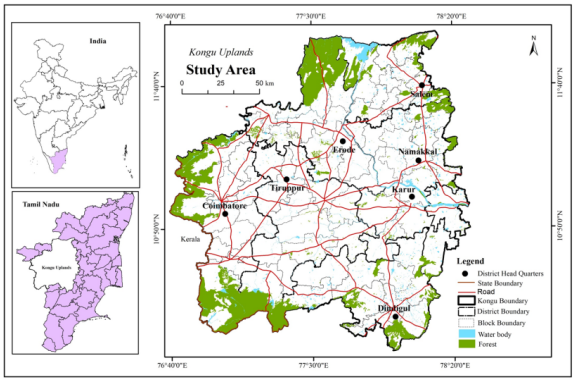

Fig. 1. Location map of the study area

Materials and Method

This study is based on secondary data. Blocks have been taken as the unit of study. The Survey of India toposheets within in the scale of 1:2, 50,000, block level maps from state government and Census Hand Book are utilised to demarcate the physical and block boundary of the study area. The geology and geomorphology of the area and its surroundings are analysed through maps and report of Geological Survey of India (GSI) and LISS III Satellite Image. Block wise information on population, population attributes, land use, irrigation, cropping pattern, agricultural labours, birth rate and death rate are collected from Census Hand Book, Agricultural Offices (G-Return data) of concerns districts and planning Commission of Tamil Nadu. Infrastructural, health, education and industrial related data are gathered from Deputy Directorate of Health and Sarva Shiksha Abhiyan (SSA) (2011-2014), Census Hand Book and Report (2001 and 2011), Economic and Statistical Hand Book (2014-15), State Planning Commission of Tamil Nadu Report (2003 and 2016- 2017), various industrial survey reports and UNDP annual Report. Based on the information collected, GIS software is used to prepare thematic spatial information for evolving appropriate development strategies and planning for the study area. Sums of sixty indicators are considered in assessing the overall development. The United National Development Programme (UNDP) methods are adopted for computing and analysing the composite indices of the study. The spread sheet is used for computing the correlation analysis of checking the effect and relation of obtained results. ArcGIS 10.1 environment is used for preparing and analysing the various thematic maps related to regional development. The following indicators are used: Unirrigated area, Rural Population, Net Zone Area, Net Area Cultivable, Land Cultivated More than Once, Irrigation Intensity, Irrigated Area, Gross Irrigated Area, Gross Area Cultivable, Cultivators, Cropping Intensity, Agricultural Power Supply, Agricultural Labours, Agricultural Credit Society, Percentage of Irrigated Area to Total Cultivable Area, Percentage of Cultivable Area to Total Area.

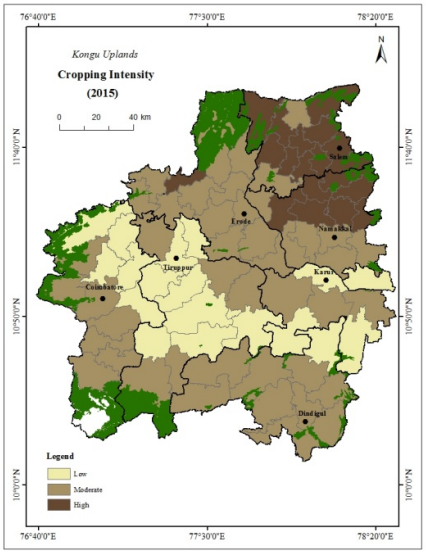

Fig. 2. Cropping intensity

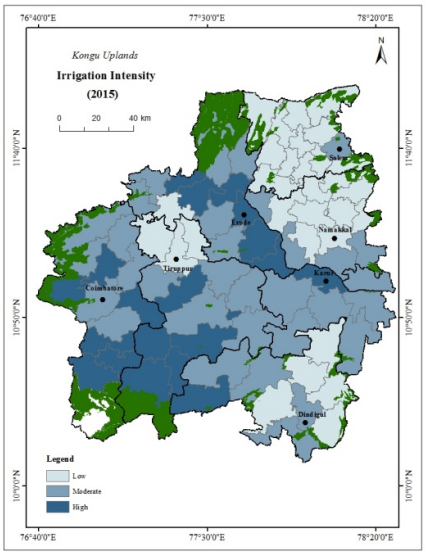

Fig. 3. Irrigation intensity

Results and Discussions

Irrigation Intensity

The intensity of irrigation is the proportion of total gross cropped area to the net sown area. In principle the intensive cultivation is possible in two or more seasons for growing various crops or mono crop there is sufficient water is needed for crop cultivation. There is a wide variation in the irrigation intensity. It ranges from 100 to 147. The high irrigation intensity is found in the western, north-western, southwestern portions and some patches of central area of the Uplands. The major portions of the medium intensity of irrigation is prevails in the south, east and southeastern regions. The lowest intensity is distributed in the extreme northeast, east and the pocket area of the central part.

Cropping Intensity

Cropping intensity is the successive cropping in a particular land throughout the year. The intensity of cropping shows the magnitude to which the unit of area has been used intensively for several purposes of agriculture. The cropping intensity usually mentions that the number of crops rising in a region at a specific time. Though, high intensity of cropping reveals the maximum and multiple usage of land, the low intensity shows minimum and single usage of land.

Table 1. Irrigation patterns

Category	In Hectares	In Percentage
Gross Irrigated Area	639,940	25
Gross Area Cultivated	1,350,176	52
Net Area Cultivated	1,138,450	44
Total Unirrigated Land	379,864	15
Cropping Intensity	——	111
Irrigation Intensity	———	50

Distribution of cultivators

A person is classified as cultivator if he or she is engaged in cultivation of land owned or from government or from private persons or institutions for payment in money, kind or share. The cultivators are mostly land holders and engaged in all kinds of cultivation process of crop production and rendering agricultural labour on their land. Out of total workers, the average cultivator of the Uplands is 24 percent in 2001 and 19.61 percent in 2011. Overall there is declining trends in cultivators in the Uplands at the rate of 4.4 percent. In Kundadam block, among the total workers the share of cultivators is 44.9 percent. This block is top at the cultivators. The low concentrations of cultivators are noted in the Dindigul (9.9 percent) and Salem (8 percent) blocks. In 2011, the map indicates that the central southern part and a pocket of north, east, southeast and west of the Uplands have high concentration of cultivators. The remaining areas reflect the moderate to low cultivators.

Distribution of agricultural laborers

A person who works on another person's land for wages in cash or kind or share is regarded as an agricultural labourer. They have no risk in the cultivation, but merely works on another person's land for wages. An agricultural labourer has

no right of lease or contract on land on which they work (Census of India). The average agricultural labourers in the Uplands are 39.39 percent and 39.14 percent in 2001 and 2011 respectively. There is only a slight change during this decade. In 2011 the highest percentage of agricultural labourers are recorded in the Reddiarchattiram, Thoockanaickenpalayam, Krishnarayapuram and Thottiam. These blocks contribute above 55 percent. Twenty four blocks are note down moderate percentage of agricultural labour. The lowest contribution of agricultural labours can be seen in the six blocks. They are Pallipalayam (19.15 percent), Periyanaickenpalayam (17.7 percent), Palladam (17.32 percent), Thiruppur (15.49 percent), Sulur (14.28 percent) and Salem (9.63 percent). The highest distributional patterns of agricultural labourers are found in the north, east, west and southern portions of the Uplands region. A moderate to low patterns are seen only in some pockets of central, northeast and northwestern parts of the entire region. In overall, there is almost evenly distributed the agricultural labourers in 2001 and 2011 periods.

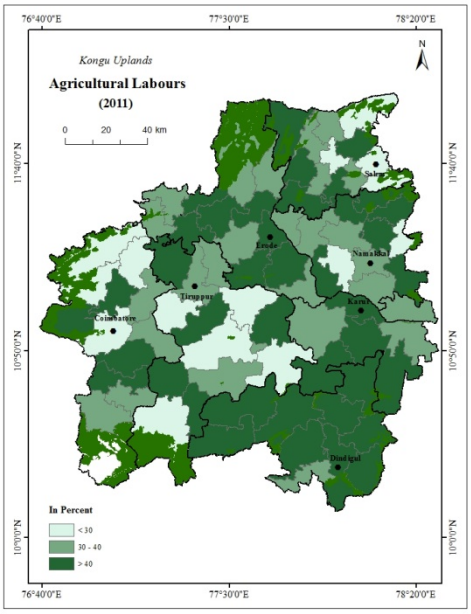

Fig. 4. Cultivators

Distribution of Agricultural Marketing Centres

Marketing is essential and effective machinery for generating necessary incentive for increased agricultural production and development. With the progress of urbanisation and industrialisation, marketing farm products have become more complex. The spatial distribution of agricultural market is not uniformly spread across the Uplands. These markets are held at different places on different days during a week. The highest numbers of agricultural markets are

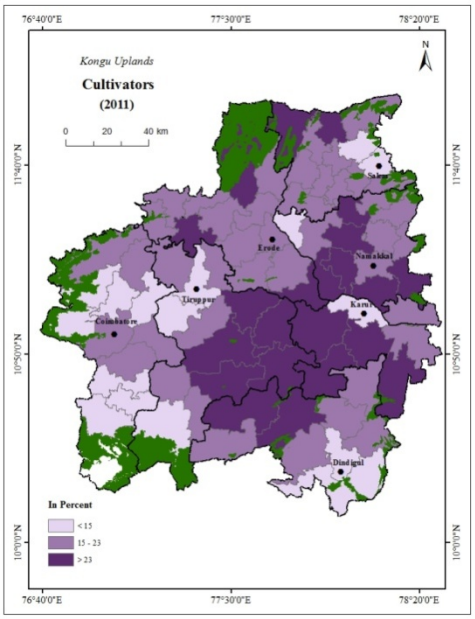

Fig. 5. Agricultural labours

spatially distributed in the Shanarpatti block. Here the total number of markets is 30. The spatial distribution of agricultural markets shows some distinct concentrations in northeast (adjoining Salem), north and northwest and western portions. Elsewhere, the distribution is sparse, particularly north, southern parts and some pockets of central region.

Agricultural credit society

Credit plays a pioneer role in the developments of agriculture. Agriculture needs production credit of short term for meeting current cultivation expenses such as wages, seeds, fertiliser, pesticides, hire and maintenance of implements and machinery etc. It also requires investment credit for long term development programmes and schemes. In 2011, the highest number of agricultural credit society is found only in one block i.e. Thoppampatti (21). A moderate number of agricultural markets are displayed in the 22 blocks. In 2011, it is interesting to note that the number of agricultural credit societies is relatively high in northwest and southwestern parts of the Uplands. A moderate number of these societies have concentrated in the northeast and southwestern portions. There is increasing trends of agricultural credit society between 2001 and 2011.

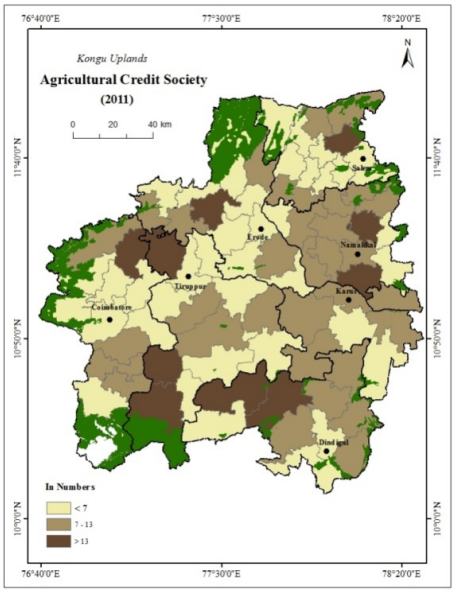

Fig. 6. Agricultural marketing

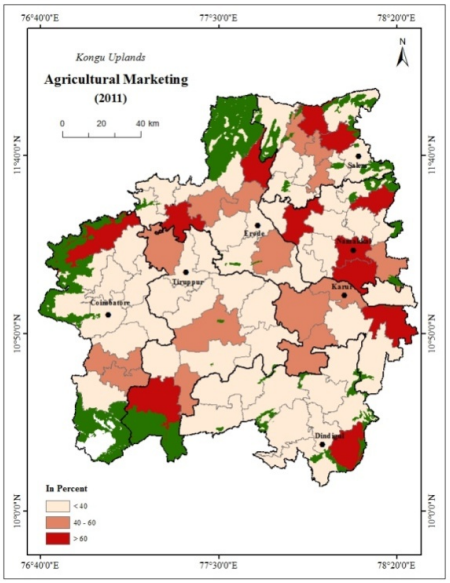

Fig. 7. Credit society

Table 2. Variables of agricultural development

Category	Total Number	Percentage
Cultivators	777,132	20
Agricultural Labour	1,167,423	39
Agricultural Power Supply	1,604	—–
Credit Society	675	41
Veterinary Hospital	444	32
Rural Population	6,987,082	—–

Disparities of agricultural development

The significance of agricultural sector in the Kongu Uplands is justified by the fact that approximately 40 percent of study area work forces are engaged in the agricultural activities. In addition to this 20 percent of people are also engaged in cultivation activities. In total, more than half of people in the Kongu Uplands is engaged in agricultural and allied activities. In particular references of Kongu Uplands, half of the people are inhabited in rural areas. So, determining the agricultural development is important and vital. Agricultural development in the Kongu Uplands is assessed by 16 indicators. These are percentage of cultivators, agricultural labours, number of agricultural labours, cultivable area to total area, irrigated area to total cultivable area, net area zone, rural population, net area cultivated, gross area cultivated, agricultural credit society, crop intensity, irrigation intensity, total irrigated area and total unirrigated area. The agricultural development in the Kongu Upland is moderate with index value of 0.503.

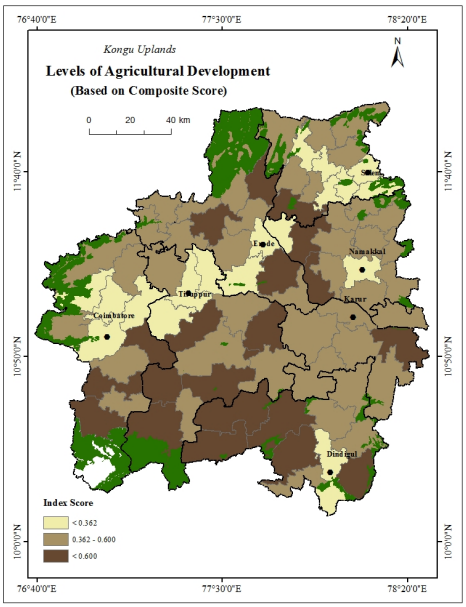

Fig. 8. Disparities of agricultural development through composite score

A pattern of high agricultural development is found in the 21 blocks of the Uplands of Tamil Nadu. The range of high agricultural development lies above 0.600 and share of 27 percent of total geographical area. The Udumalpet block stands at first position in terms of agricultural development. This is followed by Anaimalai, Gudimangalam, Thoppampatti, Palani and Gobichettipalayam. Those index values go above the 0.500. The high development is concentrated in the south and south western portions of the Uplands that extended from

Pongalur block in the north to Anaimalai block in the southwest and Reddiachitram in the southeast. Second high group of this type is observed in the north, central and east which is extended from Anthiyur in the north to Krishnanarayapuram in the east and western limits of this category is Gobichettipalayam. Two isolated blocks, Shanarpatti and Vellakoil lies on the southeast and central regions of the study area.

With composite value ranges from 0.362 to 0.500 come under the patterns of moderate agricultural development. There are 44 blocks fall under this category. It contributes 54 percent of the total agricultural development in the Kongu Uplands. The major portion of the moderate development in terms of agriculture is found in the central to south eastern portions. This category extended from Kangeyam in the northwest to Vennanthur in the southeast. Second category is focused on the near northeastern parts of the study area. The third category of moderate development is found in the extreme north and northeastern area which includes Kolathur, Mecheri, Kadayampatti, Idappady and Konganapuram. The next category consists of north, northeast and the western portion of the study area. The moderate agricultural development is due to the intermediate availability of agriculture developmental infrastructure.

The pattern of low development of agriculture consists of 16 blocks of the study area. The composite value of this category ranges below 0.400. It shares an account of 19 percent of total geographical area of Uplands. The least development is found in the Tirupur and Salem blocks of the Uplands. The composite values of these blocks are 0.174 and 0.152 respectively. An elongated stretch of low development in terms of agriculture is extended from Madukkarai in the northwest to Pallipalayam in the northeast. The Salem portion of the northeastern also comes under this category. The eastern and southeastern portions of the Uplands also depict this category of development. Low percentage of cultivators, agricultural labourers, number of agricultural labourers, cultivable area to total area, irrigated area to total cultivable area, net area zone, rural population, net area cultivated, gross area cultivated, agricultural credit society, crop intensity, irrigation intensity, total irrigated area and total unirrigated area which leads to the low development in terms of agriculture in Kongu Uplands of the Tamil Nadu.

Overall performances of agricultural components

The delimitation pattern of the level of agricultural development is based on some relevant indicators. Kongu Uplands is located in the western parts of Tamil Nadu and eastern parts of Western Ghats and it has the scope for agricultural development. Though Uplands situated on the south and southwest of Cauvery River shows remarkable disparities in the levels of agricultural development, this development is not uniform in all blocks of the Uplands of Tamil Nadu. In the Uplands, there is spatial variation in the level of agricultural development. The different blocks of the study area characterised by varying development due to the diversity in physical, cultural, social, economic and other factors.

In order to analysis the spatial patterns of overall agricultural developments, composite of UNDP techniques have been adopted. Selection of indicators provides a strong basis for attaining a more accurate conclusion on spatial pattern of agricultural development. Agricultural development of the study area plays a sensible role in the overall development of a region. This is also a component of regional development. In this analysis, 16 variables have taken for the assessment of agricultural development. The selected variables are given in the table 3. The table reveals the different dimension of agricultural development index. This consist of cultivators, agricultural labourers, percentage of area to the cultivable area, percentage of irrigated area to total cultivable area, net sown area, rural population, irrigation intensity, cropping intensity, gross area cultivable, gross irrigated area etc. The parameters of agricultural development show high, moderate and low performances.

Table 3. Overall performances of agricultural components

Category	Index	Rank	Remark
Unirrigated area	0.401	12	L
Rural Population	0.652	2	H
Net Zone Area	0.527	5	M
Net Area Cultivable	0.497	8	L
Land Cultivated More than Once	0.465	10	L
Irrigation Intensity	0.459	11	L
Irrigated Area	0.365	14	L
Gross Irrigated Area	0.345	15	L
Gross Area Cultivable	0.475	9	L
Cultivators	0.528	4	M
Cropping Intensity	0.523	6	M
Agricultural Power Supply	0.393	13	L
Agricultural Labours	0.763	1	H
Agricultural Credit Society	0.042	16	L
Percentage of Irrigated Area to Total Cultivable Area	0.599	3	H
Percentage of Cultivable Area to Total Area	0.522	7	M
Overall	0.503	—-	M

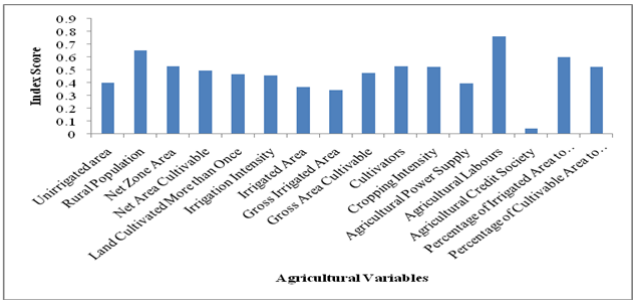

Fig. 9. Overall performances of agricultural variables.

Conclusions

During the initial stage of development, it is evident that the primary activities especially agriculture plays a key role in the development of a region. The delimitation of pattern of level of agricultural development is based on some relevant indicators. Regional disparity in agricultural development are due to the spatial variations in the accessibility or lack of net area sown to total geographical area, net irrigated area, number of agricultural credit society, agricultural labourers, cultivators, cropping intensity, irrigation intensity etc. A pattern of high agricultural development is found in the 21 blocks of the Uplands. The range of high agricultural development lies above0.500 index value and shares 26 percent of total study area. The Udumalpet block stands at firstposition in terms of agricultural development. This is followed by Anaimalai, Gudimangalam, Thoppampatti, Palani and Gobichettipalayam. Composite value ranging from 0.400 to 0.500 showthe pattern of moderate agricultural development. There are 43 blocks fall under this category. It contributes 53 percent of the total agricultural development in the Kongu Uplands.The major regions of the moderate development in terms of agriculture is found in the central to southeastern portions. This area is extended from Kangeyam in the northwest to Vennanthur in the southeast. The patterns of low agricultural development are consisting of 17 blocks of the study area. The composite value of this category ranges below 0.400. It shares an account of 21 percent of area of Uplands. The least developed blocks are Tirupur and Salem blocks. In general, the agricultural development in the Kongu Uplands is moderate with the index value of 0.503.

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