

JES-Applied Sciences

Land Use Pattern and Cropping Pattern of Orathanadu Block, Thanjavur District, Tamil Nadu using GIS

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Article Info	Abstract
Article History <i>Received</i> : 14-03-2011 <i>Revised</i> : 05-04-2011 <i>Accepted</i> : 07-04-2011	Agriculture is the most fundamental activity of mankind. Agriculture refers to the art of raising plant from soil. This study is mainly based by agriculture. Orathanadu block is located in the Eastern part of Thanjavur district in Tamilnadu. The land use patterns explain from agriculture cropping pattern and changes are analyzed. Two sets of data (1997&2009) were taken in this study. Primary and secondary data's are collected and analyzed by cropping pattern and land use pattern. The two sets of land use category mostly varied from net area sown 56.8% to 50.0% and current follow lands are 1.1% to 13.3% of increased. Others lands are not more changes. At the same year of the cropping pattern details of paddy 79.9% to 81.6%, Pulses 3.1% to 2.8%, Oil seeds 14.9% to 13.6%, Fiber is not changes the cropping pattern.
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Key Words: Cropping pattern, Land use, Remote sensing, GIS, Orathanadu

Introduction

Agriculture still forms the backbone of Indian economy, inspite concerned efforts towards industrialization in last three decades. Agriculture contributes a high share of net domestic product by sectors in India. Farmers are growing numerous of crops in the field rather than single crop. The distributional pattern of crops in any region is an outcome of predominance of certain crop or combination of crops. This is an term of emergence of typical crop combination. Cropping pattern in study region has undergone an evolutionary process. The soil and other natural environmental factors, along with the socioeconomic factors, affect the cropping pattern in study region.

Agriculture is the most fundamental activity of mankind. Agriculture refers to the art of raising plant from soil. It is carried throughout the world. In many Asian countries more than 70 percent of the population depends upon agriculture. Even in industrialized countries, the agriculture is an important activity because it provides food crops like paddy and wheat, industrial raw materials like sugarcane and rubber, and many other products.

Rapid land use change has taken place in Thanjavur district and Orathanadu Block such as the Cauvery delta over the past three decades due to accelerated and mainly for agricultural, industrialization and urbanization.

Due to the growth of population the food requirements are also increased. In order to meet the basic requirements, the govt. has planned to increase the irrigation facilities and the agricultural inputs. (HYV and of seeds, agricultural implements etc.) to the farmers and also implement the schemes and incentives.

Aims and objectives

The present study is going to analyze the land use and cropping pattern of Orathanadu block. The following objectives are as follows.

- i) To analyze the land use pattern of orathanadu block.
- ii) To study the sources of irrigation and analyze the cropping pattern related with physical elements.
- iii) To analyze the changing pattern of land use and cropping pattern.

Review of literature

Some of the previous studies on agricultural production in the colonial period deal with undivided India [10], some deal with British India [2,4], and others deal with areas of contemporary India [8], but very few investigate the case for areas of contemporary Pakistan and Bangladesh in a way comparable with that for India. If we restrict to Punjab and Bengal, there are a few good studies with comparative perspectives between Indian Punjab and Pakistan Punjab and between West Bengal and East Bengal (Bangladesh) [1,5]. However, the coverage of these studies is limited those investigating the pre-1947 period did not adjust for the boundary changes, while those comparing the areas corresponding to the current international borders investigated the post-1947 period only. Although it is true that the state of Pakistan did not exist before 1947 and the state of Bangladesh did not exist before 1971, investigating agricultural production trends for "fictitious" Pakistan before 1947 and "fictitious" Bangladesh before 1971 would give us valuable insights, since farming is carried out on land, which is immovable by definition.

Cropping pattern is the proportion of area under various crops at a point of as it changes over space and time. The

cropping patterns of a region are closely influenced by the geo-climatic, socio-economic, historical and political factors [6] patterns of crop land use of a region are manifestation of combined influence of physical and human environment. Differences in attitude towards the rural land in the level of prosperity and technology have produced changes in emphasis. Their effects on both landscape and land use studies are likely to be far reaching [3]

Cropping pattern of rice could be monitored by analyzing phenological features obtained from high-temporal resolution satellite data. MODIS was employed as the source data to characterize the pattern of rice planting in Asian region[9,11,13]. These studies showed successfully the pattern of spatial distribution of rice planted area in the continental scale, and also presented properly temporal changes of rice cultivated area in the large scale irrigated land. However, the results of these studies could not be optimized to estimate the case of complex cropping pattern typically presented in West Java, Indonesia. At this point it is significant to implement

further study of method of monitoring rice planting, which should be applicable to the tropical humid region. Then, the author preliminarily examined adaptability of composite MODIS data for estimating rice planting time in Indonesian case study [12].

Study area

Orathanadu block is one among the blocks of Thanjavur district which is formed in 1986. It is located in the eastern part of Thanjavur district in Tamilnadu. It extends latitudinally from 10°33' N to 11°13' N and longitudinally, from 78°15' E to 79°10'E. It is bordered by Pudukkottai and Trichy district in the west, Thanjavur and Mannargudi in East, Pudukkottai Taluk in South, Papanasam and Valangaiman in North. Orathanadu block covered area of 409.79sq.km, the population of 163742 in 2001. It consists of 65 villages and it has a plain topography. Cauvery river and Grand anaicut canal is the main sources of water. This block is highly influenced for the development of agriculture in and around.

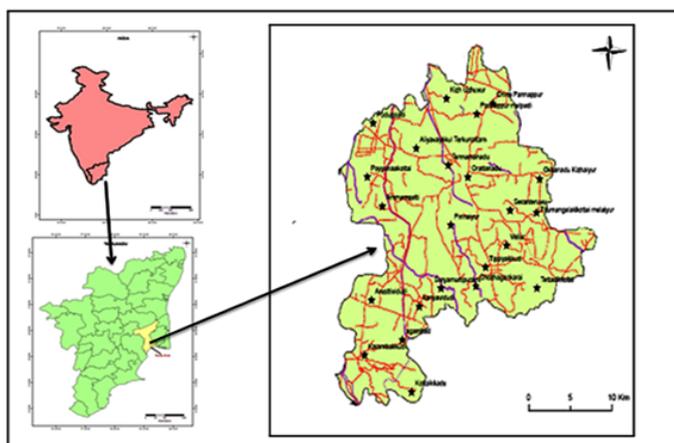


Fig.1 Location map of the study area

The annual temperature of Orathanadu block is 37.63°C. The maximum temperature is 38.50°C felt during the summer month of April to May. January to February the winter months with a minimum temperature of 29.72°C. The maximum

amount of rainfall received by the block is 321.2mm. The major soil types are 4. Mainly the soil names are Garden soil, loamy soil, red soil, and Sandy soil. The details are shown.(Table .1)

Table No.1: Soil Types

S.No.	Soil Types	Area in Hectares
1.	Sandy Soils	7254.883
2.	Loam Soils	18137.083
3.	Garden Soils	19137.053
4.	Red Soils	18277.983

Methodology

The present study is based on secondary sources of information Area under different crops and land use for the year 1997 to 2009 were collected from statistical department of Orathanadu block. The information regarding irrigation, soils, population and rainfall are collected from Joint Director of Agriculture, Orathanadu block.

In this study land use change were analysed by use of 1997 and 2009 data. The land use map of 2009 is drawn by

use of GIS &Remote sensing techniques. The appropriate results were drawn using toposheet, aerial photo, satellite imageries.

Land Use Pattern Analysis

Land use (1997 -2009)

Land, water and soils are the basic resources of agriculture. The present study is focusing the availability of land under various uses. Thanjavur is the predominantly of agriculture region. The most of the peoples are directly or

indirectly related to the agricultural activities. In 1997 the total geographical area is 40979 hectares. The land usages are different categories. The non-agriculture uses of the area is 18.7%, cultivable waste 5.8% .the grass lands is 1% and current fallow land is about 1.1%. The land under

miscellaneous tree crops are 4.6%, the other follow land is about 11.7% and the net area shown is 56.8% of land. The agriculture cultivated by various crops in this area (Table 2 & fig.2).

Table No. 2: Land use (1997 -2009)

Sl.no.	Land Use	Area in hectares		Area in Percentage	
		1997	2009	1997	2009
1.	Forest	-	-	-	-
2.	Barren and uncultivable land	-	-	-	-
3.	Land put non-agriculture uses	7693	7862	18.7	19.1
4.	Cultivable wastes	2416	2202	5.8	5.3
5.	Grass land	450	528	1.0	1.2
6.	Land under miscellaneous tree crops	1888	1997	4.6	4.8
7.	Current fallow	456	5460	1.1	13.3
8.	Other fallows land	4798	2420	11.7	5.9
9.	Net area sown	23278	20510	56.8	50.0
	Total Geographical Area	40979	49797	100	100

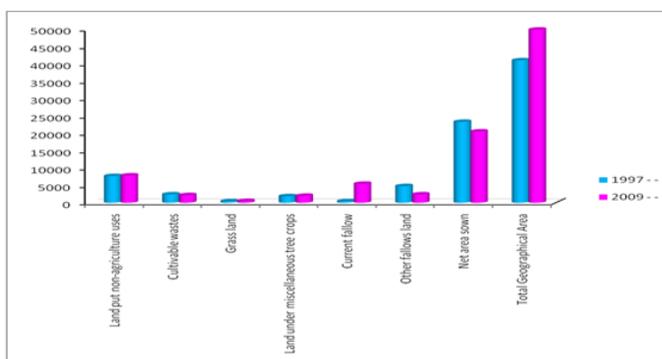


Figure- 2 Land use 1997 -2009

The land use has been changed in 2009. The land put to non agricultural uses is 19.1%. The cultivable waste is 5.3%. The grass land is about 1.2%. The land under miscellaneous tree is 4.8%, current fallow is about 13.3%. The other follow land is 5.9% and the net area sown is 50.0%. The present land use has major changes particularly in net area sown is about 68.8%.

Cropping (1997-2009)

There are quite a large variety of crops with varying hectares under cultivation. There are four important crops are selected for the present analysis. Three crops are traditional crops and only one commercial crop has been taken into

consideration. Based on the preparation of land under each crop to the total area cultivation (Table 3 & Fig.3).

During the year of 1997&2009 paddy, Ragi, Cholam, Cumbu, Greengram, Blackgram, Redgram, Groundnut, Coconut are Gingili, Sugarcane and Cotton are selected for the study. The total cultivated are of 42331 hectares of land under paddy in Orathanadu block in Thanjavur district.

i)Paddy

According to the areal extent paddy is the dominant crop in the block. It is ranked as a first crop, in 1997 – 2009. The total area under paddy is about 33853 &43854 hectares (79.9% &81.6%) area to the total cropped area. Due to the

availability of fertile soil and drainage facilities the cultivation of paddy is more than that of other crops like ragi, cholam etc.

ii)Oil seeds

Oil seeds ranks 2nd important crops. Oil seeds are a traditional crop taken place in the cropping pattern. Oil seeds include groundnut gingili, coconut etc., though it is a commercial crop, the main crop is groundnut. The cultivation of oil seeds in 1997 is 6311 &73.11 hectares in Orathanadu block 14.9% &13.66%

Oil extracted from the seed is essentially used as a cooking media. They have a variety of uses except olives and

oil palms of all varieties of seeds are grown. This includes groundnut, coconut and sunflower in the order of importance.

iii)Pulses

Total cultivated area under pulses is about 1345&1545 hectares 3.12%&2.8%. The important pulses like green gram, black gram, and Red gram. They are traditional crops of this region and cultivated as leguminous crop. They are great importance for more than one reason. They supply much required protein to the vegetarian diet of most Indians. They are leguminous and restore fertility to the soil by fixing up of atmospheric nitrogen; therefore these are valuable crops of crop rotation.

Table No.3 Cropped area.(1997 – 2009)

S.No.	Crop	Area in Hectares		Percentage	
		1997	2009	1997	2009
1.	Paddy	33853	43854	79.9	81.6
2.	Pulses	1345	1545	3.1	2.8
3.	Oil Seeds	6311	7311	14.9	13.6
4.	Fibers	822	1023	1.9	1.9
	Total	42331	53733	100	100

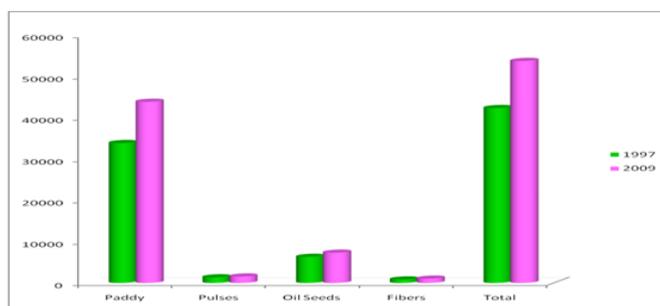


Figure – 3, Cropping pattern 1997 – 2009

iv)Fiber

Fiber crops particularly cotton is cultivated about 1023 hectares 1.9% on 1997 & 2009. This year the production is same. Cotton is a native crop in India; we are the second largest producer of cotton next to Brazil, though we lead the world in terms of area under cotton cultivation. The percentage of area under cotton has no change.

Changes in land use and cropping pattern (1997-2009)

The present land use pattern of Orathanadu block is nine categories as followed. The land put to non agriculture uses for the year 1997 18.7% (7693 hectares). In 2009 it has been increased to 79.1% (7862 hectares). But it has been increased to 5.3% (2202 hectares) in 2009. The grass land occupies about 1.0% (450 hectares). In 2009 it has been increased to 1.2% (528 hectares). The land under miscellaneous tree and crops is 4.6% (1888 hectares) 1997. It increased to 4.8% in 2009. The land under current fallow is about 1.1% (456 hectares) in 1997. It has been increased about 13.3% (5460 hectares) in 2009. The land other follows is about 11.7% (4798 hectares) in 1997. But in the year 2009 the area has been reduced in 5.9% (2420 hectares). The net area sown is about 56.8% (23278 hectares) in 1997. But the percentage

land under net area sown declined about 50% (20510 hectares) in 2009.

The crop cultivation is well practiced in Orathanadu block. The cultivated paddy is about 79.91% (33853 hectares) in 1997. But is has been increased to 81.64 (43854 hectares) in 2009. The pulses (black gram, green gram, redgram) is about 3.11 (1345 hectares) in 1997. The cultivated area has been reduced to 2.81 (1545 hectares) in 2009. The oil seeds (Groundnut, sunflower Oil) cultivated about 14.9% (6311 hectares) in 1997. The percentage of has been declined to 13.6% (7311 hectares) in 2009. The other important crops like fibers (Cotton) are about 1.9% (822 hectares) in 1997. But there is no change in the cultivated area of fiber in 2009. These changes mainly due to the growth of population in the cultivable area may change into a residential area. The major change of land use has been well noticed in the southern side of the block (Fig.4).

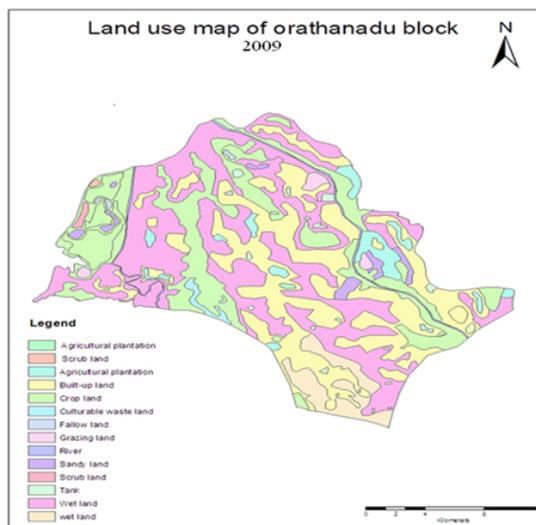


Fig.4, Land use map of Orathanadu block-2009

Summary and Conclusion

Land use and cropping pattern are inter related with factors like soil and water. The study is Orathanadu block is one of the blocks in Orathanadu Taluk. This is centrally located in Thanajvur district. To obviate the problem of short supply of water, attempt has been made to cultivate crops through irrigation. Out of the net sown area (21619 hectares) the total irrigated area is 26619 hectares. Canals 93.5%, wells 0.6% and tube wells (5.8%) are played as sources of irrigation and helped to develop the agriculture. Physiographically this is an area of plain region. Cauvery River and its branch Grand Anaicut canals are supply the sources of irrigation climatically this region comes tropical conditions and receivers moderate rainfall.

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