



ASSESSING THE EXTENT OF LAND USE CHANGES IN PADDY FIELDS IN KERALA

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Abstract

Land is the most important natural resource which human beings have inherited. It is the main source for the basic necessities like food, shelter and clothing. As a result of increasing population pressure, requirements increased and became complex. Economic development and structural changes led to considerable changes in the land use and cropping pattern because land plays a crucial role in the development process.

The increasing population and developmental activities put pressure on the utilization of land. The growth of population and rapid urbanization change the pattern of land utilization by creating new townships, infrastructural facilities etc. Kerala has witnessed major changes in its land use pattern. The most important among them are the shrinking area devoted to cultivating food crops and an increase in the rate of deforestation. With the changing land use pattern, wetlands and paddy lands have been severely affected either by converting them for constructing buildings or for cultivation of other crops or for the construction of infrastructural facilities. Thus the rice culture of Kerala is fast vanishing. Rice has been the staple food of Keralites and presently Kerala has to depend on other states for her requirements.

Index terms: Land use change, Paddy fields

I INTRODUCTION

Land is a basic resource for human society. Land use change is necessary for the economic development and social progress. However, land use change does not come without cost. Conversion of farmland and forest to development process reduces the amount of land available for food and timber production.

The changes in paddy field play an important role in the shifting of land use. Rice one of the world's most important crops is grown in around 114 countries in the world. It is the staple food of nearly half of the world's population. Rice is grown mostly under flooded conditions. Paddy field is a flooded parcel of arable land used for growing semi aquatic rice. Paddy cultivation requires great deal of labour and large quantity of water for irrigation. The word paddy is derived from Malay word 'padi' which means 'rice plant'. Paddy fields can provide habitat for wetland

species and many ecosystem services which is similar to wetlands. The value of paddy fields becomes vastly important.

II OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To study the changing land use pattern in Kerala with special reference to paddy fields.
2. To analyze the extent of paddy land conversion in the study area.

DESCRIPTION OF THE STUDY AREA AND SELECTION OF THE SAMPLE

Kerala, one among the state of Kerala has 14 districts and rice is cultivated in all districts. The area under paddy cultivation is decreasing in all districts. On the basis of geographical, historical and cultural similarities Kerala is divided into North Kerala, Central Kerala and South Kerala. One district from each geographical division are selected to get the representation of the whole Kerala. Accordingly Malappuram district was selected from North Kerala, Ernakulam district was selected from Central Kerala and Alappuzha district from South Kerala. From each district block wise area was selected. Accordingly, Kuttipuram block from Malappuram district, Koovappady block from Ernakulam district and Veliyanad block from Alappuzha district was selected.

MAJOR LEGISLATIONS IN KERALA TO PROTECT PADDY LANDS

The Kerala Land Utilization Order, 1967 issued by the Government of Kerala under the Essential Commodities Act 1955 extends to the whole of Kerala. The two main objectives of the Order were (a) to bring occupied waste or arable lands likely to be left fallow during a cultivation season back to cultivation with paddy or other food crops, and (b) to prevent the conversion of any land cultivated with food crops for other purpose, except with the written permission of the District Collector.

The Kerala Conservation of Paddy Land and Wetland Act, 2008 was enacted to conserve the paddy land and wetlands in Kerala and to restrict the conversion or reclamation in order to promote growth in the agricultural sector and to sustain the ecological system in the State of Kerala. The Government noticed that indiscriminate and uncontrolled reclamation and massive conversion of paddy land and wetland were taking place in the State and no existing law in the state restrict it effectively. Hence this act aims at the conservation of paddy land and wetland.

MAGNITUDE OF THE REDUCTION IN THE AREA UNDER PADDY CULTIVATION

During 1955-56 the area under paddy cultivation was 759368 hectares. Up to 1975-76 there was an increasing trend in the area under paddy cultivation. Towards the end of the 1990's the area under paddy cultivation in Kerala become halved. During the year 2014-15 the area under paddy cultivation in Kerala was only 198159 hectares.

Table 1. Area of Paddy Cultivation in Kerala

| Year | Area ('000 Hectares) |
|---------|----------------------|
| | Kerala |
| 1955-56 | 75.9368 |
| 1956-57 | 76.2039 |
| 1957-58 | 76.6774 |
| 1958-59 | 76.8435 |
| 1959-60 | 76.8976 |

| | |
|---------|---------|
| 1960-61 | 77.8926 |
| 1961-62 | 75.2704 |
| 1962-63 | 80.2676 |
| 1963-64 | 80.5083 |
| 1964-65 | 80.1121 |
| 1965-66 | 80.2329 |
| 1966-67 | 79.9438 |
| 1967-68 | 80.9544 |
| 1968-69 | 87.3871 |
| 1969-70 | 87.4059 |
| 1970-71 | 87.4830 |
| 1971-72 | 87.5157 |
| 1972-73 | 87.3704 |
| 1973-74 | 87.4675 |
| 1974-75 | 88.1466 |
| 1975-76 | 87.6022 |
| 1976-77 | 85.4374 |
| 1977-78 | 84.0374 |
| 1978-79 | 79.9238 |
| 1979-80 | 79.3266 |
| 1980-81 | 80.1699 |
| 1981-82 | 80.6871 |
| 1982-83 | 77.8490 |
| 1983-84 | 74.0086 |
| 1984-85 | 73.0379 |
| 1985-86 | 67.8281 |
| 1986-87 | 66.3803 |
| 1987-88 | 60.4082 |
| 1988-89 | 57.7557 |
| 1989-90 | 58.3388 |
| 1990-91 | 55.9450 |
| 1991-92 | 54.1327 |
| 1992-93 | 53.7608 |
| 1993-94 | 50.7832 |
| 1994-95 | 50.3290 |
| 1995-96 | 47.1150 |
| 1996-97 | 43.0826 |
| 1997-98 | 38.7122 |
| 1998-99 | 35.2631 |
| 1999-00 | 34.9774 |
| 2000-01 | 34.7455 |
| 2001-02 | 32.2368 |
| 2002-03 | 31.0521 |
| 2003-04 | 28.7340 |
| 2004-05 | 28.9974 |
| 2005-06 | 27.5742 |
| 2006-07 | 26.3529 |
| 2007-08 | 22.8938 |
| 2008-09 | 23.4265 |
| 2009-10 | 23.4013 |
| 2010-11 | 21.3187 |

| | |
|---------|---------|
| 2011-12 | 20.8160 |
| 2012-13 | 19.7277 |
| 2013-14 | 19.9611 |
| 2014-15 | 19.8159 |

Source: Economic Review (Various Issues), Kerala State Planning Board, Thiruvananthapuram

As per the records of the Government of Kerala in 1974-75 the area under paddy cultivation in Kerala was 876000 hectares. As per the data presented by the Agricultural Minister in Kerala Legislative Assembly on August 2013, the area under paddy cultivation was 197277 hectares. And according to the data from the Rice procurement agency of Kerala viz SupplyCo the state has an area of 1.5 lakhs hectares paddy land under cultivation. The official record of the Agricultural Department reveals the area as 1.78 lakhs hectares. It is reported that in 39 years Kerala lost 7 lakhs hectares of paddy fields. (Mathrubhumi Newspaper daily dated February 14, 2015).

AREA UNDER PADDY CULTIVATION IN VARIOUS DISTRICTS OF KERALA

Paddy one of the important cultivation of the districts of Kerala was showing a declining trend especially after 1990s. The shifting of paddy fields to other cultivations and construction activities are responsible for this. The Information Technology revolution in Kerala also paved the way for the utilization of paddy fields for the construction of IT Parks.

Table 2 Area under Paddy Cultivation in Various Districts of Kerala and the Compound Annual Growth Rate (In Ha)

| Districts | 1980-81 | 1990-91 | 2000-01 | 2010-11 | 2014-15 | CAGR* |
|---------------------|---------------|---------------|---------------|---------------|---------------|--------------|
| Thiruvananthapuram | 32583 | 21677 | 6995 | 2833 | 2093 | -7.98 |
| Kollam | 50055 | 30513 | 14939 | 2402 | 1327 | -10.42 |
| Pathanamthitta | 17439 | 14234 | 6279 | 2976 | 2592 | -5.61 |
| Alapuzha | 82466 | 60675 | 37740 | 36661 | 34415 | -2.61 |
| Kottayam | 31948 | 26257 | 16677 | 14712 | 17295 | -1.84 |
| Idukki | 9261 | 5078 | 3473 | 1634 | 697 | -7.54 |
| Ernakulam | 102500 | 63078 | 37433 | 8675 | 4644 | -8.95 |
| Thrissur | 110314 | 74038 | 39384 | 19297 | 24151 | -4.50 |
| Palakkad | 183634 | 145687 | 118701 | 84058 | 82912 | -2.38 |
| Malappuram | 80022 | 51934 | 23148 | 6563 | 8402 | -6.60 |
| Kozhikode | 45451 | 12062 | 6737 | 841 | 2321 | -8.62 |
| Wayanad | 30021 | 20343 | 15000 | 9413 | 9690 | -3.37 |
| Kannur | 73465 | 19582 | 11791 | 4977 | 4955 | -7.85 |
| Kasargode | | 14292 | 7413 | 3180 | 2665 | -7.04 |
| Total Kerala | 849159 | 559450 | 345710 | 198222 | 198159 | -4.31 |

Source: Economic Review (Various Issues), Kerala State Planning Board, Thiruvananthapuram.

* CAGR Computed from this data.

Table 3 Decadal growth in Area under Paddy Cultivation in Various Districts of Kerala (In Ha)

| Districts | 1990-91 | 2000-01 | 2010-11 | 2014-15 |
|--------------------|---------|---------|---------|---------|
| Thiruvananthapuram | -33.47 | -67.73 | -59.50 | -26.12 |
| Kollam | -39.04 | -51.04 | -83.92 | -44.75 |
| Pathanamthitta | -18.38 | -55.89 | -52.60 | -12.90 |
| Alapuzha | -26.42 | -37.80 | -2.86 | -6.13 |
| Kottayam | -17.81 | -36.49 | -11.78 | 17.56 |
| Idukki | -45.17 | -31.61 | -52.95 | -57.34 |
| Ernakulam | -38.46 | -40.66 | -76.83 | -46.47 |
| Thrissur | -32.88 | -46.81 | -51.00 | 25.15 |
| Palakkad | -20.66 | -18.52 | -29.19 | -1.36 |
| Malappuram | -35.10 | -55.43 | -71.65 | 28.02 |
| Kozhikode | -73.46 | -44.15 | -87.52 | 175.98 |
| Wayanad | -32.24 | -26.26 | -37.25 | 2.94 |
| Kannur | -73.35 | -39.79 | -57.79 | -0.44 |
| Kasargode | - | -48.13 | -57.10 | -16.19 |
| Total Kerala | -34.12 | -38.21 | -42.66 | -0.03 |

Source: Computed from the data from Economic Review (Various Issues), Kerala State Planning Board, Thiruvananthapuram

III RESULTS AND DISCUSSIONS

3.1 Percentage of Paddy Land Conversion to Other Purposes

During the field survey detailed investigation was conducted among the paddy land owners regarding the area of paddy land converted for different purposes. Only 19.7 percent of the households did not convert their paddy lands. 8 percent converted less than or equal to 25 percent of their paddy lands. 35 percent converted 26-50 percent of their paddy lands. 8.5 percent converted 50- 75 percent and 28.8 percent converted more than 75 percent of their paddy lands.

Chi- square test was conducted to test whether there was any significant difference in the percentage of paddy land conversion in Kuttippuram, Koovappady and Veliyanad blocks. The result is presented in Table 4.

Table 4 Percentage of Paddy Land Conversion to Other Purposes

| Paddy land converted (%) | Kuttippuram | | Koovappady | | Veliyanad | | Total | |
|--|-------------|----------|------------|----------|-----------|----------|-------|----------|
| | Count | Per cent | Count | Per cent | Count | Per cent | Count | Per cent |
| Not converted | 18 | 11.6 | 59 | 21.1 | 41 | 24.8 | 118 | 19.7 |
| ≤ 25 | 19 | 12.3 | 9 | 3.2 | 20 | 12.1 | 48 | 8.0 |
| 26-50 | 49 | 31.6 | 78 | 27.9 | 83 | 50.3 | 210 | 35.0 |
| 50-75 | 11 | 7.1 | 27 | 9.6 | 13 | 7.9 | 51 | 8.5 |
| More than 75 | 58 | 37.4 | 107 | 38.2 | 8 | 4.8 | 173 | 28.8 |
| Total | 155 | 100.0 | 280 | 100.0 | 165 | 100.0 | 600 | 100.0 |
| Chi square = 84.601**; p-value < 0.001 | | | | | | | | |

Source: Primary Data.

** Significant at 0.01 level

Since p-value is less than 0.001, Chi square value was found to be significant at 0.01 level. This indicates that there is significant difference among the three blocks in the conversion of paddy land to other purposes. 37.4 percent of the respondents in the Kuttippuram block converted more than 75 percent of the paddy fields while in Koovappady block it was 38.2 percent and in Veliyanad it was 4.8 percent.

3.2 The Conversion of Paddy Land under Reversible and Irreversible Form

The changes in the paddy land area were mainly by converting these to reversible form or irreversible form. The area under irreversible form poses a serious threat to both the society and the environment. The area of paddy field in the three study areas of Kuttippuram, Koovappady and Veliyanad are 226.2, 289.3 and 175.0 hectares respectively. Out of the total paddy field in the study area of Kuttippuram (226.2 ha) 170.4 ha were converted. Of this, 34.5 percent were reversible and 65.5 percent were irreversible. In Koovappady among the total paddy fields of 289.3 hectares, 254 hectares were converted and out of this only 31.5 percent were reversible and 68.5 percent were irreversible land. In Veliyanad out of the 175 hectares of the paddy fields 69.25 percent were converted, 14.1 percent were reversible and 85.9 percent were irreversible. Thus among the total paddy land area of 690.4 hectares of paddy fields in the three regions a total of 493.65 hectares were converted and among this only 30.1 percent were reversible and 69.9 percent were irreversible. This brings out the seriousness of the paddy land conversion and if this trend is not brought under control the paddy fields in Kerala will be endangered. Table 5 gives the data regarding the area under reversible and irreversible paddy land area which changes its original use pattern.

Table 5 Area of Converted Paddy Fields under Reversible and Irreversible Form

| Block | Reversible form | | Irreversible form | | Total land area converted |
|-------------|-----------------|------------|-------------------|------------|---------------------------|
| | Area | Percentage | Area | Percentage | |
| Kuttippuram | 58.75 | 34.5 | 111.65 | 65.5 | 170.4 |
| Koovappady | 80 | 31.5 | 174 | 68.5 | 254 |
| Veliyanad | 9.75 | 14.1 | 59.5 | 85.9 | 69.25 |
| Overall | 148.5 | 30.1 | 345.15 | 69.9 | 493.65 |

Source: Primary Data.

3.3 Legal Support for the Protection of Paddy Fields in Kerala

Section 3 of the Kerala Conservation of Paddy Land and Wetland Act 2008 includes 'Prohibition of Conversion or Reclamation of Paddy Land' which states that "on and from the date of commencement of this Act, the owner, occupier or the person in custody of any paddy land shall not undertake any activity for the conversion or reclamation of such paddy land except in accordance with the provisions of this Act". Section 23 deals with the penalty to person who violates the provisions of this Act. It states that the person who converts or reclaims any paddy land or wetland shall on conviction be punishable with imprisonment for a term which may extend to two years, but it shall not be less than six months and with a fine which may extend to one lakh rupees but shall not be less than fifty thousand rupees. With this strong legislation prevailed in Kerala for the preservation of wetlands and paddy fields the conversion was done.

3.4 Action from the Part of Authorities on the Paddy Land Conversion

The field discussion clearly reveals that the laws to conserve the paddy lands and wetlands are confined only in paper. The sample households reveal the conversion process is done mainly on holidays and during nights. Even the machine used conversion is going on in the areas.

68.5 percent households reported that no action was taken from the part of the authorities. 31.5 percent reported in a positive way only in the sense that the authorities visit the concerned sites, but no further action was taken for preserving paddy fields.

Chi-square test was carried out to test whether there was any dependence between the responses regarding the action taken from the part of the authorities with respect to the blocks.

Table 6. Action from the part of Authorities on the Paddy Land Conversion

| Response | Kuttippuram | | Koovappady | | Veliyanad | | Total | |
|--|-------------|----------|------------|----------|-----------|----------|-------|----------|
| | Count | Per cent | Count | Per cent | Count | Per cent | Count | Per cent |
| Yes | 78 | 50.3 | 65 | 23.2 | 46 | 27.9 | 189 | 31.5 |
| No | 77 | 49.7 | 215 | 76.8 | 119 | 72.1 | 411 | 68.5 |
| Total | 155 | 100.0 | 280 | 100.0 | 165 | 100.0 | 600 | 100.0 |
| Chi square = 35.362**; p-value < 0.001 | | | | | | | | |

Source: Primary Data.

** Significant at 0.01 level

The result of the test shows that there was a significant difference between the opinions regarding the action taken from the part of the authorities as Chi-square is found to be significant at 0.01 level.

CONCLUSION

The area of paddy fields are decreasing drastically and it will lead to serious problems in our state. Paddy fields with high economic and environmental value have to be conserved at any cost for the sustainability of our state. Kerala has strict legislation to protect the paddy fields but the implementation strategy is a failure. The conversion of the paddy fields is mainly in the households which depend on non - agricultural source as their major source of livelihood.

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