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AN ENQUIRY INTO THE ECONOMIC REFORMS AND LAND USE DYNAMICS OF KERALA

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Abstract

This paper makes an attempt to analyze the land-use dynamics in Kerala before and after the introduction of economic reforms. The objectives of the study are to examine land-use dynamics in Kerala during the pre and post-reform period, and to analyse land-use dynamics at the district level during the post-reform period. The study is based on secondary data collected from the Economic Review published by the Government of Kerala. The paper reveals that land-use dynamics in Kerala during the post-reform period are mainly characterized by a significant increase in area under the non-agricultural sector at the cost of agricultural sector. The paper infers that these forms of land-use change have serious implications on the sustainable development of the Kerala economy, especially on the food security and environmental sustainability of the state. The paper suggests stringent policy and regular monitoring mechanisms for addressing this issue.

Key Words: Economic Reforms, Land Use, Agricultural sector, Non-Agricultural Sector, Ecological Sector, Kerala

I

Introduction

Land is a crucial natural resource for an economy. The inelastic supply of land necessitates sustainable use and management of land for the well-being of the people of a country. Land-use change has a multidimensional impact on important variables ranging from economic growth, quality of life and quality of environmental resources to national food supply (Rathe, 2013). Land use is defined by the purpose for which humans utilize the land cover. Land-use change is caused by multiple interacting factors. They include natural factors, economic and technological factors, demographic factors, institutional factors and cultural factors. Recent researchers have found that globalization, though not a driver of land-use change accelerates the impact of these drivers on land use. The recent land-use change in the world shows an increase in the

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agricultural land, pastoral areas and built-up land (Lambin, Geist, & Erica, 2003). The land-use trend in India shows that during the period 1950-51 and 2008-09, there is an increasing trend in the area under non-agricultural use and a declining trend in the area under arable land and the area under barren and non-arable land. This trend in land use is due to the economic development in general and the promotion of urbanization in particular (Rathee, 2013). In India, Kerala is one of the states, that has unique geography and climatic condition and it makes Kerala one of the country's and world's distinctive biodiversity hotspots. Recently the environment and natural resources of Kerala experience rising pressure due to an increase in density of population and the State's developmental needs. This also exerted an impact on the land use pattern of Kerala. Mainly of two major changes in the land use pattern of Kerala are witnessed, one the shift from cultivation of food crops to non-food crops and the other is increase in area under land put to non-agricultural use (Government of Kerala, 2020). However, indepth studies on land use dynamics of Kerala in relation to its sustainable development are less. Against this background, the present study makes an attempt to analyze the land-use dynamics in Kerala before and after the introduction of economic reforms. The objectives of the study are 1) To examine land-use dynamics in Kerala during the pre and post-reform period, and 2) To analyse land-use dynamics at the district level during the post-reform period.

Research Methods

The study is descriptive. On secondary data collected from various volumes of Economic Review and from District land use statistics, Government of India. The land-use dynamics are analyzed by using land use equation provided by Bardhan and Tewari (2010). Compound Annual Growth Rate (CAGR) is computed to analyse the trends in land-use.

II

Comparative analyses of land use dynamics during pre and post reform period

This section discusses the land-use change in Kerala, before and after economic reforms. To facilitate the analysis data on land-use change in Kerala across three points of time are presented in Table 1.

It is evident from the table that, before economic reforms, the share of area under the agricultural sector in the total reporting area increased from 56.80 per cent during 1959-60 to 62.08 per cent during 1989-90. During the same period, the share of area under the non-agricultural sector increased from 5.25 per cent to 7.33 per cent. But the share of area under the ecological sector declined from 37.96 per cent to 30.59 per cent with a CAGR of -0.7 per cent.

Table 1
Land use change in Kerala before and after globalization (area in hectares)

Sectors	Classification of land	1959-60	1989-90	CAGR (%)	2019-20	CAGR (%)
	Reporting area	3862568	3885497	0.0	3886287	0.0
Non- agri sector	Area under non -agricultural use	202701 (5.25)	284850 (7.33)	1.1	561824 (14.46)	2.3
Ecological sector	Forests	1056090 (27.34)	1081509 (27.83)	0.1	1081509 (27.83)	0.0
	Barren and unculturable land	156231 (4.04)	65994 (1.70)	-2.8	10619 (0.27)	-5.9
	Permanent pastures and other grazing land	49761 (1.29)	2916 (0.08)	-9.0	-	-100.0
	Land under miscellaneous tree crops and groves not included in Net area	204013 (5.28)	38095 (0.98)	-5.4	2143 (0.06)	-9.1
	Eco-Total	1466095 (37.96)	1188514 (30.59)	-0.7	1094271 (28.16)	-0.3
Agric ultur al secto r	Cultivable waste land	149415 (3.87)	107362 (2.76)	-1.1	99810 (2.57)	-0.2

	Fallow land other than current fallow	69989 (1.81)	26609 (0.68)	-3.2	46931 (1.21)	1.9
	Current fallow	69765 (1.81)	46044 (1.19)	-1.4	57387 (1.48)	0.7
	Net area sown	1904603 (49.31)	2232118 (57.45)	0.5	2026064 (52.13)	-0.3
	Agri-Total	2193772 (56.80)	2412133 (62.08)	0.3	2230192 (57.39)	-0.3
	Area sown more than once	401691	786901	2.26	560388	-1.12
	Total cropped area	2307773	3019019	0.89	2586452	-0.51

Source: Economic review, Government of Kerala

Note: Figures in parenthesis indicate percentage to reporting area

Regarding forest land, between the period 1959-60 and 1989-90, its share in the total reporting area slightly increased by 0.49 per cent with a CAGR of 0.1 per cent. The trend in the growth of area under three land-use classes show that, before economic reform, the area under the agricultural sector and non-agricultural sector increased with a CAGR of 0.5 per cent and 1.1 per cent respectively. But during this period the area under the ecological sector declined sizably with a CAGR of (-) 0.7 per cent.

The analysis of land-use dynamics in Kerala, before the economic reforms, shows that the land-use change was mainly driven by the expansion of the area under the agricultural sector. Another reason for the land-use change was the increase in area under the non-agricultural sector. This caused a net decline in areas under the ecological sector. Within the ecological sector, a significant decline is found in the area under permanent pasture and grazing land (CAGR-9.0 per cent), land under miscellaneous tree crops and groves (CAGR -5.4 per cent) and barren and unculturable land (CAGR -2.8 per cent) between the periods 1959-60 and 1989-90. Within the agricultural sector increase in net area sown (NAS) caused a decline in the cultivable wasteland, fallow land other than current fallow and current fallow land. Within the ecological sector, the increase in forest area is attributed to a decline in the barren and unculturable wasteland, permanent pasture and grazing land and land under miscellaneous tree crops. In a nutshell, it is concluded that the net increase in the agricultural sector and increase in the area under non-agricultural uses caused a net decline in the ecological sector. It is estimated that, 78.6 per cent of the decline in the ecological sector is due to a shift in land use from the ecological sector to the agricultural sector. That is a net increase in the agricultural sector was the major cause of a net decline in the ecological sector before the introduction of economic reforms in Kerala.

Table 1 also shows data on land-use changes during the post-reform period (2019-20). After the economic reform, a drastic change in land-use patterns occurred in Kerala. The table shows that between the periods 1989-90 and 2019-20, the share of the agricultural sector in the total reporting area declined from 62.08 per cent to 57.39 per cent. Similarly, the share of area under the ecological sector declined from 30.59 per cent to 28.16 per cent.

Regarding forest, between 1989-90 and 2019-20, its share in the total reporting area remains the same. The forest area has not changed during this period.

The analysis with the help of the CAGR of different land use classes shows that during the 1989-90 and 2019-20 periods, the area under the agricultural sector (particularly the NAS) and ecological sector declined with a CAGR of -0.3 per cent each. On the other hand, the area under the non-agricultural sector increased with a CAGR of 2.3 per cent which is a serious issue of concern in terms of food security.

The analysis of land-use dynamics in Kerala shows that there is a drastic decline in the area under the ecological sector and agricultural sector that had occurred in Kerala, between the periods 1989-90 and 2019-20 indicating also the effects of economic reforms. Within the ecological sector, a huge loss of permanent pasture and grazing land occurred in Kerala. Similarly land under miscellaneous tree crops and barren and unculturable land registered a massive decline after the economic reforms. This indicates that there is a significant shift in land use from these divisions of the ecological sector to the non-agricultural sector. It is a serious issue of concern in terms of environmental sustainability. Within the agricultural sector, unlike in the pre-reform period, the area under current fallow and other fallow land increased during 1989-90 and 2019-20. This seems to be one of the reasons for a decline in the NAS during the post-reform period. Likewise, the cultivable wasteland declined between the periods 1989-90 and 2019-20. The major reason for the decline in the NAS and cultivable wasteland is due to the land-use shift favouring the non-agricultural sector. Thus

during the post-reform period, in Kerala, there was a significant increase in the non-agricultural land at the cost of a decline in area under the ecological sector and agricultural sector. The major chunk (74.39 per cent) of the increase in non-agricultural land use has been from the agricultural sector. In other words, one hectare increase in land under the non-agricultural sector is at the cost of 0.74 hectare reduction in the agricultural sector and 0.34 hectare reductions in the ecological sector. Thus there is clear evidence that, during the post-reform period, the net decline in the agricultural sector and the ecological sector is due to the increased conversion of land for non-agricultural uses. The increased area under non-agricultural uses at the cost of a decline in the agricultural sector and ecological sector (pastures, grazing land and land under miscellaneous tree crops) has serious implications for food security and environmental sustainability of the state.

III

Land use dynamics of districts of Kerala: A Post Reform Analysis

This section provides a comprehensive analysis of land use dynamics of districts in Kerala during 1999-2000 and 2019-20 so as to understand its effects of economic reforms.

The data on the area under different land-use classes across the districts of Kerala are shown in Table 2. With regard to the total geographical area, the largest district in Kerala during 2019-20 is Palakkad and the smallest district is Alappuzha. The larger area under the non-agricultural sector is seen in Palakkad followed by Ernakulam and Malappuram. The smallest area under the non-agricultural sector is seen in Wayanad. Regarding the ecological sector, the larger area under the ecological sector was seen in Idukki followed by Pathanamthitta and Palakkad. It is the lowest in Alappuzha.

During the period 2019-20, the larger area under the agricultural sector is seen in Palakkad followed by Idukki and Kannur and a smaller area is seen in Pathanamthitta. It is also seen from Table 2 that, the share of the non-agricultural sector in the total reporting area increased in all the districts during 1999-2000 and 2019-20. Concerning the area under the ecological sector, it declined in all the districts except Kollam and Pathanamthitta. Similarly, the share of area under the agricultural sector in the total reporting area declined in all the districts except in Idukki.

The district-wise compound annual growth rate (CAGR) of different land use classes for the period 1999-2000 and 2019-20 is given in Table 3. During this period, the highest increase in the area under non-agricultural land was recorded in Malappuram (CAGR 3.11 per cent) followed by Kozhikode (CAGR 2.9 per cent) and Idukki (CAGR 2.84 per cent). The lowest increase is recorded in Wayanad with a CAGR of 1.6 per cent which is also notable. Regarding the ecological sector, the area under, the ecological sector declined in all the districts except in Ernakulam. In Ernakulam the area under the ecological sector increased mainly due to the increase in the forest area. The highest decline in the area under the ecological sector was recorded in Alappuzha (-6.79 per cent) followed by Kasaragod (-3.28 per cent) and Idukki (-1.57 per cent). The area under the agricultural sector declined in all the districts. The highest decline was recorded in Malappuram (-0.78 per cent) followed by Kollam (-0.65 per cent) and Kozhikode (-0.48 per cent). The lowest decline in area under the agricultural sector is recorded in Kasaragod.

Table 2

The area under different land use classes at district level

Districts	Reporting area		Non-agricultural sector		Ecological sector		Agricultural sector	
	1999-2000	2019-20	1999-2000	2019-20	1999-2000	2019-20	1999-2000	2019-2020
ALAPPUZHA	136058	141011	22894 (16.83)	38084 (27)	367 (0.27)	90 (0.06)	112797 (82.9)	102837 (72.93)
ERNAKULAM	235319	305826	39855 (16.94)	60143 (19.67)	9540 (4.05)	71127 (23.26)	185924 (79.01)	174556 (57.08)
IDUKKI	514962	436328	14982 (2.91)	26227 (6.01)	271086 (52.64)	199856 (45.8)	228894 (44.45)	210245 (48.19)
KANNUR	296797	297112	28978 (9.76)	47064 (15.84)	54372 (18.32)	50076 (16.85)	213447 (71.92)	199972 (67.31)
KASARAGOD	196133	199166	19758 (10.07)	30926 (15.53)	18755 (9.56)	9625 (4.83)	157620 (80.36)	158615 (79.64)
KOLLAM	251838	248788	21705 (8.62)	37001 (14.87)	81800 (32.48)	81563 (32.78)	148333 (58.9)	130224 (52.34)

KOTTAYAM	219550	220442	24840 (11.31)	37671 (17.09)	9690 (4.41)	9175 (4.16)	185020 (84.27)	173596 (78.75)
KOZHICODE	233330	234641	23436 (10.04)	41479 (17.68)	43449 (18.62)	41989 (17.89)	166445 (71.33)	151173 (64.43)
MALAPPURAM	363230	355446	32533 (8.96)	60072 (16.9)	107304 (29.54)	104227 (29.32)	223393 (61.5)	191147 (53.78)
PALAKKAD	438980	447584	43891 (10)	62762 (14.02)	141454 (32.22)	138140 (30.86)	253635 (57.78)	246682 (55.11)
PATHANAMTHITTA	268750	265277	14986 (5.58)	21525 (8.11)	155750 (57.95)	155465 (58.6)	98014 (36.47)	88287 (33.28)
THIRUVANANTHAPURAM	218600	218781	22564 (10.32)	36225 (16.56)	50440 (23.07)	50202 (22.95)	145596 (66.6)	132354 (60.5)
THRISSUR	299390	302919	32321 (10.8)	46652 (15.4)	104961 (35.06)	103840 (34.28)	162108 (54.15)	152427 (50.32)
WAYANAD	212560	212966	11647 (5.48)	15993 (7.51)	80193 (37.73)	78896 (37.05)	120720 (56.79)	118077 (55.44)

Source: District land use statistics, Government of India

Note: Figures in parenthesis indicate percentage to reporting area

The district-level analysis of land-use dynamics shows that, during the post-reform period, in all the districts there was a significant increase in the area under the non-agricultural sector. This increase is attributed to the conversion of land from ecological and agricultural sectors to non-agricultural sectors.

In the Thiruvananthapuram district, 96.9 per cent of the net increase in the non-agricultural sector came from the agricultural sector. In Kottayam, 89.03 per cent of the net increase in the non-agricultural sector came from the agricultural sector. In the Malappuram district, 85.40 per cent of the net increase in the non-agricultural sector came from the agricultural sector. In Kozhikode district, 84.6 per cent of the net increase in the non-agricultural sector came from the agricultural sector. In the Kasaragod district, 81.7 per cent of the net increase in the non-agricultural sector came from the ecological sector. In the Kannur district, 74.5 per cent of the net increase in the non-agricultural sector came from the agricultural sector and 23.7 per cent came from the ecological sector. In Thrissur, 67.5 per cent of the net increase in the non-agricultural sector came from the agricultural sector. In the Palakkad district, 67.2 per cent of the net increase in the non-agricultural sector came from the agricultural sector.

In Alappuzha, 65.5 per cent of the increase in non-agricultural land came from the agricultural sector. In the Wayanad district, 60.81 per cent of the net increase in the non-agricultural sector came from the agricultural sector. In the Eranakulam district, 56.03 per cent of the net decline in the agricultural sector is due to a net increase in the non-agricultural sector. From the above analysis, it is clear that during the post reform period, a major chunk of the net increase in the non-agricultural sector came from the agricultural sector in all the districts in Kerala.

IV

Conclusion and policy implications

This paper has analysed land-use dynamics in Kerala during the pre-reform and post-reform periods. The state-level analysis shows that during the pre-reform period the expansion in agriculture and increase in the non-agricultural sector caused a decline in area under the ecological sector. Land use dynamics in Kerala during the post-reform period are mainly characterized by a significant increase in area under the non-agricultural sector at the cost of ecological and agricultural sectors. These kinds of changing land use patterns have serious implications for the sustainable development of the Kerala economy, especially in terms of food security and environmental sustainability of the state. The paper suggests for formulating stringent policies for sustainable management of land resources of Kerala. This must be so formulated that it would particularly stop any further conversion from agricultural and ecological sectors to non-agricultural purposes as also could possibly recover lands under non-agricultural uses. While the policy needs to cover the entire state special and more attention may be given to the districts of Alappuzha, Kollam, Thiruvananthapuram, Kottayam, Malappuram, Kozhikode, Idukki and Kasaragod through a special and differentiated approach. The paper also recommends a mechanism of regular monitoring of land use at gram panchayat, district and state levels and effective implementation of policies related to land use practices.

Table 3

District wise growth in different land use classes during post reform period in Kerala (1999-2000 and 2019-2020) (in Per cent)

	Reportin g area	Non- agri sector	Ecological sector					Agricultural sector				Agri - Total
		Area under non - agricultur al use	Forest s	Barren and unculturable land	Permane nt pastures and other grazing land	Land under miscellaneo us tree crops and groves not included in Net area	Eco- Total	Cultivable waste land	Fallow land other than current fallow	Current fallow	Net area sown	
ALAPPUZHA	0.18	2.58	0	-95.83	0	-3.72	-6.79	8.99	-3.86	-4.02	-0.87	-0.46
ERNAKULAM	1.32	2.08	11.42	-67.05	-100	-3.39	10.57	6.42	3.71	0.61	-0.86	-0.31
IDUKKI	-0.83	2.84	-1.36	-67.65	-100	-18.24	-1.57	-3.01	-0.22	0.46	-0.4	-0.42
KANNUR	0.01	2.45	0	-68.35	-100	-11.36	-0.41	1.53	2.52	-2.35	-0.38	-0.33
KASARAGOD	0.08	2.27	0	-56.83	0	-12.67	-3.28	-1.24	2.4	-3.17	0.16	-0.03
KOLLAM	-0.06	2.7	0	-69.92	-100	-3.75	-0.01	7.27	1.62	-1.16	-0.75	-0.65
KOTTAYAM	0.02	2.1	0	-35.12	0	-0.69	-0.27	7.07	-2.31	-1.02	-0.42	-0.32
KOZHIKODE	0.03	2.9	0	-63.17	-100	-9.52	-0.17	5.81	2.87	-0.3	-0.57	-0.48
MALAPPURAM	-0.11	3.11	0	-76.81	0	-9.49	-0.15	0.42	1.22	-3.23	-0.74	-0.78
PALAKKAD	0.1	1.8	0	-62.2	-100	-5.35	-0.12	1.15	3.57	-1.05	-0.37	-0.14
PATHANAMTHITTA	-0.07	1.83	0	-63.45	0	-0.11	-0.01	11.68	8.47	-1.87	-0.73	-0.42
THIRUVANANTHAPURAM	0	2.4	0	-42.03	-100	-1.6	-0.02	1.62	3.84	6.19	-0.59	-0.48
THRISSUR	0.06	1.85	0	-89.88	-100	-7.54	-0.05	5.58	1.49	-0.2	-0.6	-0.31
WAYANAD	0.01	1.6	0	-82.54	-100	-14.1	-0.08	-2.41	0.59	-0.83	-0.07	-0.11

Source: Computed from land use data, district land use statistics, Government of India

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