

A Study of Occupational Structure in Kerala State Using GIS Techniques

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ABSTRACT

Occupational structure is the distribution or division of working population in different sectors based on occupations. It is one of the key elements in manifestation of population composition of a region. The economy is segregated based on its occupational structure namely, the agriculture sector, industrial or manufacturing sector and service sector. Occupational structure provides clear picture of working and non-working population in an area. The growth and prosperity of a region largely depends on the size of working population and proportion of productive workers engaged in various economic activities. The objective of this study is to find out the shift in occupation from primary sector to other sectors and the rate of change in last two decades from 2001 to 2011 in Kerala state with district as spatial unit. The study is based upon the secondary data collected from Census 2001 and 2011. By using GIS techniques thematic maps were prepared to show the variation in occupational structure in the study area. To find out the changes in occupational structure, percentage of workers engaged in four categories are to be calculated. There is a remarkable shift of workers from agriculture to non-agricultural sector in Kerala.

Keywords: Occupational structure, Agriculture sector, Non-agriculture sector, Workers, Non workers, Kerala

I. INTRODUCTION

The occupational structure of a country refers to division or distribution of population according to their occupations. It is one aspect of population structure and shows how the population is engaged in various economic activities in a region. An analysis of

working force provides a useful tool to the social scientists not only for measuring the level of social and economic development an area has attained (Maitra,1969) but also for formulating future plans(Chandna and Sidhu,1980) for mobilizing its man power. Occupational structure provides clear picture of working and non-working population in an

area. The growth and prosperity of a region largely depends on the size of working population and proportion of productive workers engaged in various economic activities. Work is defined as participation in any economically productive activity with or without compensation, wages or profit (Census of India, 2001). Work involves not only actual work but also includes effective supervision and direction of work. It even includes part-time help or unpaid work on farm, family enterprise or in any other economic activity. The concept of 'worker' was introduced for the first time in India in 1961. Any person whose main activity is participation in any economically productive work either by his physical or by his mental activity was classified as worker (Census of India, 1971). Occupations are generally classified as primary, secondary and tertiary (Census of India, 1991). The economy is segregated based on its occupational structure namely, the agriculture sector, industrial or manufacturing sector and service sector.

II. METHODS AND MATERIAL

2.1 Study Area

Kerala state extends from 8°18' N to 12°48'N latitudes and 74°52' to 77° 22' E longitudes. The state is located in the south-western part of India. The state is bounded by Karnataka state in the north, Tamil Nadu state in the east and south and the Lakshadweep Sea in the west and a long range of mountains called the Sahyadri (a part of Western Ghats) in the east. At the time of re-organisation there were 9 districts in the state. Districts were further re-organised in subsequent years. At present, there are 14 districts in Kerala (Figure 1). The coastal length of the state is 560 km. The East West width of the state varies from 15 to 120 kms. Within a limited area of 38,863sq.km, there is a very wide variation in its physiography. On the basis of altitude and physiographic features the state can be divided into Highland, Midland and Lowland. The drainage network of Kerala consists of 44 short and swift-flowing rivers. Out of these 44, 41

flows westward and 3 eastward. The four major rivers are Periyar, Bharathapuzha, Pamba and Chaliyar together drain about 35percent of the state. Three east flowing rivers are Kabini, Bhavani and Pambar.

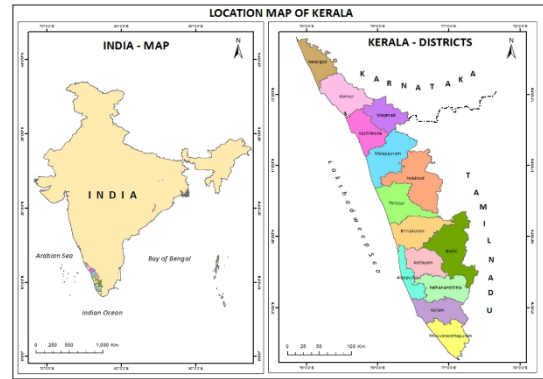


Figure 1

Table 1 shows the demographic features of Kerala. The total population of the state is 33,406,061 as per 2011 Census. Malappuram has the highest population of 4112920 and Wayanad has the least population of 817420. (Thiruvananthapuram here after sometimes used as TVM)

Table1. District wise Distribution of Population Characteristics

	Total Population		Density		Sex Ratio		Literacy (in%)	
	2001	2011	2001	2011	2001	2011	2001	2011
TVM	3234 356	3301 427	147 6	150 9	105 8	10 88	86.2 6	92. 66
Kollam	2585 208	2635 375	103 8	105 6	107 0	11 13		93. 77
Pathan amthit ta	1234 016	1197 412	574	453	109 4	11 29	93.7 1	96. 93
Alappu zha	2109 160	2127 789	149 6	150 1	107 9	11 00	91.1 4	96. 26
Kottay am	1953 646	1974 551	722	896	102 5	10 40	94.4 5	96. 4
Idukki	1129 221	1108 974	252	254	999	10 06	85.0 4	92. 2
Ernak ulam	3105 798	3282 388	105 0	106 9	101 7	10 28	90.9 6	95. 68
Thriss ur	2974 232	3121 200	981	102 6	109 2	11 09	89.9 4	95. 32
Palakk ad	2617 482	2809 934	584	627	106 8	10 67	79.3 1	88. 49
Malap puram	3625 471	4112 920	102 2	115 8	106 3	10 96	85.9 6	93. 55
Kozhik ode	2879 131	3086 293	122 8	131 8	105 8	10 97	88.8 6	95. 24
Wayan ad	7806 19	8174 20	369	383	100 0	10 35	80.8	89. 32
Kannu r	2408 956	2523 003	813	852	109 0	11 33	89.5 7	95. 41
Kasara god	1204 078	1307 375	604	654	104 7	10 79	79.8	89. 85
KERA LA	3184 1374	3340 6061	819	859	105 8	10 84	87.8 6	93. 91

State/ District	Area (in sqkm)		Total Households	
	2001	2011	2001	2011
TVM	2192	2192	759382	837877
Kollam	2491	2491	593314	669375
Pathanamthitta	2642	2637	297134	322684
Alappuzha	1414	1414	483960	535958
Kottayam	2203	2208	434520	487296
Idukki	5019	4358	265344	279812
Ernakulam	2407	3068	693161	814011
Thrissur	3032	3032	639871	759210
Palakkad	4480	4480	530216	637220
Malappuram	3550	3550	612413	793999
Kozhikode	2344	2344	567658	697710
Wayanad	2131	2131	166763	190894
Kannur	2966	2966	457368	554298
Kasaragod	1992	1992	225252	273410
KERALA	38863	38863	6726356	7853754

Source: Census report 2001 and 2011

2.2 Objectives of the Study

- To evaluate the changes in occupational structure of Kerala State during 2001 to 2011.
- To study the rate of change in population engaged in working category from 2001 to 2011.
- To gauge the shift in occupation from agriculture to non-agricultural sectors

2.3 Methodology

Data collected from the Census of India Publications for Kerala state for the year 1991, 2001, 2011 and reports of Kerala State Planning Board. Govt and Other publications were used. All the demographic data has been taken only from these census reports. Survey of India Topographic maps of 1: 50,000 and 1:250,000 scales were used administrative boundaries and base details. Appropriate statistical techniques were used to bring out variation and GIS used for thematic mapping of the study area. The data were in

actual numbers, ratios and percentages. As there were many bifurcations of the districts of Kerala, earlier decades were not considered for the study. It would be very difficult to compile and compare them. All the 14 districts of Kerala were digitised using GIS software. Arc GIS and QGIS Software were used for preparing thematic maps. For processing data Excel of MS Office was used and added as attribute data in GIS and the maps were prepared.

III.RESULTS AND DISCUSSION

3.1 Occupational profile of the Study area

The study of occupational structure dealing with working and non-working population has been carried out in this research. The number of workers engaged in various economic activities is a clear indicator of the level of socio economic development in Kerala. From the profile of working population in the study area, the total working population (main and marginal workers) as per 2011 Census is about 35%. It means about one third of total population is engaged in working category and the rest of the population (65%) is non-workers. Of the total population, 27.93% comes under main workers and 6.85% is marginal workers. The occupational structure in Kerala has undergone significant changes in 2 decades. Changes have been seen very clearly in all 14 districts. For the easy interpretation of various demographic characteristics depicted in the maps, values are classified into three groups namely High, Medium and Low as per the values. The proportion of main workers in Kerala has increased 2 percent in 2011 when compared to 2001. Proportion of marginal workers has not undergone significant change during 2001 to 2011. Only 0.42 percent increase can be seen in marginal workers. Proportion of total workers increased 2.48 percent in 2011. But the proportion of non-workers decreased to 2.48 percent. In 2001 proportion of main workers are High (>30%) only in Idukki district. In 2011, five districts namely Idukki, Kottayam, Ernakulam, Thrissur and Wayanad shows

High (>30%) proportion of main workers. Proportion of main workers and marginal workers in all districts shows an increasing trend in 2011 when compared to 2001. Only two districts, Wayanad and Alapuzha shows High (>8%) percent of marginal workers in 2001 and in 2011 six districts including Wayanad and Alapuzha along with other southern districts shows High (>8%) percent marginal workers. In 2001 total workers are High (>35%) in districts viz Idukki, Ernakulam, Palakkad and Wayanad. Having more land under highlands, Idukki and Wayanad districts are famous producers of plantation crops especially tea and coffee. Palakkad district is known as granary of Kerala and majority of people here are engaged in agriculture and allied sectors. But in 2011, total workers are High in nine districts and only one district has Low percent (<30) of total workers. Malappuram district has low percent of total workers. Emigration from Kerala to foreign countries is mainly from Malabar Muslims and it leads to decreasing number of workers in Kerala. (Table 2, Figure 2, Figure 3, Figure 4, Figure 5).

Table 2. Proportion of Workers and Non Workers to the Total Population in Kerala- District Wise (2001, 2011)

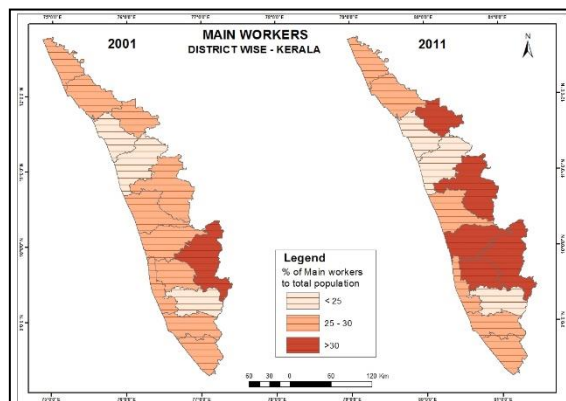


Figure 2

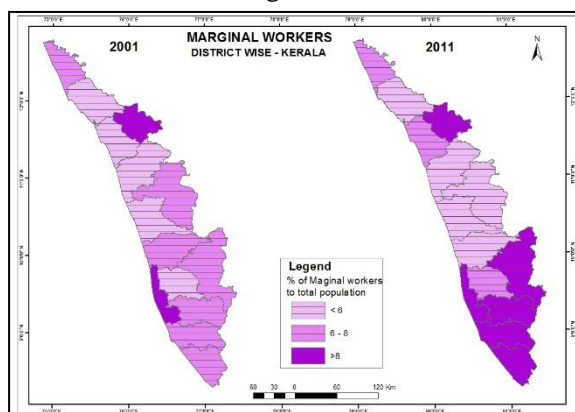


Figure 3

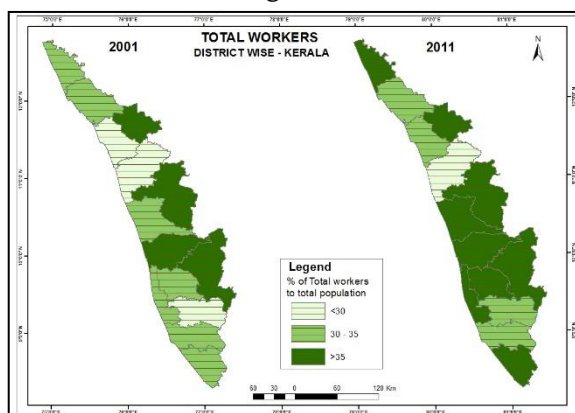


Figure 4

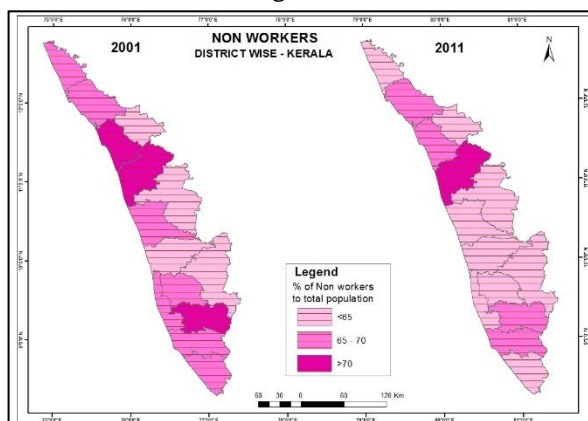


Figure 5

District/State	Main Workers(%)		Marginal Workers(%)		Total Workers(%)		Non-Workers(%)	
	2001	2011	2001	2011	2001	2011	2001	2011
TVM	25.31	27.91	7.09	9.40	32.40	37.31	67.60	62.69
Kollam	25.33	26.38	6.72	8.22	32.05	34.61	67.95	65.39
Pathanamthitta	23.16	24.49	6.50	8.31	29.66	32.80	70.34	67.20
Alappuzha	25.94	28.03	8.36	9.78	34.30	37.81	65.70	62.19
Kottayam	27.62	30.62	5.25	6.64	32.87	37.26	67.13	62.74
Idukki	35.48	37.51	7.67	9.05	43.16	46.56	56.84	53.44
Ernakulam	29.49	32.34	6.48	5.73	35.97	38.06	64.03	61.94
Thrissur	27.20	29.78	4.92	5.33	32.12	35.11	67.88	64.89
Palakkad	29.36	31.16	6.74	5.94	36.11	37.09	63.89	62.91
Malappuram	19.08	20.72	5.04	5.12	24.12	25.83	75.88	74.17
Kozhikode	21.91	24.44	5.98	6.31	27.89	30.75	72.11	69.25
Wayanad	28.16	32.23	11.38	9.37	39.53	41.60	60.47	58.40
Kannur	26.02	27.52	5.82	5.15	31.85	32.66	68.15	67.34
Kasaragod	27.22	28.51	7.48	6.91	34.70	35.41	65.30	64.59
Kerala	25.87	27.93	6.43	6.85	32.30	34.78	67.70	65.22

Source: Census report 2001 and 2011

3.2 Decadal Growth of Working Population

The growth of working population in Kerala shows upward trend. Growth rate of total workers comprising of main and marginal workers together

constitute 12.98 percent. Growth rate of total workers are high in the districts of Malappuram, Kozhikkode, Thiruvananthapuram, Thrissur, Kottayam and these districts have total workers more than the state average. Growth of main workers is high in all categories. Growth rate of main workers are high in Malappuram district followed by Wayanad, Kozhikkode, Ernakulam, Thrissur, Palakkad, Kasaragod and these districts have the growth rate more than the state average. There is negative growth rate in marginal workers. Growth rate of marginal workers are high in Thiruvananthapuram which is more than three times to the state average. Other eight districts also have growth rate above the state average. Negative growth rate of marginal workers can be seen in Eranakulam, Palakkad, Wayanad and Kannur. The growth rate of non-workers in the state is 1.06 percent. It is high in Malappuram district. Thiruvananthapuram, Kollam, Pathanamthitta, Alapuzha, Kottayam and Idukki districts shows negative growth rate of non-workers. (Table 3 and Figure 6).

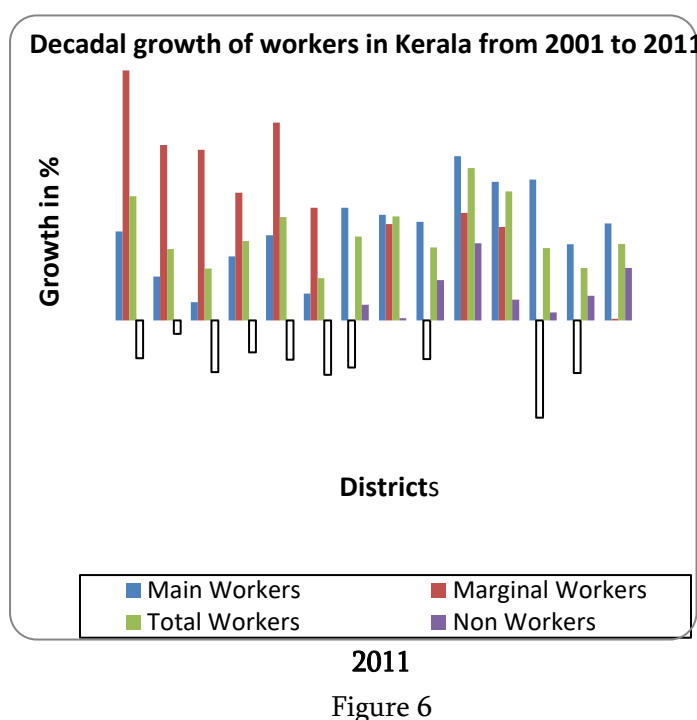
Table 3. Decadal Growth of Working population in Kerala

	Main Workers	Marginal Workers	Total Workers	Non Workers
District/State	2001-11	2001-11	2001-11	2001-11
Thiruvananthapuram	12.56	35.28	17.53	-5.34
Kollam	6.18	24.74	10.07	-1.90
Pathanamthitta	2.59	24.10	7.31	-7.30
Alappuzha	9.02	18.03	11.21	-4.51
Kottayam	12.04	27.92	14.57	-5.54
Idukki	3.81	15.88	5.95	-7.67
Ernakulam	15.90	-6.65	11.84	2.23
Thrissur	14.90	13.59	14.70	0.32
Palakkad	13.91	-5.46	10.29	5.69

Malappuram	23.16	15.19	21.49	10.89
Kozhikkode	19.55	13.21	18.19	2.94
Wayanad	19.86	-13.73	10.20	1.13
Kannur	10.74	-7.42	7.42	3.48
Kasaragod	13.71	0.24	10.81	7.40
KERALA	13.27	11.84	12.98	1.06

Source: Census report 2001 and 2011

Decadal growth of workers in Kerala from 2001 to 2011



3.3 Changes in Occupational structure

Kerala was a model for high human development at low incomes. But in recent years the income levels also have risen. Kerala is gradually shifting from an agrarian economy and industrial sector into a service-based one during the period between 1960 and 2010. Kerala has 1.18% of India's geographical area, 2.76% of population and contributes 4.11% of country's GDP. In Kerala the shift of labourers can be easily identified from 2001 to 2011. Idukki, Pathanamthitta and Wayand districts have high (>10%) percent of cultivators to the total workers both in 2001 and 2011. In 2001, the districts in central Kerala and Kannur shows 5 to 10% cultivators and it decreased in

2011. Thiruvananthapuram and Alapuzha districts remain same (<5%) in both decades. Only Kasaragod district shows increase in percent of cultivators'. Agricultural labourers also remain high (>20%) in Idukki, Palakkad and Wayanad district in both decades. Only Kozhikode and Ernakulam district shows below 10 percent of Agricultural labourers in 2001. Whereas in 2011 seven districts come in below 10 percent category. It reveals the shift of workers from agriculture to other sectors. Household industry workers are declining in all districts in 2011. There is 6.89% increase in other workers in Kerala during 2001 to 2011. All districts in Kerala show increase in percentage of other workers in 2011. Palakkad district shows 13.21% change in increase of other workers and it is the highest among the districts (Table 4, Figure 7, Figure 8, Figure 9, Figure 10).

Table 4. Distribution of Workers (main & marginal)

District/State	Cultivators			Agricultural Labourers		
	2001	2011	Change in percent	2001	2011	Change in percent
TVM	3.67	3.15	-0.51	12.95	7.67	-5.28
Kollam	6.83	6.22	-0.62	14.69	10.11	-4.58
Pathanamthitta	13.52	10.54	-2.98	19.86	14.12	-5.74
Alappuzha	3.81	3.14	-0.67	13.70	8.91	-4.79
Kottayam	7.82	6.79	-1.02	13.22	8.57	-4.65
Idukki	21.14	19.54	-1.59	27.07	28.22	1.14
Ernakulam	5.25	4.04	-1.22	7.97	5.71	-2.26
Thrissur	5.31	3.81	-1.49	11.40	6.75	-4.65
Palakkad	9.06	6.51	-2.56	33.56	23.98	-9.58
Malappuram	6.56	5.42	-1.14	17.81	11.05	-6.76
Kozhikode	3.47	2.80	-0.68	8.23	6.76	-1.46
Wayanad	16.77	15.51	-1.26	30.50	29.88	-0.62
Kannur	5.99	4.43	-1.55	13.25	10.07	-3.18
Kasaragod	4.99	5.13	0.13	10.05	8.37	-1.68
KERALA	7.04	5.77	-1.27	15.76	11.39	-4.38

Household Industry workers			Other Workers		
2001	2011	Change in percent	2001	2011	Change in percent
3.39	2.32	-1.07	79.99	86.86	6.87
2.60	2.36	-0.24	75.87	81.32	5.44
2.85	2.82	-0.03	63.77	72.52	8.75
7.20	4.46	-2.75	75.29	83.49	8.20
3.33	2.52	-0.81	75.63	82.12	6.49
1.66	1.33	-0.32	50.13	50.91	0.77
2.88	1.92	-0.97	83.89	88.33	4.44
5.11	2.54	-2.57	78.18	86.89	8.71
3.47	2.40	-1.07	53.90	67.11	13.21
2.01	1.73	-0.28	73.61	81.80	8.18
1.96	1.40	-0.56	86.34	89.04	2.70
1.17	1.34	0.18	51.56	53.26	1.70
2.51	1.56	-0.95	78.25	83.93	5.68
12.08	5.29	-6.79	72.87	81.21	8.34
3.59	2.35	-1.24	73.60	80.50	6.89

Source: Census Report 2001 and 2011

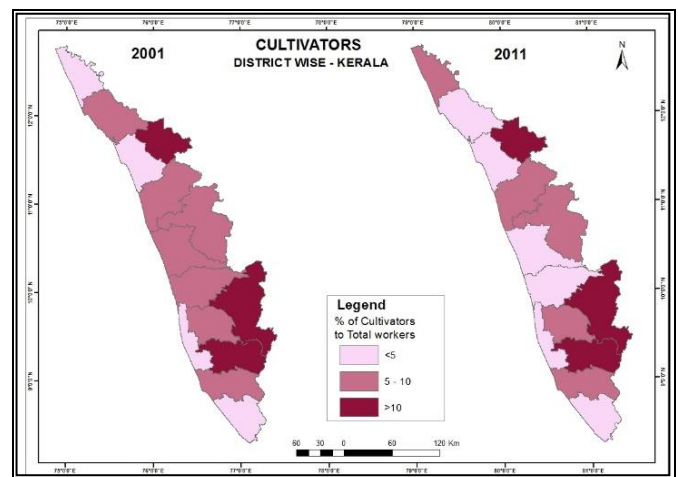


Figure 7

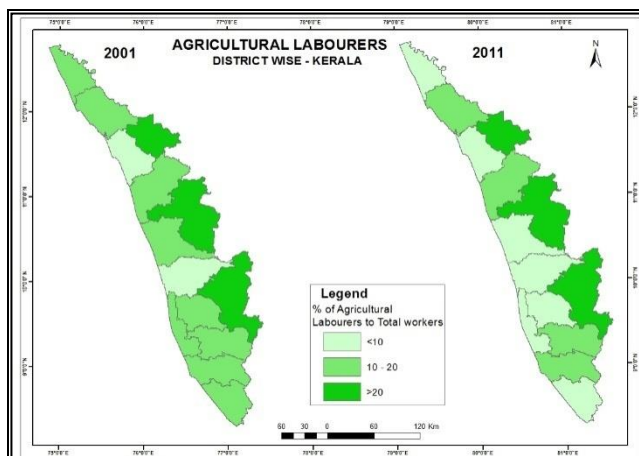


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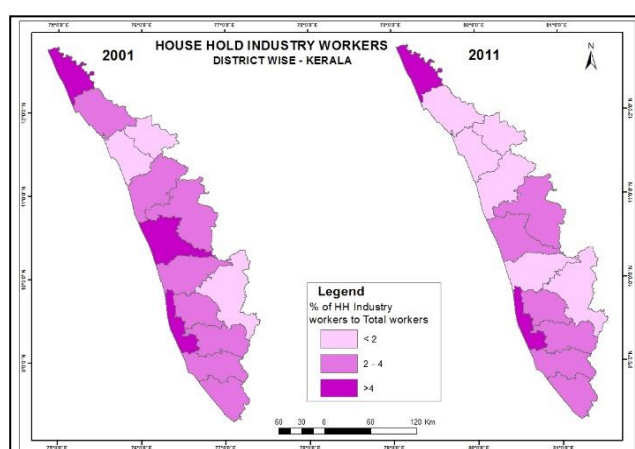


Figure 9

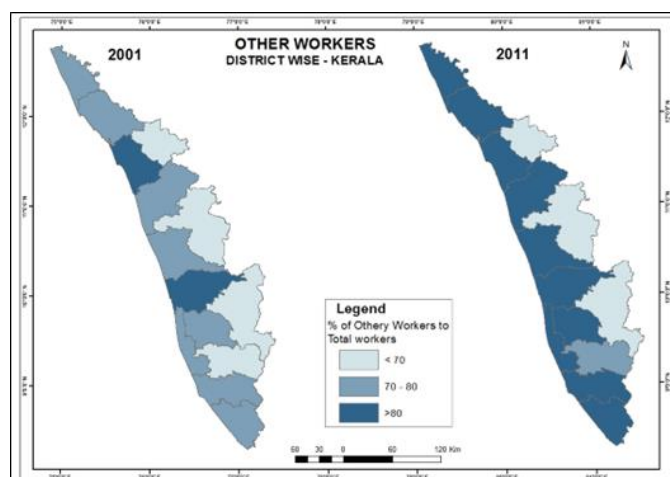


Figure 10

3.4 Decadal Growth of Workers

The state experienced a negative decadal growth rate in all categories of workers except other workers. Thiruvananthapuram, Kollam, Malappuram, Wayanad and Kasaragod districts have positive growth rate of cultivators. But in the case of agricultural labourers, Idukki and Wayanad districts shows positive growth rate. Being parts of highland, the economy of these districts is still agrarian in nature, depending mostly on farming and plantation which are labour intensive. Positive growth of household industry workers can be seen in Pathanamthitta, Malappuram and Wayanad districts. All districts show positive gain in decadal growth rate of other workers, indicating the convergence of Kerala state to pseudo- urban centre. (Table 5, Figure 11)

Table 5. Decadal Growth of Workers (main and marginal workers)

District/State	Growth of Cultivators (in %)	Agricultural Labourers (in %)	HH Industry workers (in %)	Other Workers (in %)
Thiruvananthapuram	1.08	-30.40	-19.62	27.63
Kollam	0.12	-24.27	-0.08	17.97
Pathanamthitta	-16.34	-23.71	6.32	22.02
Alappuzha	-8.35	-27.64	-31.18	23.33
Kottayam	-0.42	-25.74	-13.38	24.40
Idukki	-2.04	10.43	-14.75	7.59
Ernakulam	-14.10	-19.81	-25.58	17.76
Thrissur	-17.57	-32.11	-42.92	27.48
Palakkad	-20.82	-21.20	-23.75	37.33
Malappuram	0.31	-24.62	4.60	35.00
Kozhikode	-4.83	-2.83	-15.39	21.89
Wayanad	1.95	7.96	27.06	13.82
Kannur	-20.41	-18.38	-33.09	15.22
Kasaragod	13.72	-7.68	-51.49	23.49
KERALA	-7.44	-18.39	-26.14	23.57

Source: Census Report 2001 and 2011

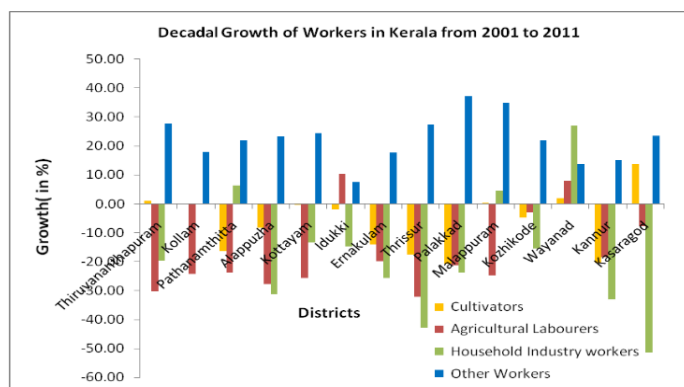


Figure 11

3.5 Shift in occupation from Agriculture to Non-Agricultural activities

The size of working population and its division into various economic activities are the clear indicators of the social status of a region. The distribution, trend and growth of working population clearly show the change in occupational structure in Kerala. The proportion of workers engaged in agricultural activities in Kerala in 2001 was 22.80 percent which included both cultivators and agricultural labourers. But in 2011 proportion of these workers showed downward trend and slipped to 17.15 percent of total workers. All districts in Kerala show the same declining trend like that of the state. On the other hand, workers in non-agricultural sector which comprises of household industry workers and other workers is showing upward trend in 2011. In 2001, the workers engaged in non-agricultural activity stood at 77.20 percent in Kerala, while in 2011 it increased to 82.85 percent. The districts also show the same trend as in the state (Table 6).

Table 6. Agricultural and Non-agricultural workers in Kerala 2001 - 2011

Agricultural and Non Agricultural Workers in Kerala (Percentage to Total Workers)				
District/State	Agricultural workers		Non Agricultural workers	
	2001	2011	2001	2011
Thiruvananthapuram	16.62	10.82	83.38	89.18
Kollam	21.53	16.32	78.47	83.68
Pathanamthitta	33.38	24.66	66.62	75.34
Alappuzha	17.51	12.05	82.49	87.95
Kottayam	21.04	15.36	78.96	84.64
Idukki	48.21	47.76	51.79	52.24
Ernakulam	13.22	9.75	86.78	90.25
Thrissur	16.71	10.56	83.29	89.44
Palakkad	42.63	30.48	57.37	69.52
Malappuram	24.37	16.47	75.63	83.53
Kozhikode	11.70	9.56	88.30	90.44
Wayanad	47.27	45.40	52.73	54.60
Kannur	19.24	14.50	80.76	85.50
Kasaragod	15.05	13.50	84.95	86.50
KERALA	22.80	17.15	77.20	82.85

Source:Census Report 2001and 2011

IV.CONCLUSION

The analysis of occupational structure reveals remarkable changes in Kerala. The total workers including main and marginal constitute decadal growth rate of 12.98 percent from 2001 to 2011 in Kerala. The decadal growth of main workers during 2001 – 2011 is 13.27 percent. The broad industrial category of workers during 2001 – 2011 reveals that proportion of agricultural labourers to total workers declined by -4.38 percent, followed by cultivators by - 1.27 and household industry by -1.24. On the other hand proportion of other workers to total workers

increased by 6.89 percent. As far as the workers in broad industrial categories are considered, during 2001 – 2011 the cultivators registered declined decadal growth rate of -7.44 while agricultural labourers declined by -18.39 and house hold industry workers by -26.14. But other workers witnessed a decadal growth rate of 23.57 percent. In 2001 proportion of agricultural workers to total workers is 22.80 percent and it declined to 17.15 percent in 2011. But when we consider about the non-agricultural workers to total workers it increased from 77.20 percent in 2001 to 82.85 percent in 2011. From the given detailed study we can clearly conclude that there is remarkable shift of workers from agriculture sector to non-agricultural or service sector.

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