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RESEARCH ARTICLE

Occupational Structure of Population in the Malaprabha River Basin, Karnataka State, India; A Geographical Approach

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Abstract

Changes in the size, composition, and distribution of the population are closely associated with the demographic structure of the workforce. On the other hand, the workforce participation rates vary according to the stages of economic development, across cultures, age groups, and between sexes (R. B. Bhagat and K. C. Das, 2008). It is an indicator of a growing society (Pant, 1992). Thus, occupational structure is the most important demographic aspect in explaining the economic well-being structure of the inhabitantsof the region. The occupational structure, in turn, is influenced by the participation rates and related features, such as the growth and levels of farm and rural non-farm activities. An attempt is made in this study to examine the emerging trends in the occupational structure of the population in the Malaprabha River Basin area from 1971 to 2011. More specifically, the spatio-temporal analysis of the work participation rates in total and farm sectors among males and females in the talukas of the study area This study is based upon secondary sources of data, and though the study area is a natural region, the talukas or tehsils have been taken as units of study. The findings suggest that there are undoubtedly significant changes in work participation rates between farm and non-farm sectors and between males and females in the study area. To overcome this context, some developmental policies such as youth employment is one of the prime focus areas of SHGs. This can bring prosperity to workers in far-off rural areas.

Keywords: WPRs, Farm and Non-Farm Sectors, Cultivators, Agricultural Labors and Distribution of Males and Females Workers

Introduction

Changes in the size, composition, and distribution of the population are closely associated with the demographic structure of the workforce. On the other hand, workforce participation rates vary according to the stages of economic development, across cultures, age groups, and between sexes. The Indian economy has been predominantly agricultural, which contributes about one third to the total economy and employs more than half of the workforce. Agriculture is understandably not able to absorb a significant number of additional workers. However, with modernization, urbanisation, and industrial development picking up, there is likely to be a shift in the occupational structure of the Indian workforce. Moreover, a major change in economic policy took place in 1991 with the introduction of LPG in the Indian economy. It was expected to bring a qualitative shift in the occupational structure of the workforce (R. B. Bhagat and K. C. Das, 2008).Thus, occupational structure is the most important demographic aspect and mirror of population composition, throwing enough light on explaining the socio-economic structure and changes therein of the region. It is a prime means to achieve the economic well-being of the inhabitants of the region. It is an indicator of a growing society (Pant, 1992).

The occupation of an individual refers to his trade, profession, or type of work. Work is defined as participation in any economically productive activity with or without compensation, wages, or profit. Such participation may be physical and/or mental in nature. Work involves not only actual work but also effective supervision and direction of work (Census of India, 2011). The data pertaining to its spatial distribution, structure, and growth in time have their own utility and role in policymaking (Kohli and Kothari, 1996). The proportion of workers engaged in different

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occupations throws light on economic and cultural facets of society, especially in India, where cultural moorings have a strong bearing on a man's livelihood (Gosal, 1965). The occupational structure, in turn, is influenced by the participation rates and related features, such as the growth and levels of farm and rural non-farm activities. The work participation rates of a region are the by-product of various physical, socio-institutional, and techno-economic factors. It is a well-known fact that agriculture and its allied activities are the lifeline activities of the inhabitants of the study area.Hence, an attempt is made in this study to examine the emerging trends in work participation rates in the Malaprabha River Basin area of Karnataka State from 1971 to 2011. More specifically, the spatio-temporal analysis of the work participation rates in total and farm sectors among males and females in the talukas of the Malaprabha river basin area.

Objectives

The objectives of this analysis are:

- To present an overview of the changing agricultural structure of the Malaprabha river basin area from 1971 to 2011,
- To examine the distribution of workers and volume of changes in different occupational categories in the Malaprabha river basin area during 1971–2011,
- To study the trends of work participation rates in different occupational categories in the Malaprabha river basin area from 1971 to 2011,
- To describe the spatial distribution and volume of changes in total workers in the Malaprabha river basin area during 1971 and 2011, and
- To analyse the causative factors for the rise or fall in WPRs and suggest some remedial measures for the expansion of WPRs at all levels.

Material and Research Methods

The present paper intends to analyze the work participation rates in the Malaprabha river basin from 1971 to 2011. The analysis is mainly based on the secondary sources of data, basically collected from District Census Handbooks and C. Ds. of Belgaum, Dharwad, Gadag, and Bagalakot districts from 1971 to 2001 and Final Reports of the 2011 Census from the Directorate of Census Operations, Karnataka State, Bangalore; besides this, supplemented information was also collected from various government offices in the districts. The obtained data has been analysed both qualitatively and quantitatively. In the present paper, the talukas have been considered the smallest unit of study. The demographic aspects, that is, population distribution, workers, and work participation rates of talukas in the Malaprabha river basin area, have been studied in detail. Simple percentages and some of the most suitable standard statistical techniques have been applied. For the graphical presentation, cartographic techniques have been used to regionalize variation, which helps to understand the regional pattern of the aspects.

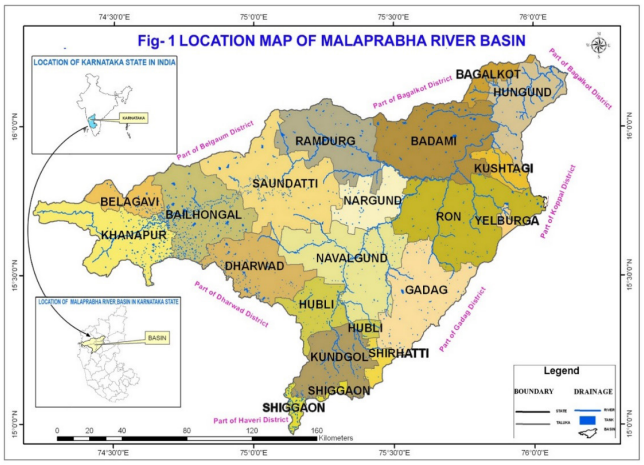
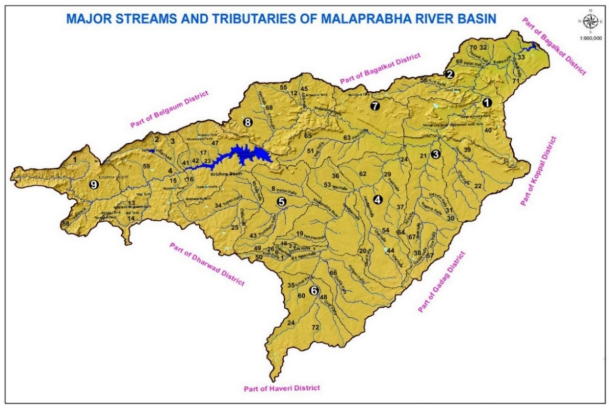


Figure 1: Location Map of Malaprabha River Basin, Karnataka State, India

Study Area

The Malaprabha River Basin area of Karnataka state is approximately triangular and located in the extreme western part of the Krishna basin. It lies between $15^0\ 05^{I}\ 02^{II}$ to $16^0\ 20^{I}\ 19^{II}$ N. latitudes and $74^0\ 05^{I}\ 43^{II}$ to $76^0\ 05^{I}\ 33^{II}$ E. longitudes, covering an area of 11549 sq. km, out of which 3880 sq. km are in Belgaum (33.59%), 1950 sq. km in Bagalakot (16.89%), 2739 sq. km in Dharwad (23.72%), 2657 sq. km in Gadag, 220 sq. km in Koppal, and 103 sq. km (Figure 1). Topographically, the Malaprabha basin area presents two important divisions, viz., the Western Ghats and the typical eastern part of the Deccan/Karnataka plateau, with distinct characteristics. The plateau has two natural sub-divisions, the Semi-Malnad and the Northern Maidan, which include the northern upland, or the Deccan trap, of the state. An exhumed structure with superimposed drainage is also responsible for the sharp relief in the Kaladgi sandstones, in which Ghataprabha forms a waterfall near Gokak and the Malaprabha forms a gorge near Saundatti (Spate and Learmonth, 1967).

The river Malaprabha is the most important right-bank tributary of the river Krishna. The Benni Hall, Hire Hall, and others are the principal tributaries of the Malaprabha River. (Figure 2). The entire river basin experiences a semi-arid type of climate, spread in the hilly, Northern dry, and Northern Transition zones of the agro-Climatic Zones of Karnataka State, and it is very warm during the summer, especially in April and May, with temperatures ranging between 35^0 and 400 °C in the eastern part of the basin area. The annual normal rainfall of the Malaprabha basin area is over 759 mm spread over 50 days, which receives monsoon rainfall as much as our nation with slight variations. Deep black cotton soils are ubiquitous in the basin area. Jowar, besides other drought-resistant inferior small millet crops, is traditionally



Length [km]	306
Area [km^{2}]	11549
Total Population 2011 [millions]	3.38
Population Density [persons /km^{2}]	232
Annual Rainfall Runoff [P]	528 mm/7.8 km^{3}
Annual Runoff [Q] [km^{3}]	1.6
Runoff Coefficient [Q:P]	Observed : 0.20Predicted : 0.11
Potential Evaporation Ep [mm/yr]	1,468
Aridity Index [Ep/P]	2.8
Available Yield [tmcft]	56
Allocation Yield [tmcft]	57

Figure 2: Salient Features of the Malaprabha River Basin, Karnataka, India

the predominant crop. Geographically, deep black cotton soils, Unpredictable monsoonal rainfall, droughts, and famines are part of the lives of people in the study region. The present study is a natural region that occupies 6.02% of the Karnataka state. As per the 2011 census, the population of the Malaprabha River Basin is 3.38 million (5.53% of the state's total population), of which 77.66% are rural and 22.34% are urban. The dominance of rural populations makes the regional economy mainly agrarian. The basin's 68.37% of the workforce (61.75% of males and 79.55% of females), however, is still dependent on agriculture and its allied activities for their livelihood. The economic development and prosperity of the masses depend mainly on agriculture.

Results and Discussion

Changing Agricultural Structure of MalaprabhaRiver Basin Area; 1971 to 2011

We look at the changing structure and structural transformation of agriculture in the Malaprabha river basin area in terms of growth of population, both total and rural, and workforce, including farm and non-farm sectors. Population size is one of the key determinants of the work force and its participation rates. According to the 2011 Indian Census, the population of Malaprabha River Basin Area is 33.83 lakh, comprising 17.13 lakh males and 16.71 lakh females, which works out to be 976 females per thousand males. This ratio is higher than the average for the state (968). The River Basin Area accounted for a meagre share of the total population of Karnataka State (5.53%), slightly higher than its share in 2001 (5.81%).

The decadal growth of the total and rural populations of the Malaprabha River Basin Area over the decade from 1971 to 2011 is given in Table 1. During the year 1971, the Malaprabha River Basin Area had about 19.01 lakh people (share of rural population: 80.87%). In 1981, which is the base year of study, it had increased to 23.08 lakhs (share of rural population: 78.95%) with a decadal growth rate of 21.44 percent. In the year 1991, the study area had a population of 27.10 lakh (share of rural population: 79.55%), and the decadal growth rate had declined to 17.41 percent. During the 2001 decade, the absolute population increased to 30.71 lakh (share of rural population: 79.12%), with a remarkable decline in the growth rate of the decadal population (13.32 percent). Further, during the present decade, i.e., 2011, the population of Malaprabha River Basin Area has increased to 33.83 lakhs (share of rural population: 77.66%) and by 3.12 lakhs in absolute terms, thus yielding a growth rate in terms of percentage; it has registered a decadal growth of 10.18 percent, which is below the state average of 15.67 percent and the national average of 17.64 percent. This growth rate is 5.31 percent and 7.46 percent lower than that of the state (15.67 percent) and the national average (17.64 percent). At the same time, the working population of the study area also increased from 7.29 lakhs, or a WPR of 38.33%, in 1971 to 15.64 lakhs, or a WPR of 46.21%, in 2011.

The agriculture sector in the study area has undergone significant structural changes in the form of a decrease in the share of the farm sector from 75.04% in 1971 to 68.37% by 2011, and at the same time, the share of the non-farm sector increased from24.96% in 1971 to 31.63% by 2011, indicating a shift from the traditional agrarian economy towards a non-agrarian-dominated one (Table 1). This decrease in agriculture's contribution to population growth has not been accompanied by a matching reduction in agriculture's share of employment.

About 68.37% of the total workforce is still employed by the farm sector, which makes more than 2/3 of the population of the basin area dependent on agriculture for sustenance. In 2011, among the agricultural workforce, about 57.81% were registered as agricultural laborers and the rest, i.e., 42.19%, as cultivators, while 50.46% were registered as agriculture laborer's and the rest, i.e., 49.54%, as cultivators in 1971. This indicates that the agricultural workforce shifted from cultivators to agricultural laborers (Table 1). However, within the rural economy, the share of income from non-farm activities has also increased.

Table 1: Population & Its Growth, Farm and Non-Farm Workers inMalaprabha River Basin Area, Karnataka State since 1971 to 2011

Components		*Census Years*				
		1971	*1981*	*1991*	*2001*	*2011*
Total Population(In Lakhs)		19.01	23.08	27.10	30.71	33.84
Decadal Growth Rate(%)		--	21.44	17.41	13.32	10.18
Rural Population(In Lakhs)		15.37	18.22	21.65	24.30	26.28
Share of Rural Population (In %)		(80.87)	(78.95)	(79.55)	(79.12)	(77.66)
Decadal Growth Rate(%)		--	18.56	18.31	12.71	8.14
Total Workers(In Lakhs)		7.29	9.14	11.07	14.56	15.64
(In % to total population)		(38.33)	(39.61)	(40.83)	(47.40)	(46.21)
FARM	Cultivators(In Lakhs)	2.71	3.46	3.98	4.92	4.51
	(In % to total workers)	(37.26)	(37.85)	(35.93)	(33.77)	(28.86)
	% to Farm Workers	49.54	50.14	47.27	46.81	42.19
	Agricultural Labourers(In Lakhs)	2.75	3.44	4.44	5.69	6.18
	(In % to total workers)	(37.78)	(37.64)	(40.11)	(38.45)	(39.51)
	% to Farm Workers	50.46	49.86	52.73	53.19	57.81
	Total(In Lakhs)	5.47	6.90	8.42	10.51	10.69
	(In % to total workers)	(75.04)	(75.49)	(76.05)	(72.22)	(68.37)
NON-FARM	Household Industry Workers(In Lakhs)	0.55	0.56	0.42	0.68	0.56
	(In % to total workers)	(7.51)	(6.07)	(3.84)	(4.71)	(0.56)
	% to Non-Farm Workers	30.22	25.00	15.85	16.83	11.31
	Other Workers (In Lakhs)	1.27	1.69	2.23	3.36	4.39
	(In % to total workers)	(17.45)	(18.44)	(20.12)	(23.08)	(28.07)
	% to Non-Farm Workers	69.78	75.00	84.15	83.17	88.67
	Total (In Lakhs)	1.82	2.24	2.65	4.04	4.95
	(In % to total workers)	(24.96)	(24.51)	(23.95)	(27.78)	(31.63)

Sources: District Census Handbooks of Belgaum, Bagalakot, Dharwad and Gadag Districts 1971 to 2001 and Final Census Reports of 2011 [Note: In bracket figures are in percentages]

Trends of Population, Working & Non-Working Population and Workers in Different Occupational Categories by sex in MRB Area from 1971 to 2011

Occupational structure is the most important demographic aspect in explaining the economic structure of any area. The occupational structure, in turn, is influenced by the participation rate and related factors such as growth and the level of agricultural activities. In a developing country like India, the total availability of the working force and its division over diverse economic activities can be considered a measure of the overall economic development. The availability of human resources and their involvement in various activities in the agrarian environment symbolise the scenario of the development of the region. The population can generally be grouped into two groups: the working population and the non-working population. The working population has special significance as it is directly involved in productive economic activity. The proportion of population, demographic characteristics, and economic composition have a bearing on the land use pattern (Farasat Ali Siddiqui, 1988).

The Planning Commission of India has classified the working population of the nation into two categories: main workers and Marginal Workers. Further, the workers have been again classified into four subgroups as follows: 1) cultivators; 2) Agriculture labourers; 3) Workers engaged in household industry; and 4) Other workers who are engaged in other activities such as trade and transport. Table 2 illustrates the trend of population, working and non-working population, farm workers including cultivators and agricultural labourers, and non-farm workers including household industry and other services by sex in different occupational categories in the Malaprabha River Basin area since 1971 to 2011. In the talukas of Malaprabha River Basin Area, the total number of workers was about 15, 63, 641 (46.21% of the total population) during the decade of 2011. Out of this, 4, 51, 313 (28.86% of total workers) are cultivators, and 6, 17, 780 (39.51% of total workers) are agricultural labourers. The remaining 4, 94, 548 (31.63% of total workers) are engaged in household industry and other service activities.

Trends of Workers and Volume of Change in Different Occupational Categories in MRB Area during 1971 & 2011

Table 3 and Figure 2 highlight the distribution of workers in different occupational categories in the Malaprabha River Basin Area between 1971 and 2011. In the decade 1971

Table 2: Trends of Population, Working & Non-Working Population and Workers in Different Occupational Categories by Sex inMalaprabha River Basin Area, Karnataka State; 1971 – 2011

Categories	*1971*			*1981*			*1991*			*2001*			*2011*		
	Total	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*
Total Population	1900611	957212	943399	2308154	1161525	1146629	2709969	1375099	1334870	3070963	1557682	1513281	3383512	1712583	1670929
In %	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total Working Population	728539	536993	191546	914146	646484	267662	1106597	736027	370570	1455601	877000	578601	1563641	982358	581283
In %	38.33	56.10	20.30	39.61	55.66	23.34	40.83	53.53	27.76	47.40	56.30	38.23	46.21	57.36	34.79
Total Non-Working Population	1172072	420219	751853	1394008	515041	878967	1603372	639072	964300	1615362	680682	934680	1819871	730225	1089646
In %	61.67	43.90	79.70	60.39	44.34	76.66	59.17	46.47	72.24	52.60	43.70	61.77	53.79	42.64	65.21
Cultivators	271482	230534	40948	346017	285944	60073	397615	303919	93696	491538	345791	145747	451313	337995	113318
In %	37.26	42.93	21.38	37.85	44.23	22.44	35.93	41.29	25.28	33.77	39.43	25.19	28.86	34.41	19.49
Agricultural Labours	275223	154408	120815	344071	173263	170808	443897	208268	235629	559625	214127	345498	617780	268659	349121
In %	37.78	28.75	63.07	37.64	26.80	63.81	40.11	28.30	63.59	38.45	24.42	59.71	39.51	27.35	60.06
Total Farm Population	546705	384942	161763	690088	459207	230881	841512	512187	329325	1051163	559918	491245	1069093	606654	462439
In %	75.04	71.68	84.45	75.49	71.03	86.26	76.05	69.59	88.87	72.22	63.84	84.90	68.37	61.75	79.55
House Hold Workers	54705	41377	13328	55533	40739	14794	42485	31023	11462	68488	42412	26076	55711	35937	19774
In %	7.51	7.71	6.96	6.07	6.30	5.53	3.84	4.21	3.09	4.71	4.84	4.51	3.56	3.66	3.40
Other Workers	127129	110674	16455	168525	146538	21987	222600	192817	29783	335950	274670	61280	438837	339767	99070
In %	17.45	20.61	8.59	18.44	22.67	8.21	20.12	26.20	8.04	23.08	31.32	10.59	28.07	34.59	17.04
Total Non Farm Workers	181834	152051	29783	224058	187277	36781	265085	223840	41245	404438	317082	87356	494548	375704	118844
In %	24.96	28.32	15.55	24.51	28.97	13.74	23.95	30.41	11.13	27.78	36.16	15.10	31.63	38.25	20.45

Sources: District Census Handbooks of Belgaum, Bagalakot, Dharwad & Gadag Districts 1971 to 2001 and Final Census Reports of 2011

Table 3: Trends of Workers and Volume of Change in Different Occupational Categories in Malaprabha River Basin Area, Karnataka State; 1971 & 2011

S. No	Occupational Category	1971			2011			Volume of Change		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Total Population	1900611	957212	943399	3383512	1712583	1670929	1482901	755371	727530
		100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Progressive Growth over 1971 (in %)								+78.02	+78.91	+77.12
2	Total Working Population	728539	536993	191546	1563641	982358	581283	835102	445365	389737
		38.33	56.10	20.30	46.21	57.36	34.79	+7.88	+1.26	+14.49
Progressive Growth over 1971 (in %)								+114.63	+82.94	+203.47
2a	Cultivators	271482	230534	40948	451313	337995	113318	179831	107461	72370
		37.26	42.93	21.38	28.86	34.41	19.49	-8.40	-8.52	-1.89
Progressive Growth over 1971 (in %)								+66.24	+46.61	+176.74
2b	Agricultural Labours	275223	154408	120815	617780	268659	349121	342557	114251	228306
		37.78	28.75	63.07	39.51	27.35	60.06	+1.73	-1.40	-3.01
Progressive Growth over 1971 (in %)								+124.47	+73.99	+188.97
Total Farm Workers (2a & 2b) 75.04		546705	384942	161763	1069093	606654	462439	522388	221712	300676
		71.68	84.45	68.37	61.75	79.55	-6.67	-9.93	-4.90	
Progressive Growth over 1971 (in %)								+95.55	+57.60	+185.87
2c	House Hold Workers	54705	41377	13328	55711	35937	19774	1006	-5440	6446
		7.51	7.71	6.96	3.56	3.66	3.40	-3.95	-4.05	-3.56
Progressive Growth over 1971 (in %)								+1.84	-13.15	+48.36
2d	Other Services	127129	110674	16455	438837	339767	99070	311708	229093	82615
		17.45	20.61	8.59	28.07	34.59	17.04	+10.62	+13.98	+8.45
Progressive Growth over 1971 (in %)								+245.19	+150.67	+502.07
Total Other Workers (2c & 2d) 24.96		181834	152051	29783	494548	375704	118844	312714	223653	89061
		28.32	15.55	31.63	38.25	20.45	+6.67	+9.93	+4.90	
Progressive Growth over 1971 (in %)								+171.98	+147.09	+299.03

Sources: District Census Handbooks of Belgaum, Bagalakot, Dharwad & Gadag Districts 1971 to 2001 & Final Census Reports of 2011

in the study area, the share of workers was 38.33 percent of the total population, of which 75.04% were engaged in the farm sector, followed by 24.96% in the non-farm sector (household industry and other services). During the present decade, i.e., 2011, the share of the workforce in the total population increased to 46.21%, with +7.88% point increases as compared to the earlier decade (1971). Out of the total workers, 68.37% of the population was engaged in the farm sector, followed by household industry and other services (31.63%).

The share of cultivators has shown a decline of -8.40% points, whereas the share of agricultural labourers has revealed a marginal increase of +1.73% points during the study period. The proportion of workers engaged in the farm sector including cultivators and agricultural labourers has fallen from 75.04% in 1971 to 68.37% in 2011. The net decline was -6.67% points in the farm sector during the study period. The percentage share of workers in household industries has also shown a declining trend, i.e., from 7.51% in 1971 to 3.56% in 2011 (-3.95%). While the trend of the percentage share of workers in other services has experienced landmark increases from 17.45% in 1971 to 28.07% in 2011 (+10.62), At the same time, the proportion of workers engaged in the non-farm sector has gone up from 24.96% in 1971 to 31.63% in 2011 (+6.67%). There has been a marginal increase in male workers from 56.10% to 57.36% during the same period. On the other hand, female workers witnessed a milestone increase from 20.30% in 1971 to 34.79% in 2011 (+14.49%).

Figure 3: Trends of work participation rates in different occupational categories in Malaprabha river basin area from 1971 to 2011

Table 4: Distribution of Population and Working Population by Work Participation Rates inMalaprabha River Basin,Karnataka State: 1971-2011
[Share of Talukas]

Range of WPRs	1971					2011				
	Talukas	Total Population	%	Working Pop^n	%	Total Population	%	Working Pop^n	%	Talukas
Total	13	1900611	100	728539	100	3383512	100	1563641	100	13
< 37.5	5	918662	48.34	334747	45.95	--	--	--	-	--
37.5 to 40.0	5	589797	31.03	225141	30.90	--	--	--	--	--
40.0 to 42.5	2	258565	13.60	106581	14.63	381189	11.27	161498	10.33	1
42.5 to 45.0	--	--	--	--	--	688596	20.35	302510	19.35	2
45.0 to 47.5	1	133587	7.03	62070	8.52	1455994	43.03	675384	43.19	5
47.5 to 50.0	--	--	--	-	--	524718	15.51	253052	16.18	3
50.0 +	--	--	--	-	--	333015	9.84	171197	10.95	2
Male	13	957212	100	536993	100	1712583	100	982358	100	13
< 52.5	1	105603	11.03	55014	10.24	0	0	0	0	0
52.5 to 55.0	1	76518	7.99	41950	7.81	161741	9.44	87401	8.90	1
55.0 to 57.5	7	441945	46.17	246830	45.97	801441	46.80	450868	45.90	5
57.5 to 60.0	4	333146	34.80	193199	35.98	494673	28.88	288341	29.35	4
60.0 +	--	--	--	-	--	254728	14.87	155748	15.85	3
Female	13	943399	100	191546	100	1670929	100	581283	100	13
< 15	2	168124	17.82	24725	12.91	--	--	--	-	--
15 to 20	4	336872	35.71	61126	31.91	--	--	--	-	--
20 to 25	6	372221	39.46	82967	43.31	--	--	--	-	--
25 to 30	--	--	--	-	--	188727	11.29	52819	9.09	1
30 to 35	1	66182	7.02	22728	11.87	591540	35.40	192335	33.09	4
35 to 40	--	--	--	-	--	797396	47.72	296230	50.96	7
40 +	--	--	--	-	--	93266	5.58	39899	6.86	1

Sources: District Census Handbooks of Belgaum, Bagalakot, Dharwad & Gadag Districts 1971 to 2001 and Final Census Reports of 2011

Total Workers in Malaprabha River Basin Area during 1971 and 2011

Spatial distribution of population and workers by WPRs in MRB area in 1971&2011

The comparable analysis of the distribution of population and workers by work participation rates in the Malaprabha River Basin of the 1971 and 2011 censuses has been presented in Table 4. As per the Figure 3 of the 2011 census, the numbers of talukas falling under different ranges of WPRs, as given in the table, have remarkably changed during the decade. None of the talukas in the study area have below 40% WPRs, whereas in 1971, each of the five talukas fell below 37.5% and fell within the range of 37.5 to 40.0%; two talukas fell within the range of 40 to 42.5%; only one taluka fell within the range of 45 to 47.5 percent WPRs; and none of the talukas fell within the range of above 47.5% WPRs in the study area. Out of 13 talukas, Bailhongal taluka is the proof of the least WPR and falls under the range of below 42.5%, and the other two talukas, namely Hunagund and Gadag, fall in the range of 42.5 to 45% WPRs of workers during 2011. These talukas have 31.62 percent of the total population and 29.68 percent of the total workers in the basin area. All other ten talukas in the basin area have WPRs above 45%, more than 68.38 percent of the total population, and 70.32 percent of total workers in this range of WPRs.

Regarding males, in 2011, Hunagund taluka of the basin area had a lower than 55 percent range of WPRs, with 9.44 percent of the male population and 8.90 percent of male workers. Three talukas can be proud of having more than 60+ ranges of WPRs, with more than 14.87 percent of the total male population and 15.85 percent of male workers. Hubli has the highest WPRs (61.41%) among the three talukas of the basin area. While in 1971, each taluka had WPRs below 52.5 percent and below 55 percent, seven talukas had WPRs less than 57.5 percent, and the remaining four talukas had WPRs less than 60 percent. The share of population and workers in the less than 52.5 percent, less than 55 percent, 57.5 percent, and less than 60 percent ranges is 11.03, 7.99, 46.17, and 34.80 percent of the male population, and 10.24,

Table 5: Taluka-wise Total Workers & Volume of Changes of WPRs in Malaprabha River Basin Area,Karnataka State from 1971 to 2011

S. No	Talukas	Total Workers (%) 1971			2011			Volume of Change (%)		
		Total	Male	Female	Total	Male	Female	Total	Male	Female
1	Khanapur	38.44	54.82	21.82	45.88	58.33	33.14	+7.44	+3.51	+11.32
2	Bailhongal	36.46	57.81	14.59	42.37	56.47	27.99	+5.91	-1.34	+13.40
3	Saundatti	41.51	58.23	24.47	46.34	56.94	35.45	+4.83	-1.29	+10.98
4	Ramadurga	46.46	58.37	34.34	47.61	56.38	38.62	+1.15	-1.99	+4.28
5	Badami	36.54	56.41	16.78	46.04	55.10	36.83	+9.50	+1.62	-0.69
6	Hunagund	36.81	55.84	18.01	43.85	54.04	33.52	+7.04	-1.80	+15.51
7	Naragund	38.11	55.09	21.13	47.68	57.75	37.22	+9.57	+2.66	+16.09
8	Ron	38.42	55.57	21.63	46.78	56.36	37.13	+8.36	+0.79	+15.50
9	Gadag	35.82	52.10	18.86	44.01	57.51	30.36	+8.19	+5.41	+11.50
10	Dharwad	36.72	57.58	14.91	47.01	59.58	33.78	+10.29	+1.80	+18.87
11	Hubli	40.51	56.77	23.61	50.52	61.41	39.13	+10.01	+4.64	+15.52
12	Navalgund	37.90	55.55	20.10	52.08	61.02	42.78	+14.18	+5.47	+22.68
13	Kundagol	37.68	55.37	19.49	49.52	61.05	37.41	+11.84	+5.68	+17.92
Total		38.33	56.10	20.30	46.21	57.36	34.79	+7.88	+1.26	+14.49

Sources: District Census Handbooks of Belgaum, Bagalakot, Dharwad & Gadag Districts 1971 to 2001 and Final Census Reports of 2011

7.81, 45.87, and 35.98 percent of the male workers in the basin area, respectively.

However, the scenario is not so remarkable in the case of females. In 2011, there are five talukas that have a WPR range of less than 35 percent, with 46.69 percent female population and 42.18 percent female workers; the other seven talukas of the basin have a WPR range of 35 to 40 percent, with 47.72 percent female population and 50.96 percent female workers. Navalgund is the evidence of the highest WPRs (42.78%) among the female population of the basin area, which falls under 40+ WPRs with 5.58 percent of the population and 6.86 percent of workers. But in 1971, out of thirteen talukas, two fell in less than 15 percent of WPRs, four fell in less than 20 percent, six fell in less than 25 percent, and only one fell below the 35 percent range of WPRs. The share of population and workers in less than 15 percent, less than 20 percent, less than 25 percent, and less than 35 percent ranges is 17.82, 35.71, 39.46, and 7.02 percent of the female population, and 12.91, 31.91, 43.31, and 11.87 percent of the female workers in the basin area, respectively.

Spatial Distribution ofTotal Workers in MRB Area, 1971 &2011

In the process of reducing regional imbalances, total worker participation rates go a long way. As such, an attempt is made to examine the spatial distribution of total, farm, and non-farm workers among the talukas of the Malaprabha river basin area. The data relating to the distribution and volume of change of total workers to total population and farm workers, including cultivators and agricultural labourers, to total workers by sex in the talukas of the basin area for 1971 and 2011 censuses are presented in Table 5. In the Malaprabha River Basin Area, the rise in WPRs is prominent in the total and in the case of females work force, whereas it is marginal in the case of males during the study period. The main contributing factor to this rise is the total as well as the female workforce in the farm and non-farm sectors. As can be seen from Table 5, the total work participation rates, both in total and by sex, in the basin area have increased by the 2011 census when compared to the work participation rates of the 1971 census. It is also interesting to note that the increase in females is more pronounced than in males. This is an indication of the generation of more working opportunities in and around living places, which is a welcoming feature. As per the 2011 census, the total WPRs of the Malaprabha River Basin area are 46.21%; however, it is 57.36% for males and 34.79% for females. The taluka-wise distribution of total WPRs in the basin area shows wide variations; it runs from 42.37% in Bailhongal to 52.08% in Navalgund taluka. The pattern of regional distribution of total WPRs in the basin may be projected systemically by grouping the taluka rates into four grades with the help of maximum and minimum, that is, very high (above 50%), high (47.5 to 50%), medium (45 to 47.5%), and low (below 45%).

Considering the four grades mentioned above separately, it is observed from Table 5 and Figure 4 that the very high grade of (above 50%) WPR constitutes two talukas, Navalgund (52.08%) and Hubli (50.52%), in one distinct zone. The next category is the high grade of (47.5 to 50%) WPRs observed in three talukas, namely Kundagol (49.52%), Naragund (47.68%), and Ramadurga (47.61%), and they

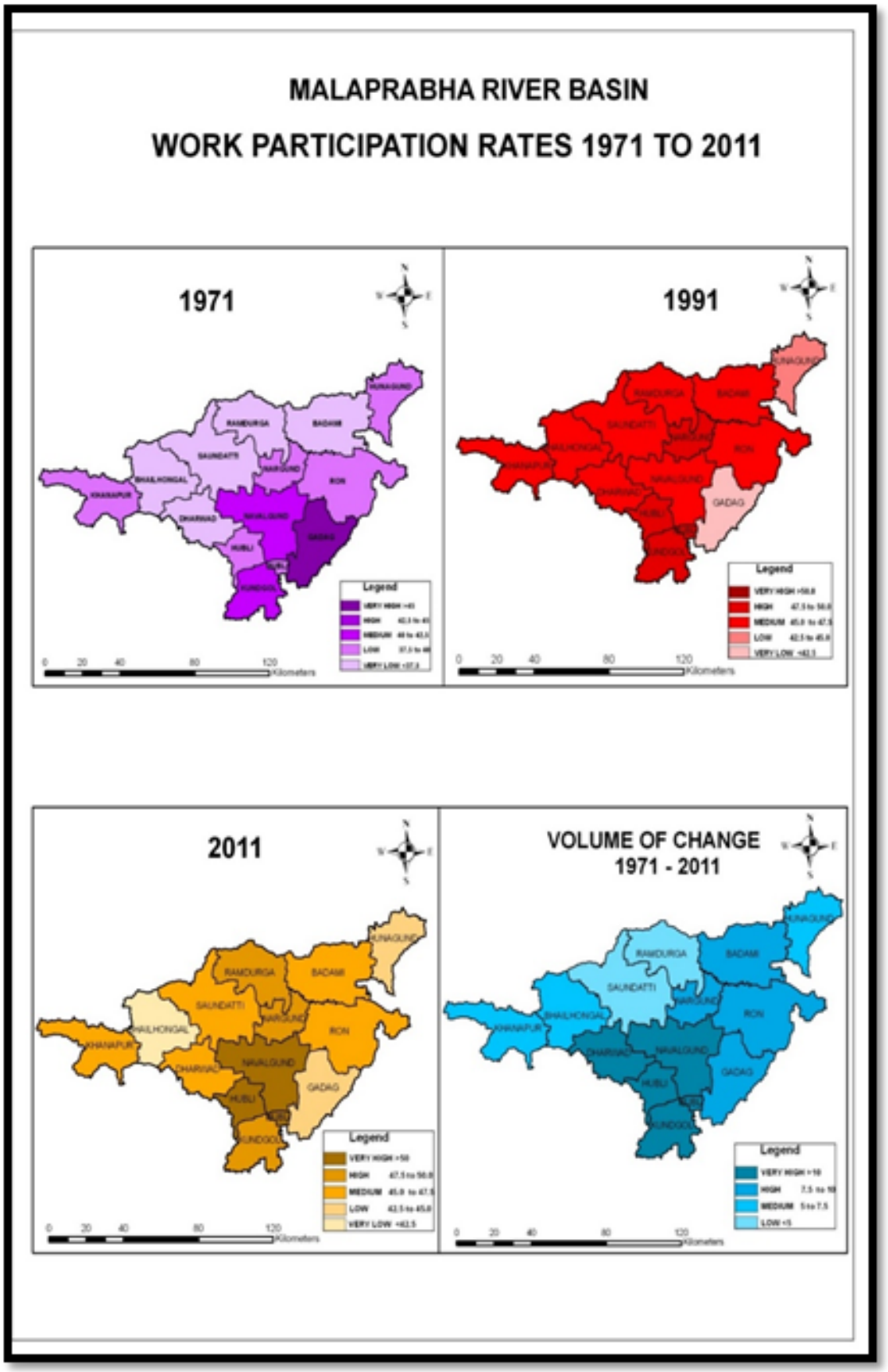


Figure 4: Spatial Distribution and Volume of Change of Total Workers in MRB Area, 1971 & 2011

form two notable zones. The medium grade of 45 to 47.5 percent WPR is observed in five talukas of the basin. They are Dharwad (47.01%), Ron (46.78%), Saundatti (46.34%), Badami (46.04%), and Khanapur (45.88%) talukas and do not form any notable zones. The remaining three talukas, namely Gadag (44.01%), Hunagund (43.85%), and Bailhongal (42.37%), show low grade levels (below 45%) for WPRs, and they are again not farming any notable zones in the basin area.

Spatial Patterns of WPRs in Male and Female in MRB Area

In accelerating the economic prosperity of any region, the workforce participation rates of not only males but also females are equally important, particularly in view of the importance attached to the empowerment of women in recent years. The statistical information relating to the spatial patterns of female and male workers in the study area relative to the total population in the basin area is shown in Table 5.As can be seen from the table, there is a marginal rise (+1.26%) in the participation rates of male workers, but there is a notable rise (+14.49%) in the rates of female workers in the study area by 2011. During 2011, the taluka-wise distribution of total WPRs in males in the basin area showed wide variations, ranging from 54.04% in Hunagund to 61.41% in Hubli taluka. Above 60% WPRs in males is recorded as a very high grade in the following three talukas: Hubli (61.41%), Kundagol (61.05%), and Navalgund (61.02%). The predominant rural irrigation and market facilities are plentiful, and the agrarian economy remains the mainstay of the talukas, reflecting a high workforce. Four talukas, viz. Dharwad (59.58%), Khanapur (58.33%), Naragund (57.75%), and Gadag (57.51%), of the basin area show high-grade WPRs in males (57.5 to 60.0%). It is found that there are five talukas such as Saundatti (56.94%), Bailhongal (56.47%), Ramadurga (56.38%), Ron (56.36%), and Badami (55.10%) where male WPRs listed as medium grade ranged between 55.0 and 57.5%. Only the Hunagund (54.04%) taluka has less than 55% WPRs in males, which is registered as low grade.

As can be seen from Table 5, there was a noteworthy rise (+14.49%) in the participation rates of female workers in the study area by 2011. During 2011, the taluka-wise distribution of total WPRs in females in the basin area showed wide variations; it ran from 27.99% in Bailhongal to 42.78% in Navalgund taluka. Above 40% WPRs in females is witnessed as a very high grade in only one taluka, i.e., Navalgund (42.78%), of the basin area. The prime rural and irrigation facilities are ample; the agrarian environs remain the mainstay of the taluka, with a shiny high labour force. Seven talukas, namely Hubli (39.13%), Ramadurga (38.62%), Kundagol (37.41%), Naragund (37.22%), Ron (37.13%), Badami (36.83%), and Saundatti (35.45%), of the basin area show high-grade WPRs in females (35 to 40.0%). It is found that there are four talukas, such as Dharwad (33.78%), Hunagund (33.52%), Khanapur (33.14%), and Gadag (30.36%), where female WPRs listed as medium grade ranged between 30 and 35.0%. Only the Bailhongal (27.99%) taluka has less than 30% WPRs in females, which is registered as low grade.

Spatial Patterns of Volume of Changes in WPRs in MRB Area, 1971-2011

The volume of Changes in WPRs during 1971–2011 was +7.88% and ranged from as low as +1.15% in Ramadurga to as high as +14.18% in Navalgund taluka for the basin area (Table 5 and Figure 4). Four types of areas of change in WPRs have been identified: areas with very high change (more than 10%), areas with high change (7.5 to 10%), areas with moderate change (5 to 7.5%), and areas with low change (less than 5%).

Out of a total of thirteen talukas in the basin, four talukas recorded a very high change (more than 10%). These are Navalgund (+14.18%), Kundagol (+11.84%), Dharwad (+10.29%), and Hubli (+10.01%), and they formed a distinctive zone in the southwestern part of the study area. The major factors associated with this pattern are irrigation facilities, good accessibility due to plain surface transportation development, relatively good market connectivity, and prosperity due to agro-based industrial development.

Four talukas of the Malaprabha river basin area show high changes (7.5 to 10%) in WPRs during 1971–2011. Naragund (+9.57%) and Badami (+9.50%) recorded the highest change (above +9.50%); Ron (+8.36%) and Gadag (+8.19%) talukas are others in this group. Among these talukas, Gadag (+8.19%) displayed the lowest change, and they formed a distinctive zone in the eastern part of the basin.

In three talukas, a moderate change (5 to 7.5%) in WPRs has been observed. They are, namely, Khanapur (+7.44%), Hunagund (+7.04%), and Bailhongal (+5.91%) talukas. Out of all these three talukas, Khanapur (+7.44%) emerges with the highest change, whereas Bailhongal (+5.91%) displays the lowest change during this study period. The remaining two talukas of basin area show low change in WPRs during 1971–2011, i.e., less than 5%. Saundatti (+4.83%) is the highest change and Ramadurga (+1.15%) is the lowest change that has been observed, and they formed a region in the southern part of the basin.

Except Kundagol (+5.68%), Navalgund (+5.47%), Gadag (+5.41%), Hubli (+4.64%), Khanapur (+3.51%), and Naragund (+2.66%) talukas of the basin area, all other seven talukas have witnessed a decrease in male workers. While in the case of female workers, Navalgund (+22.68%), Dharwad (+18.87%), Kundagol (+17.92%), Naragund (+16.09%), Hubli (+15.52%), Hunagund (+15.52%), and Ron (+15.50%) talukas are confirmed by the increasing trend above the basin average (+14.49%), and the other six talukas are below the average of the basin area.

Conclusion

The Malaprabha river basin is a natural region with different agricultural environs. Observably, the impact of varied conditions for agricultural development in the Malaprabha

river basin on a balanced path needs perfect plans in terms of management, investment, and policy. The above analysis suggests that;

- There are undoubtedly significant changes in work participation rates between total, farm, including cultivators and agricultural labourers, and non-farm sectors, as well as by sex, in the Malaprabha river basin area from 1971 to 2011.
- These changes existed at all levels, but for males, they were even more serious and higher than the changes in participation rates for females in the study area.
- To overcome this context, some attractive and developmental policies must be framed for both farm and rural non-farm workers, including skilled and unskilled workers in the basin area.
- Enhancement of new innovative technological advancements and regular participation of peoples in all levels of agricultural practices, such as farm mechanization measures, are essential and are taken up as a top priority in the basin area. That should be leads the higher rates of work participation in the basin area.
- Youth employment through Mahatma Gandhi National Rural Employment Guarantee is one of the prime focus areas of Self Help Groups. This can bring prosperity to workers in far-off rural areas.
- An Integrated developmental plan for the women's workers like dairy farming, animal husbandry and marketing of rural products need to implement in the rural side on top priority base for sustainable development in the Malaprabha river basin.

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