



**DEMOGRAPHIC TRENDS**  
**IN**  
**RAJASTHAN**

**BY**  
**SOBHAG NARAIN MATHUR**

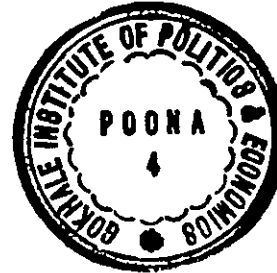
**SUPERVISOR**  
**PROF. N. V. SOVANI**  
**JOINT DIRECTOR**  
**GOKHALE INSTITUTE OF**  
**POLITICS AND ECONOMICS**  
**POONA (INDIA)**

**1959**

**DEMOGRAPHIC TRENDS IN RAJASTHAN**

DEMOGRAPHIC TRENDS

IN  
RAJASTHAN



(A thesis submitted to the University of Poona  
for the degree of Doctor of Philosophy)

by

SOHNAG KARAIN MATHUR

M.A., B.Sc.

Under the guidance

of

Prof. N.V. SOVANI

Joint Director,

Gokhale Institute of Politics & Economics,

POONA (India)

1959

## P R E F A C E

This thesis is the work of a Research that I undertook while I was a Ford Foundation Research Fellow at Gokhale Institute of Politics and Economics, Poona. Most of the writing and a bulk of the Statistical work were accomplished there. However, it was still unfinished when I joined the Staff of National Defence Academy, Kharakvasla, and the rest of the work was completed during my stay at Kharakvasla.

The main objective of the thesis has been to consolidate the scattered data for the population of Rajasthan by studying the different censuses and to analyse them fully with a view to drawing useful conclusions by tracing the trend in respect to growth, birth, death, marriage, fertility and mortality of the population.

Attempts have also been made to construct Life Tables exclusively for Rajasthan for two decades from 1931 to 1951, and to make an estimate of the future population. The scope of the study has been further enlarged by studying the trends of population growth in the four natural regions of Rajasthan, and the effects of natural factors on the population.

It may be noted that none of the surveys conducted in India and none of the censuses present a detailed analysis of the regional trends for a particular section of India's population. An attempt has, therefore, been made throughout this thesis to view the State and its regions against the background of population developments and economic conditions

elsewhere, and to find out in what ways the State is unique and in what respects it has common patterns with other parts of India.

In the past the Census Superintendents were content with presenting the population data collected at each decennial census. Although general conclusions at the country level were made, no detailed analysis was made at the State level. But for regional planning it is very essential to know the peculiar population trends of the region in detail. If we want to raise the standard of living and to alleviate pain, prolong life and postpone death, we must know the men for whom the plans are drawn. Our knowledge of even the basic population and other vital data for Rajasthan in the past was neither completely correct nor comprehensive. The statistics are also devoid of regularity and uniformity. With the merger of twenty-one States of Rajputana and the emergence of greater Rajasthan, the need has been increasingly felt to draw plans for the economic development of this part of the country which is still backward in several respects.

We have, therefore, fully analysed the data from the census volumes, despite great limitations. The Statistical techniques used in America and European countries, have been used in these analyses as far as possible. New methods have been evolved, wherever necessary, in order to suit the data available. Advantage has been taken of the published works of several authors which have been acknowledged at their proper places. We were confronted with some

difficulties and bottlenecks also which have been mentioned at their appropriate places.

India's population is increasing by more than two percent every year, and this is one of our greatest problems. A great majority of our population is denied even the bare requisites of life, and the fabulous growth of population is further lowering the standard of living. In spite of great efforts in the Plans and the advances in modern science and technology, our food problem is still a nightmare. It is obvious, therefore, that a restrictive population policy based on family planning is envisaged.

It is hoped that this independent study may do something to fill the gap in the basis of planning for Rajasthan, and to stimulate a better understanding and discussion of the most basic of the numerous population problems of Rajasthan.

I most sincerely express my debt of gratitude to Prof. N.V. Sovani for his kind and sympathetic guidance and for going through the whole of the dissertation. The discussions I had with him and the comments offered by him have been of immense help to me in writing this thesis.

I am also grateful to Prof. P.N. Mathur, Professor of Statistics, Gokhale Institute for his valuable suggestions, specially in connection with the Statistical treatment of the data. Prof. Mathur was also kind enough to read through the entire draft of the thesis and to guide me.

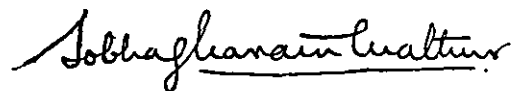
My grateful thanks are also due to Shrimati Kumudini Dandekar, Professor of Demography, Gokhale Institute for

-iv-

kindly reading the thesis very thoroughly and critically. Without her invaluable suggestions, this work would not have taken the present form.

I had the benefit of discussions on specific problems with Prof.D.R. Gadgil and I sincerely thank him for this. I must also record my deep sense of appreciation for the authorities and staff of the Gokhale Institute for their kind co-operation and encouragement throughout my stay in Poona.

Gokhale Institute of  
Politics & Economics,  
POONA ( India ).

  
( Sobhag Narain Mathur )

December 31, 1959.

-v-  
C O N T E N T S

CHAPTER		PAGE
	Preface:	1 - 1v
I	THE TASK AND THE TOOLS	1 - 26
	1. INTRODUCTION	1
	2. THE TASK	2
	3. THE TOOLS AVAILABLE	6
	4. CENSUSES IN RAJASTHAN	8
	5. CHANGES IN BOUNDARY AT VARIOUS CENSUSES	22
	6. RELIABILITY OF THE DATA.	
II	RAJASTHAN : GEOGRAPHICAL SETTING	27 - 42
	1. INTRODUCTION	27
	2. POSITION	27
	3. BOUNDARY	28
	4. AREA	28
	5. PHYSICAL FEATURES	29
	6. CLIMATIC CONDITIONS	30
	7. WATER RESOURCES	32
	8. NATURAL DIVISIONS	33
	9. OCCUPATIONAL PATTERN	40
	10. EDUCATIONAL STANDARD	41
III	POPULATION CHANGES	43 - 60
	1. INTRODUCTION	43
	2. VARIATION IN POPULATION	44
	3. GROWTH RATE	49
	4. GROWTH IN THE NATURAL REGIONS.	52



CHAPTER	PAGE
5. DENSITY	58
IV AGE - COMPOSITION	61 - 88
1. KIND OF DATA AVAILABLE	61
2. ADJUSTMENT IN AGE-GROUPS	68
3. ADJUSTED AGE-GROUPS	73
4. SEX-RATIO	80
5. SEX-RATIO IN THE NATURAL REGIONS	83
6. SEX-RATIO IN RAJASTHAN AND SOME OF THE STATES IN INDIA	84
7. SEX-RATIO IN THE REPRODUCTIVE AGE-GROUP	86
8. DEPENDENCY LOAD.	87
APPENDIX TO CHAPTER IV	(1) - ( xviii )
CORRECTED AGE DISTRIBUTION FOR RAJASTHAN AND ITS NATURAL REGIONS FROM 1901 to 1951 CENSUS.	(1)
V MARITAL STATUS.	
1. INTRODUCTION	89
2. PROPORTIONS MARRIED, SINGLE AND WIDOWED.	92
3. PROPORTIONS OF SINGLE, MARRIED AND WIDOWED IN NATURAL REGIONS.	95
4. PROPORTIONS OF SINGLE, MARRIED AND WIDOWED PERSONS IN SOME OF THE STATES OF INDIA.	99
5. VARIATION IN THE CIVIL CONDITION OF RAJASTHAN.	100
6. PROPRTION OF SINGLE, MARRIED AND WIDOWED IN THE REPRODUCTIVE AGE- GROUP.	103

CHAPTER	PAGE
7. MARRIAGE RATES BY AGE	105
8. DESCRIPTION OF THE PROCEDURE USED.	106
9. AVERAGE ANNUAL MARRIAGE RATES BY FIVE-YEARLY AGE-GROUPS.	111
10. MEAN AGE AT MARRIAGE IN RAJASTHAN.	114
VI TRENDS OF THE BIRTH RATE.	118 - 130
1. LIMITATIONS OF VITAL STATISTICS	118
2. ESTIMATION OF BIRTH RATE	120
3. A RÉSUME OF THE METHOD	122
4. BIRTH RATES FOR TOTAL RAJASTHAN	122
5. REGIONAL BIRTH RATES	124
VII FERTILITY.	131 - 156
1. FERTILITY DATA IN 1941 CENSUS OF RAJASTHAN	131
2. LIMITATIONS OF THE DATA	131
3. FERTILITY TABLES	134
4. FERTILITY RATES	138
5. GROSS REPRODUCTION RATES	150
6. NET REPRODUCTION RATES	152
7. MEAN LENGTH OF A GENERATION	155
8. TRUE RATE OF NATURAL INCREASE	156
VIII DEATH RATES	157 - 178
1. LIMITATIONS OF VITAL STATISTICS	157
2. CALCULATION OF DEATH RATES	159
3. METHOD OF ESTIMATION	161

CHAPTER		PAGE
	4. DEATH RATES FOR RAJASTHAN	165
	5. DEATH RATE IN RAJASTHAN AND ALL INDIA AND CEYLON.	169
	6. REGIONAL DEATH RATES	170
IX	MORTALITY AND LIFE TABLES.	179 - 205
	1. INTRODUCTION	179
	2. DATA AVAILABLE	183
	3. CHARACTERISTICS OF AGE STATISTICS	184
	4. GROUPING	185
	5. GRADUATION	186
	6. THE METHOD	187
	7. LIFE TABLES	189
	8. MORTALITY RATES	198
	9. MEAN EXPECTATION OF LIFE	200
	APPENDIX TO CHAPTER IX	(i) - (xiii)
	( THE METHOD OF CONSTRUCTION OF LIFE TABLES ).	
	1. METHOD	(i)
	2. Dr. KOZAKIEWICZ'S FORMULAE	(iii)
	3. EXTENSION OF $P_x$ TO AGES 65 & OVER	(v)
	4. RATE OF MORTALITY	(v)
	5. LIVING AT AGE $x$ & LIFE TABLE DEATHS	(vi)
	6. DETERMINATION OF $l_x$ FOR AGES BELOW 5	(vii)
	7. OTHER FUNCTIONS OF LIFE TABLE	(x)
	8. EXPECTATION OF LIFE OR AVERAGE FUTURE LIFE TIME.	(xi)

CHAPTER		PAGE
X	FUTURE GROWTH AND POPULATION POLICY.	207
	1. INTRODUCTION	207
	2. PROJECTIONS FOR RAJASTHAN	208
	3. GENERAL CHARACTERISTICS OF THE POPULATION OF RAJASTHAN	210
	4. THE EXPECTED COURSE OF MORTALITY	211
	5. THE EXPECTED COURSE OF FERTILITY	212
	6. THE EXPECTED COURSE OF MIGRATION	214
	7. PROJECTION NUMBER I	215
	8. PROJECTION NUMBER II	216
	9. PROJECTION NUMBER III	217
	10. DIFFERENCES IN THE THREE PROJECTIONS	220
	11. FUTURE PROSPECTS	221
BIBLIOGRAPHY		(1) - (xxi)

LIST OF MAPS

NO.	PAGE
1. LOCATION OF RAJASTHAN	1
2. FORMER PRINCELY STATES OF RAJASTHAN	8
3. AREA AND POPULATION OF RAJASTHAN	29
4. PHYSICAL FEATURES OF RAJASTHAN	29
5. RAINFALL IN RAJASTHAN	31
6. VARIATION IN POPULATION IN RAJASTHAN	48
7. GROWTH OF POPULATION IN RAJASTHAN	50
8. DENSITY OF POPULATION IN RAJASTHAN	53.

LIST OF FIGURES

NO.	PAGE
1. AREA OF RAJASTHAN AT DIFFERENT CENSUSES	22
2. OCCUPATIONAL PATTERN IN RAJASTHAN, 1951	40
3. EDUCATIONAL STANDARDS IN RAJASTHAN, 1951	41
4. PERCENTAGE GROWTH OF POPULATION IN THE NATURAL REGIONS OF RAJASTHAN	52
5. AGE PYRAMID FOR RAJASTHAN, 1951	73
6. DEPENDENCY LOAD IN RAJASTHAN	87
7. MARITAL STATUS OF POPULATION IN SOME STATES OF INDIA, 1951	99
8. MEAN EXPECTATION OF LIFE AT BIRTH IN RAJASTHAN AND ALL INDIA FROM 1921-1951	202.

LIST OF GRAPHS

NO.	PAGE.
1. GROWTH OF POPULATION IN RAJASTHAN	44
2. MEAN AGE AT MARRIAGE IN RAJASTHAN, 1901-1951	114
3. BIRTH RATE FOR RAJASTHAN AND ALL INDIA, 1901 - 1951	123
4. CUMULATIVE FERTILITY RATE OF MARRIED WOMEN IN RAJASTHAN, 1941, GRAPH No. I	139
5. AGE SPECIFIC FERTILITY RATE OF MARRIED WOMEN IN RAJASTHAN, 1941, GRAPH No. II	143
6. AGE SPECIFIC FERTILITY RATE OF ALL WOMEN IN RAJASTHAN, 1941, GRAPH No. III	148
7. DEATH RATE IN RAJASTHAN AND ALL INDIA, 1891 - 1951	169
8. POPULATION AGE CURVE FOR MALES IN RAJASTHAN, 1951	184
9. POPULATION AGE CURVE FOR FEMALES IN RAJASTHAN, 1951	184
10. POPULATION PROJECTIONS FOR RAJASTHAN, 1961 - 2001.	

LIST OF TABLES

TABLE		PAGE	
S.N. No.			
1.	I.1	AREA OF RAJASTHAN AND AJMER-MERWARA AT DIFFERENT YEARS.	22
2.	II.1	OCCUPATIONAL CLASSIFICATION IN THE NATURAL REGIONS OF RAJASTHAN.	41
3.	II.2	PERCENTAGE OF LITERACY IN THE NATURAL REGIONS OF RAJASTHAN.	42
4.	III.1	POPULATION AND ITS VARIATIONS IN RAJASTHAN FOR CENSUSES FROM 1881-1951.	44
5.	III.2	VARIATION IN MALE & FEMALE POPULATION OF RAJASTHAN AT DIFFERENT CENSUSES.	48
6.	III.3	MEAN DECENNIAL GROWTH RATE FOR RAJASTHAN FROM 1901 to 1951.	50
7.	III.4	MEAN DECENNIAL GROWTH RATE IN RAJASTHAN AND IN SOME OF THE STATES OF INDIA.	51
8.	III.5	VARIATIONS IN POPULATION AND GROWTH RATE IN THE NATURAL REGIONS OF RAJASTHAN FROM 1901 to 1951.	52
9.	III.6	MALE, FEMALE VARIATIONS IN POPULATION AND THE GROWTH RATE IN THE NATURAL REGIONS OF RAJASTHAN 1901-1951.	57
10.	III.7	POPULATION, AREA AND DENSITY OF RAJASTHAN AND ITS NATURAL REGIONS.	58
11.	IV.1	PERCENTAGE OF MALES AND FEMALES BY AGE GROUP IN RAJASTHAN FROM 1901-1951.	74
12.	IV.2	PERCENTAGE OF MALES BY QUINQUENNIAL AGE GROUPS IN THE NATURAL REGIONS OF RAJASTHAN 1901-1951.	76
13.	IV.3	PERCENTAGE OF FEMALES BY QUINQUENNIAL AGE GROUPS IN THE NATURAL REGIONS OF RAJASTHAN 1901-1951.	77
14.	IV.4	PERCENTAGE AGE-DISTRIBUTION OF POPULATION OF RAJASTHAN AND ALL INDIA FOR THE DECADES 1941 AND 1951 FOR BOTH SEXES.	79



S.No.	TABLE NO.		PAGE
15.	IV.5	PROPORTION OF FEMALES TO 1,000 OF MALES IN RAJASTHAN BY QUINQUENNIAL AGE GROUPS FROM 1901 to 1951.	80
16.	IV.6	SEX RATIO IN THE NATURAL REGIONS OF RAJASTHAN BY AGE-GROUPS FROM 1901 to 1951.	
17.	IV.7	SEX-RATIO IN RAJASTHAN AND IN SOME OF THE STATES OF INDIA AND IN THE SELECTED FOREIGN COUNTRIES,	84
18.	IV.8	PROPORTION OF FEMALES AGED 15-40 TO MALES AGED 15-40 per 1,000 OF THE POPULATION IN RAJASTHAN AND IN THE NATURAL REGIONS FROM 1901 -1951.	86
19.	IV.9	DEPENDENCY LOAD FOR RAJASTHAN AND ITS NATURAL REGIONS FROM 1901 to 1951.	87
APPENDIX TO CHAPTER IV.			
20.	1	CORRECTED AGE-DISTRIBUTION FOR RAJASTHAN 1901 (1)	
21.	2	" " " " EASTERN REGION " (11)	
22.	3	" " " " WESTERN " 1901 (11)	
23.	4	" " " " Southern " 1901(111)	
24.	5	" " " " AJMER " 1901(111)	
25.	1	" " " " RAJASTHAN 1911(iv)	
26.	2	" " " " EASTERN REGN. 1911(v)	
27.	3	" " " " WESTERN " 1911(v)	
28.	4	" " " " SOUTHERN " 1911(v1)	
29.	5	" " " " AJMER " 1911(v1)	
30.	1	" " " " RAJASTHAN " 1921(v11)	
31.	2	" " " " EASTERN REG N. 1921(v111)	
32.	3	" " " " WESTERN " 1921(v111)	

S.No.	TABLE NO.		PAGE
33.	4	CORRECTED AGE DISTRIBUTION FOR SOTHERN REGION	1921 (1x)
34.	5	" " " " AJMER "	1921 (1x)
35.	5	" " " " RAJASTHAN	1931 (x)
36.	2	" " " " EASTERN REGION	1931 (xi)
37.	3	" " " " WESTERN "	1931 (xi)
38.	4	" " " " SOUTHERN "	1931(xii)
39.	5	" " " " AJMER "	1931(xii)
40.	1	" " " " RAJASTHAN	1941(xiii)
41.	2	" " " " EASTERN REGION	1941(xiv)
42.	3	" " " " WESTERN "	1941(xiv)
43.	4	" " " " SOUTHERN "	1941(xv)
44.	5	" " " " AJMER "	1941(xv)
45.	1	" " " " RAJASTHAN	1951(xvi)
46.	2	" " " " EASTERN REGION	1951(xvii)
47.	3	" " " " WESTERN "	1951(xvii)
48.	4	" " " " SOUTHERN "	1951(xviii)
49.	5	" " " " AJMER "	1951(xviii)
50.	V.1	MARITAL STATUS OF 1,000 OF EACH SEX BY AGE, IN RAJASTHAN FROM 1901-1951.	92
51.	V.2	PROPORTIONS OF MARRIED,SINFLE AND WIDOWED AND BY RURAL & URBAN IN THE NATURAL REGIONS OF RAJASTHAN IN 1951.	96
52.	V.3	PROPORTION OF SINGLE,MARRIED AND WIDOWED IN SOME OF THE STATES OF INDIA FOR 1951,per 1,000 OF THE POPULATION .	99
53.	V.4	VARIATIONS AND PERCENTAGE CHANGE IN MARRIED, SINGLE AND WIDOWED FOR MALES AND FEMALES FROM 1901 to 1951 FOR RAJASTHAN.	101

S.No.	TABLE NO.		PAGE
54.	V.5	PROPORTIONS OF MARRIED, SINGLE AND WIDOWED IN THE REPRODUCTIVE AGES IN RAJASTHAN FOR MALES AND FEMALES SINCE 1931 to 1951.	103
55.	V.6	AVERAGE ANNUAL MARRIAGE RATES FOR MALES & FEMALES BY FIVE-YEARLY AGE-GROUPS FROM 1901 to 1951, FOR THE POPULATION OF RAJASTHAN.	112
56.	V.7	MEAN-AGE AT MARRIAGE IN RAJASTHAN FROM 1901 to 1951, FOR MALES & FEMALES SEPARATELY.	114
57.	V.8	MEAN-AGE AT MARRIAGE IN RAJASTHAN AND ALL INDIA ( BY TWO METHODS ).	116
58.	VI.1	ESTIMATED BIRTH-RATE FOR RAJASTHAN AND INDIA, FOR THE DECADES 1901 to 1951.	123
59.	VI.2	ESTIMATED BIRTH-RATES FOR AJMER REGION 1901 to 1951.	125
60.	VI.3	ESTIMATED BIRTH-RATES FOR THE EASTERN REGION OF RAJASTHAN 1901 to 1951.	126
61.	VI.4	ESTIMATED BIRTH-RATES FOR WESTERN REGION OF RAJASTHAN 1901-1951.	127
62.	VI.5	ESTIMATED BIRTH-RATES FOR SOUTHERN REGION OF RAJASTHAN 1901-1951.	129
63.	VI.6	ESTIMATED BIRTH-RATES FOR RAJASTHAN AND ITS NATURAL REGION FROM 1901 -1951.	130
64.	VII.1	FERTILITY TABLE I	135
65.	VII.2	FERTILITY TABLE II	136
66.	VII.3	AGE-SPECIFIC FERTILITY-RATES OF MARRIED WOMEN IN THE THREE CASTES OF RAJASTHAN 1941.	139
67.	VII.4	AGE-SPECIFIC FERTILITY RATES OF MARRIED WOMEN IN RAJASTHAN & IN THE RURAL & URBAN AREAS OF NASIK & KOLABA.	141

S.No.	TABLE NO.		PAGE
68.	VII.5	SINGLE-YEAR AGE SPECIFIC FERTILITY RATES OF MARRIED WOMEN IN RAJASTHAN AND EAST, NORTH EAST, SOUTH WEST MADHYA PRADESH & TRAVANCORE-COCHIN.	143
69.	VII.6	ANNUAL AGE-SPECIFIC FERTILITY RATES OF ALL-WOMEN IN RAJASTHAN 1941.	146
70.	VII.7	SINGLE-YEAR AGE-SPECIFIC FERTILITY-RATE OF TOTAL WOMEN IN RAJASTHAN AND IN NASIK AND KOLABA DISTRICTS.	148
71.	VII.8	GROSS REPRODUCTION RATES FOR FEMALES IN RAJASTHAN, NASIK, KOLABA AND IN SOME FOREIGN COUNTRIES.	151
72.	VII.9	NET REPRODUCTION RATE IN RAJASTHAN, NASIK, KOLABA AND IN SOME FOREIGN COUNTRIES.	154
73.	VIII.1	ESTIMATED DEATH AND BIRTH RATES FOR MALES IN RAJASTHAN BETWEEN 1901 to 1950.	166
74.	VIII.2	ESTIMATED DEATH AND BIRTH RATES FOR FEMALES IN RAJASTHAN BETWEEN 1901 & 1950.	167
75.	VIII.3	ESTIMATED DEATH-RATES IN RAJASTHAN ALL INDIA AND CEYLON.	169
76.	VIII.4	ESTIMATED AND REGISTERED DEATH RATES FOR AJMER REGION 1891 to 1951.	171
77.	VIII.5	ESTIMATED DEATH RATES FOR EASTERN REGION OF RAJASTHAN 1901-1951.	173
78.	VIII.6	ESTIMATED DEATH RATES FOR SOUTHERN REGION OF RAJASTHAN 1901-1951.	174
79.	VIII.7	ESTIMATED DEATH RATES FOR WESTERN REGION OF RAJASTHAN 1901-1951.	176
80.	VIII.8	ESTIMATED DEATH RATE IN THE NATURAL REGIONS OF RAJASTHAN FROM 1901-1951.	177

S.No.	TABLE NO.		PAGE
81.	IX.1	LIFE TABLE FOR MALES IN RAJASTHAN 1931-1941.	190
82.	IX.2	LIFE TABLE FOR FEMALES IN RAJASTHAN 1931-1941.	192
83.	IX.3	LIFE TABLE FOR MALES IN RAJASTHAN 1941-1951.	194
84.	IX.4	LIFE TABLE FOR FEMALES IN RAJASTHAN 1941-1951.	196
85.	IX.5	AGE SPECIFIC MORTALITY RATE FOR THE GIVEN AGES IN RAJASTHAN AND ALL INDIA FOR THREE DECADES.	199
86.	IX.6	MALE ,FEMALE, LIFE EXPECTATION AT VARIOUS AGES IN THREE LIFE TABLES OF RAJASTHAN AND ALL INDIA.	202
87.		APPENDIX II TO CHAPTER IX DR. KOZAKEWICZS OSCULATORY INTERPOLATION FORMULAE.	(xii)
88.	X.1	ESTIMATED POPULATION OF RAJASTHAN FOR THE DECADES 1961-2001 BY FITTING A LINEAR CURVE.	215
89.	X.2	ESTIMATED POPULATION OF RAJASTHAN IN THE YEARS 1961-2001, BY FITTING A POLYNOMIAL OF THE SECOND DEGREE.	216
90.	X.3	ESTIMATED POPULATION OF RAJASTHAN FOR THE YEARS 1961-2001 BY FITTING A LOGISTIC CURVE.	219
91.	X.4	ESTIMATED POPULATION OF RAJASTHAN FOR 1961 to 2001 BY THREE PROJECTIONS.	220