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C O N T E N T S

C O N T E N T S

LIST OF TABLES

DIAGRAM

CHAPTER - 1

INTRODUCTION

The provision of universal elementary education has been a cherished goal of the Indian people for more than ninety years. On attainment of Independence, Article 45 of the Directive Principles of State Policy of our Constitution laid down that State shall endeavour to provide free and compulsory education for all children till they reach the age of 14 years within ten years of the date of adoption of the Constitution i.e. the 26th January, 1950. About 30 years have since elapsed and despite various efforts, the goal of universal elementary education still remains unachieved. This has been mainly because of population explosion arising due to proportionately greater decline in the death rate than in the birth rate. The framers of the Constitution did not, perhaps, visualise such population explosion while keeping ten years for achievement of universal and compulsory elementary education. Hauser, while writing foreword to the book, Educational Planning in India remarked that "if a demographic evaluation of what was involved had been made, it is doubtful that the Constitution of India in 1950 would have adopted as unrealistic a goal as that of providing free and compulsory education to all children to the age of 14 years within a period of 10 years."[1] This has

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1. Philop M. Hauser, Foreword in Premi, M.K. Educational Planning in India, New Delhi, Sterling Publisher, 1972.

aroused interest of the researchers to work on the demographic aspect of educational development in India.

In India, the problem of universal retention in the school system is as serious as the problem of universal enrolment. The child who is once enrolled should continue to remain in the school system till he reaches the prescribed age or completes the prescribed class. But the percentage of wastage in elementary education due to dropouts from different classes is very high to the extent of around 60 percent upto Class V and 75 per cent upto Class VIII. It is for this reason that a number of workers in the field of education have tried to measure the extent of this wastage in our educational system and examine the factors which are responsible for this state of affairs. The various characteristics of population such as enrolment rates, children in various classes with above and below the normal age, sex ratio, etc. are some of the indicators of failure in attaining universal retention in elementary education.

Demographic Aspect of Educational Development

It is now well recognised that a number of demographic characteristics like age-structure, rural-urban ratio, populati size of the villages, industrial structure of the working population, literacy rate, sex ratio, etc. interact with programmes of educational development. In order to make the programme of educational development a complete success, these elements "await to be woven more closely into the fabric of our economic

and social development plans."[1] This process of weaving demographic characteristics in the fabric of educational development is said to be the demographic aspect of educational development; and is of utmost importance in making the programme successful. In the absence of proper emphasis on this aspect, "there are few, if any, specific policy induced programme other than general socio-economic development programme to cure the situation already created by other aspects of population including growth in the past."[2]

The present research, therefore, aims at studying the impact of demographic factors on the progress of elementary education over a period of time. For this purpose one of the major States namely, Andhra Pradesh has been selected to bring out:

(a) the influences of population size of the habitations on the location of school and enrolment of school going age children in the rural area;

(b) the interrelationship of educational development with demographic and socio-economic characteristics;

(c) the pattern of age-composition interms of mean age and the extent of under and over age children in subsequent grades;

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1. Asok Mitra, "Population in India's Development", appeared in A. Bose, P.B. Desai, A. Mitra and J.N. Sharma (Eds.), Population in India's Development, 1947-2000, Delhi, Vikas Publishing House, 1974, p. 17.

2. Reddy, P.H., Shortcomings of Population Studies, New Delhi, Indian Express News Paper, 27.8.79.

(d) the analysis of time-series data from cohort progression point of view;

(e) the problem of 'spurious' enrolment at grade I by giving an estimate of it in different years of the period.

Over-View of the Present State of Research

Not much work has been done in India on analysing the consequences of demographic characteristics on the development of elementary education. The only work is by Premi "who made clear the futality of adopting educational objectives without a quantitative evaluation of the magnitude of tasks involved."[1]

The problem of estimating wastage and stagnation in college education was studied first by Aamat and Deshmukh. The study shows that 'wastage increases with the advancement in age at entry. When the age of entry is 19 or above wastage is as high as 70 per cent. More over the wastage among higher age groups occur at earlier stages."[2]

Another comprehensive study on wastage in elementary education is by Sharma and Sapra. This study aimed at finding the concomitant relationships between different independent variables and the dependent variable, the drop-out rate. The study interallia explains the methodology of

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1. Premi, M.K., Op.Cit.

2. Aamat, A.R. and Deshmukh, A.G., Wastage in College Education, New Delhi, Asia Publishing House, 1963, p. 17.

Cohort Analysis for estimating the extent of wastage at primary and middle stages. The study also says that "although in most of the States, no child less than 5 years of age can be admitted to Grade-I, a substantial number of children (27.5 per cent) in Grades I to V is of higher age than the normal age group of 5-10 years."[1] This gives rise to the problem of heterogeneity in age composition which has deterent effect on continuation of the overage child in school. The findings of the study in this regard are that "most of the dro-outs are over aged, while a large majority of stayins belong to the age prescribed by the Department of Education."[2] Another finding of the study is that the rate of wastage "is highest (39.3 per cent) when children move from Grade I to II. It is 11.1 per cent when they go from Grade II to III. The rates for Grade III (7.6 per cent) and IV (7.3 per cent) are almost similar."[3] Whether this highest wastage at grade-I is real or superfluous, the study remains silent.

Recently, Reddy carried out a study on the relationship between the proportion of rural population living in villages of different sizes in different states of India and the educational development. The study "revealed a negative correlation between the proportion of rural population living in small villages in different states of India and quantitative

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1. Sharma, R.C. and Sapra, C.L., Wastage and Stagnation in Primary and Middle Schools in India, New Delhi, NCERT, 1969, p. 14.
2. Ibid, p. 71.
3. Sharma, R.C. and Sapra, C.L., Op.Cit., pp. 37-38.

aspects of educational development such as literacy rates and enrolment rates of children especially of girls at the elementary and the secondary school stage."[1]

Importance of the Study

Universal elementary education is the backbone of every country. "No economic growth would be possible in India unless it is preceded by programmes of mass education of the right type, including the provision of universal elementary education for children, which alone can help us to control population and to modernise the traditional social order."[2] In fact, without primary education and functional literacy any message on health or family planning or any other matter is extremely difficult to put across. Universal elementary education, when achieved, provides the country with 'educational' take off which should precede the 'economic' take off. This principle has been fully implemented by China.

When such is the importance of universal elementary education, any work relating to its assessment should be of much use. Assessment of universal elementary education necessarily implies the assessment of the progress made towards provision of school to every child within easy walking distance

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1. Reddy, P.H., op.cit.

2. Naik, J.P. Elementary Education in India - The Unfinished Business, New Delhi, Asia Publishing House, 1966, p. 19.

of the home; towards enrolment of every child; and towards retention of every child who is once enrolled. There are number of hurdles which come in the way of achievement of these cherished goals. These may be in the form of lack of finance, apathy of parents, specific characteristics of population such as population size of the village, age of the student, sex ratio, etc., and general socio-economic development. Assessment, therefore, implies the exploration of these hurdles also.

Objectives of the Study

Keeping the above questions in view, the present study aims at taking stock of the progress made towards universal elementary education, and exploring the reasons for its present status. For this, the emphasis has been mainly on the demographic aspect of elementary education.

The proposed study, therefore, has the following broad objectives:

The first objective of the study is to know the progress made towards the provision of schools at various distances of the child's home, and how it gets influenced by the population size of the village. This will also give an account of the porportion of the pupils coming from habitations other than where the school is located and how much distance they travel. Finally, an analysis of inter-regional differences in the Gross Enrolment Ratio of those children who have to walk over a distance for attending the school located in some other habitation and of those who attend the school within their own

habitation will be carried out.

The second objective is to identify the best predictors of enrolment ratio of the school going age children. The enrolment varies from place to place in the same region, and factors for this could be many such as social, economic, demographic etc. Which of these can best explain the enrolment variation is necessary to identify in order to launch the specific policy induced programme.

The third objective is to highlight the age composition by analysing the mean age, variation from the mean age, and proportion of under and over age students in various classes over a period of time.

The fourth objective is to analyse the percentage of retention at each successive grade. This will depict the picture of grade-wise retention and may prove better from remedial action point of view.

The fifth objective of the study is to estimate the extent of 'spurious' or 'false' enrolment in Grade-I. False enrolment in Grade-I can be a cause for highest wastage at Grade-I. The estimation of the same may change the outlook towards highest wastage at this grade.

Area of the Study

For achieving the objectives, narrated above, we have selected the state of Andhra Pradesh because this is one of those states which has been depicting some disturbing trends in the enrolment and also in the enrolment ratios in

certain years of the last decade. In order to make the analysis real, we have taken into account not only the whole area of the State but the rural area also and made the analysis separately for this area at places where considered necessary such as the impact of spatial distribution on the schooling facility, best predictors of the GER, etc.

Availability of Data

The research envisaged here will need the following types of data:

(i) District-wise data on:

a) enrolment by sex and area;

b) population in school going age by sex and area;

c) primary school/classes by distance from the habitation of different population size.

(ii) District-wise data on various demographic, economic, educational and social determinants of enrolment disparities by sex and area.

(iii) Time series data on enrolment by sex and age for grades I to VIII.

For the first type of data, the source is the Third All India Educational Survey - State Tables, available in meniographed form in the National Council of Educational Research and Training. The figures in the Survey are given as on December 31, 1973. The State Tables contain the estimated population of school going ages for both the sexes together. There are detailed data on enrolment in schools at

various distances from the habitations of varying sizes. This has been made use of for further analysis. It may be clarified here that terms and concepts used in the present research have the same definitions as adopted by the Third All India Educational Survey.

For the second type of data, the sources are the published or compiled data of 1971 census and the Third All India Educational Survey. Wherever the census publications were not available but the data were available in the compiled form, the same have been copied and a specific mention of it is made.

The third type of data have been drawn from the State forms of Ministry of Education and Social Welfare. The Ministry collects data by sex and age for each grade from different States/ Union Territory. But the State level data are seldom published. The data on enrolment in Grades I--VIII by sex and age have, therefore, been copied direct from the forms. The official figures on enrolment are given as on March 31 of the year and pertain to recognised institutions only.

Although the figures as reported by the States and collected by the Ministry in its State forms have been made use of, the quality of data is not upto the mark. For example, we observe from the figures in the State-forms that some students in Class-I are in the age group 16-17 years and similarly there are students in the age group 8-9 years in Class-VIII. Such unbelievable figures have been reported almost in each year of the period from 1956-57 to 1969-70.

However, there is no alternative to enhance the quality of the data and also the magnitude of these discripancies do not seem to be much.

Analysis of time series data has been carried out for the period from 1956-57 to 1969-70. The first year of the period refers to when the State of Andhra Pradesh came into being and the last year of the period refers to the year upto which sex and age wise data for each grade could be obtained from the Ministry. Moreover time series data has been made use of for 'Cohort analysis' to show the patterns of age composition, grade progression and spurious enrolment at Grade-I. For this purpose, the data for the period from 1956-57 to 1969-70 provided us sufficient number of cohorts.

From the above, it is clear that the data used in the research is entirely from the secondary source and therefore suffers from the limitations attributed to it.

Plan of Research

"All expansion of elementary education takes place in three stages. The first stage is that of universal provision in which an attempt is made to provide a school within easy walking distance of the home of every child.... The second stage is that of universal enrolment when an attempt is made to enrol every child into a school.... The third stage is that of universal retention in which an attempt is made to keep in school every child who is once enrolled...." The research envisaged here proposes to cover all these three aspects of expansion of elementary education in Andhra Pradesh.

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1. Naik, J.P., The Elementary Education India, op.cit., p. 28.

Since the State of Andhra Pradesh has been taken for the present study, the next chapter deals with the salient features of the state. The salient features include the main reason of its selection, its physical and social set up, its educational development, and some characteristics of its population.

The third chapter deals with the progress made towards the provision of school at various distances of the child's home; and the analysis of inter-regional differences in the GER of those children who are to walk over a distance for attending the school located in some other habitation and of those who attend the school within their own habitation itself.

The next chapter deals with the aspect of 'universal enrolment'. An attempt is made to highlight the disparities in district-wise enrolment ratios by sex and area and for both the stages - primary and middle separately. Thereafter districtwise figures of various demographic, social, educational and economic factors are taken and an attempt is made to enlist the 'best' determinants of enrolment ratios in the State. For this, statistical techniques of 'step-up regression analysis' has been applied.

The next two chapters deal with the aspect of 'universal retention'. First of all, an attempt has been made to highlight the age composition of students at various grades by analysing the mean age, deviation from the mean age and proportion of under and over age students at each grade over a period from 1956-57 to 1969-70. Secondly, an attempt has been made to analyse the progression of each cohort of children through each successive grade of elementary education till they pass grade-VIII

For this, children falling in the normal age groups of 6-7, 7-8 and 8-9 only are taken into account. This will reflect the quantum of 'wastage' at each grade of elementary education in the State.

The next chapter deals with the estimation of 'spurious' or 'false' enrolment in Grade-I. This has been done by applying the technique of 'backward extrapolation' of enrolment in Grade-I. This gives the 'expected' enrolment and excess of 'actual' enrolment over the expected enrolment is the estimate of 'spurious' enrolment in Grade-I.

The last chapter contains the summary of main findings and conclusions.

CHAPTER - II

ANDHRA PRADESH -- SOME SALIENT FEATURES

Andhra Pradesh--Focus of the Study

The present research is an analytical study of pros and cons of the progress made in the universalisation of elementary education in Andhra Pradesh. The State of Andhra Pradesh has been depicting some disturbing trends in the enrolment as well as in the enrolment ratios in certain years of the last decade. For example the enrolment in Classes I-V as well as in Classes VI-VIII in the years 1969-70, 1970-71, and 1971-72 remained lower than that in the year 1968-69. Similarly, the enrolment ratios in Classes I-V of the age group 6-11 as well as in Classes VI-VIII of the age group 11-14 started declining in 1969-70 till 1971-72. The Ministry of Education, therefore, commented that "the declining trend in the enrolment of Classes I-V in comparatively backward States like Andhra Pradesh, Assam, Karnataka... in some years is disturbing." It further says that "the adverse enrolment trends in Classes VI-VIII in States of Andhra Pradesh, Assam... in some years do not depict a happy picture of the progress of universalisation of elementary education in these States."[1] Worst than this is the trend in enrolment ratios in elementary classes. It is

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1. Ministry of Education, Enrolment Trends in States, 1968-69 to 1978-79, New Delhi, Introduction.

for this reason that the State of Andhra Pradesh has been selected here for the present research.

Physical and Social Features

As per the Andhra State Act, the first linguistic State of Andhra in the country was formed on 1st October, 1953 comprising 11 districts viz. Srikakulam, Visakhapatnam, East Godavari, West Godavari, Krishna, Guntur, Nellore, Chittoor, Cuddapa, Anantpur and Kurnool from the predominantly Telugu speaking areas of composite Madras State. Again on 1st November, 1956 in accordance with the States Reorganisation Act, the nine Telugu districts of erstwhile Hydrabad State viz. Mahbubnagar, Hyderabad, Medak, Nizamabad, Adilabad, Karimnagar, Warangal, Khammam and Nalgonda were added on to the State of Andhra bringing into existance the enlarged State of Andhra Pradesh. A new district of Ongole came into existence from 2nd February, 1970. It was carved out of portions of Guntur, Nellore and Kurnool districts. Thus, the State of Andhra Pradesh comprises 21 districts divided into three administrative regions - Coastal, Rayalaseema and Telengana. Moreover, it came into being through the fusion of regions with diverse political backgrounds that had conditioned their economic discipline and development. Consequently, there are regional disparities not only in the general level and orientation of development but also in such other aspects of peoples life as habit patterns and social attitudes.

Coastal Region: The eight coastal districts of Srikakulam, Visakhapatnam, East and West Godavari, Krishna, Guntur, Ongole

and Nellore constitute the Coastal region. The fertile delta areas formed by the three major rivers - the Godavari, the Krishna and the Pennar, have made it known as the "granary of the South." These daltas have enclosed between them a part of the sea now known as 'Kolleru Lake' which has a number of islands. The existence of chain of ports along the Eastern Coast adds to the potential for the economic development of the region. Tracts near the coast are fringed with sand which may be blown land wards or be piled to form dunes rising upto 30 to 50 ft. high. In the north, there are numerous outliers of Eastern Ghats, in the middle, there is a fertile level plain and in the south, there is low peneplains. This region is more densily populated than the other two.

Rayalaseema Region: The four districts of Anantpur, Cuddapah, Kurnool and Chittoor constitute the Rayalaseema region. The Palkanda hills rising above 3000 ft. form a fine scape overlooking Anantpur and Chittoor basins. A part of this region consists of peneplains. This region is well endowed with mineral resources. The rainfall is so scanty and uncertain that it is known as the "stalking ground of famines." The region is sparcely populated.

Telengana Region: The nine districts of Mahboob-nagar, Hyderabad, Medak, Nizamabad, Adilabad, Karimnagar, Warangal, Khammam and Nalgonda constitute the Telengana region. This consists of peneplains, bare hills, reddish or brown plains with scattered thorny shurbs. Centuries of feudal rule left

it's economy stagnant and undeveloped. It is the least urbanised part of state. The people are poor and illiterate. Like Rayalaseema, the density of population is low.

Educational Development

Educationally Andhra Pradesh is neither as advance as Kerala nor as backward as Rajasthan. It falls in the middle. Since its inception in 1956, it has been trying hard to universalise the elementary education. The enrolment ratios in Classes I-V of the age group 6-11 "was 75.1 per cent in 1968-69 which declined to 73.1 per cent in 1969-70 to 71.2 per cent in 1970-71 to 70.6 per cent in 1971-72 and 71.2 per cent in 1972-73 and 1973-74, 71.1 per cent in 1974-75 and 70.4 per cent in 1975-76. Thereafter the trend became upward and it was 74.3 per cent in 1976-77 and 78.4 per cent in 1977-78. The State proposed to achieve a target of 82.2 per cent during 1978-79. Similar is the position of enrolment ratios in Classes VI-VIII in relation to the population in the age group 11-14. The State proposed an enrolment ratio in these classes to be 25.8 per cent in 1978-79"[1].

In Andhra Pradesh, the minimum age of admission to Class I is 5 + and there is compulsory education for the age group 6-11 for both, boys and girls, and in both rural and urban areas. The State provides free education to boys upto

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1. Enrolment Trends in States, op.cit., Introduction.

Class X and to girls upto Class XII in both urban and rural areas. There are two stages of elementary education - the Primary and the Upper Primary. The former goes from Class I to V and the latter is generally of two year duration from Class VI to VII[1]. But a word of caution may be added at the outset that in the present study the elementary education has been regarded as eight year duration - five years for the Primary stage or Classes I to V and three years for the Middle stage or Classes VI to VIII. This is done in order to facilitate the comparison at the national level.

Table 1.1 depicts the picture of improvement made in enrolment of each sex in Classes I to V and Classes VI to VIII for the year 1956-57 (the year of inception of the state), 1960-61, 1965-66 (last year of Second and Third Five Year Plans), 1968-69 (last year of Three Annual Plans), 1973-74, 1977-78 (last year of the Fourth and Fifth Five Year Plans) and 1978-79 (first year of the Sixth Five Year Plan). It is satisfying to note that the enrolment has been increasing in all these years. But the two questions with regard to universal enrolment and universal retention in Classes I-VIII, remain unanswered here. These two issues will be fully analysed in the present study.

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1. Ministry of Education, Selected Information on School Education in 1970-71, New Delhi.

Table 2.1

Development of Enrolment in Elementary Education in Andhra Pradesh from 1956-57 to 1978-79

(Figures in thousands)

	Enrolment in Classes I-V			Enrolment in Classes VI-VIII		
	Boys	Girls	Persons	Boys	Girls	Persons
1956-57	1544	910	2454	256	64	320
1960-61	1779	1135	2914	316	92	408
1965-66	2246	1523	3769	476	175	651
1968-69	2345	1590	3935	504	198	702
1973-74	2405	1635	4040	543	245	788
1977-78 (likely achievement)	2848	1776	4624	525	282	807
1978-79 (target)	3037	1826	4863	563	319	882

Source: For 1956-57, 1960-61, 1965-66 - Age and Gradewise data copied from the Statistical Unit of the Ministry of Education and Social Welfare.

For other years - Ministry of Education, Enrolment Trends in States, op.cit., pp. 4-12.

Similarly, the average annual rate of growth of total educational expenditure in Andhra Pradesh during the first decade of her existence has been 12.3 per cent whereas the state income during the same period increased at the rate of 6.7 per cent. The proportion of expenditure on education as a percentage of State income rose from 1.7 per cent in 1956-57 to 2.7 per cent in 1965-66. (The corresponding all India figure for 1965-66 was 2.9 per cent) The revenue expenditure on total education was 20.4 per cent during 1965-66; and percentage expenditure on primary schools was 42.9.

Population Characteristics

Rural Area: Table 2.2 shows some important characteristics of rural population in the state and its three regions. These include estimated total and school age population, children in Classes I to V, percentages of scheduled castes/tribes and of literates, average population size of the habitation, and average density per square kilometre.

contd..

Table 2.2

Andhra Pradesh and its Regions - An Appraisal of Population Characteristics

Region	Population as on Dec. 1973 (000's)	Child population aged 6 to below 11 as on Dec. 1973 (000's)	Pupils in classes I -V as on Dec. 1973 (000's)	Gross Enrolment Ratio	Per cent of SC/ST to total population as on Dec. 1973	Per cent of Literate and educated to total population in rural areas (1971)	Average persons per sq. Km. of rural areas (1971)	Average Population size of Habitation (1973)
Coastal	17319	2068	1666	80.6	17.0	23.0	175	808
Rayalaseema	7081	854	623	73.6	16.3	20.4	98	472
Telengana	13279	1687	745	44.2	19.5	13.7	110	787
Andhra Pradesh	37679	4609	3040	66.0	17.8	19.2	129	707

Source: Computed on the basis of data given in Third All India Educational Survey, Andhra Pradesh, State Tables (Vol. I) Tables 1 and 36, NCERT, New Delhi; and Census of India, 1971, Population Tables, Series 2-A, Para II-A, New Delhi.

The Table reveals the following salient features of rural population in Andhra Pradesh:

(i) Sharp differences in Gross Enrolment Ratio: There are sharp differences in the GER of children in three regions. It is the highest (80.6) in Coastal Andhra and the lowest (44.2) in Telengana. The GER in Rayalseem region is 73.6 and that for the State as a whole is 66.0.

(ii) Population Size of the Habitation: The average population size of the habitation in three regions is not same. It is very low (472) in Rayalseema in comparison to that in other two regions or in the State. Similarly, the average persons per square kilometre is the lowest (98) in Rayalseema than that in other two regions.

(iii) Literacy: Percentage of literate and educated persons to the total population is the lowest (13.7) in Telengana and the highest (23.0) in Coastal Andhra. It is 20.4 for Rayalseema and 19.2 for the State as a whole.

(iv) Scheduled Castes/Scheduled Tribes: Percentage of Scheduled Castes/Scheduled Tribes to total population is the lowest (16.3) in Rayalseema and the highest (19.5) in Telengana. It is 17.0 for Coastal Andhra and 17.3 in Andhra Pradesh.

From the above features, it is clear that regional differences in GER can not be explained in terms of one factor alone. For example, inspite of comparatively high population size of the habitation and high density of population, the GER in Telengana region is the lowest. This requires regional analysis of distribution of schooling facility which has been done in the next chapter.

Whole Area: Some basic facts about the population characteristics in Andhra Pradesh vis-a-vis All India have been given in Table 2.3. The table reveals the following salient features of population in the State as a whole.

As per census held in 1971, Andhra Pradesh occupies 9 per cent of the country's area and 8 per cent of the country's population. Number of persons per square kilometer in Andhra Pradesh are less than that for the all India.

Gross Enrolment Ratios both at Classes I-V and VI-VIII in Andhra Pradesh have been less than those for all India in the year 1977-78. If we look at the other population characteristics of the state such as proportions of urban population, literates, Scheduled Castes/Scheduled Tribes and per capita income, all are less than those for all India. Similarly, the proportion of persons working in agriculture is more in Andhra Pradesh than in All India.

Comparative backwardness of Andhra Pradesh in the characteristics mentioned above can have reflection on its

Table 2.3

Some Basic Facts about Andhra Pradesh and India

Characteristics	Reference year	Unit	Andhra Pradesh	All India
Area	1971	000 Sq. Km.	277	3281
Population	1971	Lakh	435	5480
Density per sq.km.	1971	Number	157	178
Urban Population	1971	Per cent	19.3	19.9
Literacy	1971	Per cent	24.6	29.3
Scheduled Castes/ Tribes	1971	Per cent	17.1	21.5
Agricultural Population as per cent of total working force	1971	Per cent	70.1	69.6
Per capita income	1970-71	Rupees	545	633
Gross Enrolment Ratios* I-V	1977-78	Per cent	71.7	82.8
VI-VII	1977-78	Per cent	25.8	37.9

Source: Commerce, Some Basic Facts about States and India, Independence Day Supplement - 1973, Bombay.

* Ministry of Education, Selected Educational Statistics, 1977-78, New Delhi, p. 27.

low Gross Enrolment Ratios. As such there is a need to study the role of the above population characteristics in terms of their impact on the GER in the State. This has been attempted in Chapter-IV.

CHAPTER - III

SPATIAL DISTRIBUTION OF POPULATION, SCHOOL LOCATION AND ENROLMENT

As indicated earlier, Andhra Pradesh showed some disturbing trends in its enrolment ratios in Classes I-V in certain years of the last decade. So much so that during the period when Second and Third All India Educational Surveys were conducted, the enrolment ratios in Classes I-V of the corresponding age group 6-11 declined from 75.1 in 1965 to 70.3 per cent in 1973.[1] The reasons for it could be many. One possibility could be the influences of spatial distribution of population on the programmes of educational development in the State.

Population size of all settlements in the rural area is not the same. There are some where the population is less than 200 and there are others where the population is even more than 5000. For example, "67 per cent of the rural population in Himachal Pradesh as compared with 0.01 per cent in Kerala live in village settlements each with a population of 500 or less. How does one go about developing and implementing social and economic programmes so as to benefit people, the majority of whom live in small village settlements?[2] The

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1. NCERT, Third All India Educational Survey, Some Statistics on School Education, New Delhi, 1977, p. 34.

2. Reddy, P.H., Shortcomings of Population Studies, op.cit.

heterogeneity in the population size of the settlements in a state may influence their socio-economic development programmes. A study conducted by Reddy has revealed negative correlation between the proportion of rural population in different states and quantitative aspect of educational development.

Population size of the settlement or habitation has been one of the major determinants of 'school location'. The decision whether the school should be located within the habitation or at some distance from the home of the child, can be taken only after giving due consideration to the population size of the habitation which the school is to serve. The bigger habitations have more chances of having a school than the smaller habitations. The schools in the smaller habitations may depend more on the nearby habitations for the pupils who have to walk some distance in order to reach the school; whereas the schools in bigger habitations depend mainly on their own pupils who do not walk a distance in order to reach the school. This difference may influence the programme of educational development in the State. The present investigation, therefore, is aimed towards fulfilling the following objectives:

(i) to highlight the distributional pattern of school location in relation to the heterogeneity in the population size of the habitations;

(ii) to highlight the pattern of enrolment in relation to school age children from habitations of different population size;

(iii) to compare the enrolment ratios of those children who are to walk to some other habitation for attending the school and of those who are attending the school in their own habitation.

Keeping the above objectives in view, the analysis of availability of school and its impact on the enrolment is carried out first at the state level and then at the regional level. There are, therefore, two sections of the present investigation. The first relates to the analysis, at state level, of school-location and enrolment in relation to population size of the habitation; and the second relates to the inter-regional differences in the enrolment in relation to school-location.

As mentioned in Chapter-II, there is compulsory education for the children in the age group 6 to 11 years in Andhra Pradesh. Moreover, spatial distribution of rural population is comparatively more uneven than the urban population. As such, the present investigation is restricted to primary classes and population in rural pockets only.

Hypotheses

(i) Larger the distance of the school from the child's home lower is likely to be the enrolment.

(ii) Larger the population size of the habitation higher is the possibility of having a school within the habitation or within walking distance from child's home.

(iii) Regional variations in enrolment is explainable in terms of regional variations in availability of school.

Terms and Assumptions

The various terms used in specific sense and assumptions made are given below:

Terms

(i) Schooling Facility: Availability of either Primary school and/or Primary section of Middle/High or Higher Secondary school.

(ii) Population Served: Percentage of population of those habitations having schooling facility to the total population of all those habitations falling in that slab. This is also an index of 'schooling facility'.

(iii) School Location/Schooling Distance: The distance from the habitation at which the schooling facility is available/located.

(iv) Gross Enrolment Ratio: A ratio between pupils of all ages studying in Classes I-V and number of children aged 6 to below 11.

(v) Habitations with/without Schooling Facility: Schooling facility/no schooling facility within the habitation itself.

Assumptions

(i) In estimating the child population (aged 6-11) over various schooling distances, it is assumed that it is distributed uniformally in the same proportion as of the State/Region as a whole. The State's proportion of such child population to the total population comes to 0.1223 (computed on the basis of figures given under cols. 27 and 25 of Table 1 of Third All India Educational Survey).

(ii) Walking/Walkable distance is assumed to be 1 Km. from the home of the child.

(iii) It is also assumed that the child will attend the school at the conveniently located nearest possible school.

State Level Analysis of School-Location and Enrolment in Relation to Population Size of the Habitation

Population Size and School Location: Population size of the habitation is said to be one of the major determinants of location of a school. This can be known by grouping the habitations of varying sizes in various population slabs and then comparing the total population of each group with the population served with a school at different distances from the habitation. The rows of Table 3.1 show the population served at different distances and the cols. show the Population Slabs in which the habitations fall. The explicit trend is that higher the population size of the habitation higher is the probability of having a school within the habitation or at the most within the walking distance of 1 Km. Column 6 of the table gives percentage of habitations without schooling facility within the walking distance of 1 km. against each population slab. It not only increases but increases at a higher rate as soon as the population size of the habitation falls below 400. 22.4 per cent of habitations with population between 200-399, 44.4 per cent with population between 100-199 and 57.5 per cent of the habitations with population below 100 are without any schooling facility even within the walking distance of 1 km. Both these factors i.e. population served and habitations without schooling facility within the walking distance of the child in relation to the population size of the habitation show that in Andhra Pradesh population size is playing major role in determining school location.

Table 3.1

Total Population of Habitation's in various Slabs and its Distribution over Different School-Locations

(000's)

Population Slab	Population having Schooling Facility				Total Pop. of Habitation in the Slab	Percentage of Habitation without P.S. within walking Distance
	Within the Habitation	Upto 1 Km	1.1 -2.0 Km	More than 2 Km		
0	1	2	3	4	5	6
2000 and above	11950 (94.9)	383 (3.0)	190 (1.5)	73 (0.6)	12596 (100.0)	2.1
1000-1999	18814 (92.5)	682 (3.4)	322 (1.6)	514 (2.5)	20332 (100.0)	5.5
200-399	1914 (60.8)	558 (17.7)	268 (8.5)	411 (13.0)	3151 (100.0)	22.4
100-199	233 (21.2)	392 (35.6)	197 (17.9)	279 (25.3)	1101 (100.0)	44.5
Below 100	21 (4.7)	181 (39.9)	96 (21.2)	155 (34.2)	453 (100.0)	57.5
Total Andhra Pradesh	32932 (87.5)	2196 (5.8)	1073 (2.9)	1431 (3.8)	37633 (100.0)	

(Figures in the parentheses are percentages to total Population of the Habitations in the corresponding Slab).

Source: Computed on the basis of data given in Third All India Educational Survey, Andhra Pradesh, State Tables (Vol. I) Table 4, NCERT, New Delhi.

Population Size and Enrolment: Population size of the habitation has its impact on enrolment through school location. Since there is higher probability of having a school within the walking distance if the population size ofthe habitation is sufficiently large, most of the children from these habitations will enrol themselves in that school and as such need not walk long distances. This becomes clear from the Table 3.2.

Table 3.2 shows that larger the population size of the habitation lower is the percentage of children going to the school located in other habitations at varying distances from child's home. If we observe figures under colums 2 to 4, the percentage of children going to school from habitations of population size of above 2000 and below 200 varies from 3.8 to 42.7 for one km. distance, from 0.6 to 12.4 for two km. distance and from 0.6 to 11.0 for a distance of more than two km. This means that schools in bigger habitations largely serve their own population and a very small proportion walks to them from other habitations, but schools in smaller habitations depend more on nearby habitations for the pupils who come to these schools from varying distances.

Schooling Facility and Enrolment: Availability of school within the habitation attract children largely from the same habitation, but if the size of the habitation is quite small, a larger proportion of children are likely to come to school from nearby habitations as well. This has been made clear in Table 3.3

Table 3.2

Children in School according to distance walked and Population Slabs

(000's)

Distance Population Slab	Children in the School at a distance of				Total number of children in the school	Percentage of children going upto 1 Km.
	Within Habitation	Upto 1 Km.	1.1 to 2.0 Km.	More than 2 Km.		
0	1	2	3	4	5	6
2000 and above	1070 (95.0)	42 (3.8)	7 (0.6)	7 (0.6)	1126 (100.0)	98.8
400-1999	1438 (92.7)	78 (5.0)	19 (1.2)	17 (1.1)	1552 (100.0)	97.5
200-399	231 (83.3)	30 (10.9)	10 (3.6)	6 (2.2)	277 (100.0)	94.2
100-199	40 (62.2)	16 (25.8)	5 (8.3)	2 (3.7)	63 (100.0)	88.0
Below 100	7 (33.9)	10 (42.7)	3 (12.4)	2 (11.0)	22 (100.0)	76.6
Total	2786 (91.6)	176 (5.8)	44 (1.5)	34 (1.1)	3040 (100.0)	97.4

Figures in brackets are percentages.

Source: Computed on the basis of data given in Thrid All India Educational Survey, Op.cit., Table 43.

From this Table, we observe the following trends:

Firstly, it is observed that larger is the population size of the habitation, more is the possibility of having child·en in the school from that habitation itself. If we observe the figures under col. 4, schools in bigger habitations are havin, children from the same habitation itself and only a small proportion of children may go to school in some other habitation. But schools in smaller habitations of population size below 200 seem to depend more on the pupils of nearby habitations. In case of schools in the habitations of population size 100-199, at least 12 thousand out of 40 and those in the habitations with population below 100, 4 thousand out of 7 thousand children are attending schools from other habitations.

Secondly, it is observed that larger the population size of the habitation more is the probability of having a school within the habitation itself. From the figures in Col.5, it is clear that smaller habitations with population size between 100-199 are having schooling facility to the extent of 21.2 percent of their population and those below 100 are having to the extent of 4.7 per cent only where as habitation with population above 400 are having this facility covering more than 92 per cent of their total population.

Above two trends lead to the conclusion that children mainly from smaller habitations have to walk in order to learn

Table 3.3

School Age Population and Children going to School in their Habitation According to Population Slabs

Population Slab	Population of Habitations having schooling facility (000's)	Expected School Age Population (000's)	Children Studying in the Habitation (000's)	Proportion of school Age Children Studying in the Habitation (Col.3 as % of Col.2)	Population covered by schooling facility within Habitation
0	1	2	3	4	5
2000 and above	11950	1462	1070	73.2	94.9
400--1999	18814	2301	1438	62.5	92.5
200-399	1914	234	231	98.7	60.8
100-199	233	28	40	-	21.2
Below 100	21	3	7	-	4.7
Total	32932	4028	2786	69.2	87.5

Note: (1) Columns 1 and 5 refer to Col. 1 of Table 3.1 and Col. 3 refers to Col. 1 of Table 3.2

(ii) Expected school age population aged 6 to 11 given under Col. 2 is estimated by multiplying the corresponding population of habitations (Col. 1) with the proportion arrived at by diving the child population in this age group with the total population for the State as a whole.(The proportion comes to 0.1223).

three R's. It is quite likely that such school covers a group of small habitations and therefore children of these habitations walk to a school situated mainly in a comparatively small habitation.

Inter-Regional Analysis of Enrolment in Relation to School-Location

Having analysed the availability of schooling facility population served and proportion of enrolment of the children in the habitations of different population sizes at the State level, it would be useful to carry this exercise at the regional level so as to understand the regional variations in these characteristics. However, data at district or regional level by population size slabs are not available and hence we have analysed the regional variations in these characteristics by putting habitations of all sizes together.

Schooling Facility: Table 3.4 presents the data on schooling facility in terms of percentage of population served to the total population of the (i) habitations having schools, (ii) habitations lying within 1 Km. of the school, (iii) between 1 and 2 Km. and (iv) beyond 2 Km. of the school.

Table 3.4

Population Served by a School at Various Schooling Distances

Region/ State	Population Served by a School				
	Within Habitation	Upto 1 Km.	1.1 to 2.0 Km.	Beyond 2 Km.	All Distance
Coastal	89.5	5.9	2.4	2.2	100.0
Rayalaseema	83.8	10.4	3.8	2.0	100.0
Telengana	86.8	3.4	3.0	6.8	100.0
Andhra Pradesh	87.4	5.9	2.9	3.8	100.0

Source: Computed on the basis of data given in Third All India Educational Survey, op.cit, Table 5.

Table 3.4 reveals that Rayalaseema is having less schooling facility within habitation than the other two regions. One reason could be comparatively smaller average population size of the habitations in this region than in other regions. But the schooling facilities in all the three regions are such that more than 90 per cent of their population is covered within 1 km. radius of the school. (Coastal 95.4; Rayalaseema 94.2 and Telengana 90.2). Inspite of comaparatively larger population size of its habitations, a greater proportion of children have to travel more than 2 km to go to school in Telengana than in the other two regions. Population size of the habitation does not seem to be the only criteria to explain inter-regional differences. One reason of inter-regional differences in schooling facility can be the past historical trends. As mentioned earlier in chapter II, the nine districts of Telengana region were taken out from erestwhile Hyderabad State which had centuries of feudal rule. These rulers took very little interest in the development of economy and betterment of their masses. This region therefore had remained backward economically as well as educationally. Whereas the district*of the other two regions belonged to erestwhile Madras State which was comparatively more awakened towards the educational need of their children.

Enrolment by Distance Walked: Table 3.5 shows the total enrolment according to distance walked in three regions and the State. The enrolment is further classified into two categories - (a) from those habitations which have the school, and (b) from those which do not have the school and as such their children

have to walk a distance. This is important to know the position of Gross Enrolment Ratio both in habitations with schooling facility and without schooling facility.

The Table clearly reveals that major proportion, that is, more than 90 per cent of the children going to school in all the three regions go either within the habitation itself or in the nearby habitation within walking distance of one Km. If we superimpose Table 3.4 on the present Table, it will show that larger the percentage of population served by a school larger is the percentage of children going to that school only. In Telengana, comparatively fewer children are getting the schooling facility within the habitation or within walking distance of a kilometer and hence, a larger proportion have to go longer distances to be able to learn the three R's. It is already seen (from Table 3.4) that the proportion of population served by the schools within walking distance is lower in Telengana than what is found in the other two regions. Taken together, the two factors depress the enrolment ratio in Telengana to a great extent in comparison to the other two regions.

Almost all children from habitations with schooling facility go to their own school in the habitation. A few of them who still walk a distance may be because of their personal choice for example some may choose to go to a school, although at a longer distance, where their elder brother or sister is studying or where their father or mother is teaching.

Table 3.5

Total Enrolment and Enrolment from Habitations with and without Schooling Facility according to Distance Walked

(Figures in 000's)

Distance Walked	Total Enrolment in				Enrolment from Habitations with schooling facility				Enrolment from Habitations without schooling facility			
	COASTAL	RAYALA SEEMA	TELEN GANA	A.P.	COASTAL	RAYALA SEEMA	TELEN GANA	A.P.	COASTAL	RAYALA SEEMA	TELEN GANA	A.P.
1	2	3	4	5	6	7	8	9	10	11	12	
No Distance	1602 (96.2)	564 (89.7)	614 (89.1)	2830 (93.1)	1602 (99.2)	564 (99.1)	664 (95.8)	2830 (98.4)	-	-	-	-
Upto 1 Km.	49 (2.9)	49 (7.8)	33 (4.4)	131 (4.3)	11 (0.8)	4 (0.7)	10 (1.4)	25 (0.9)	38 (74.5)	45 (75.0)	23 (44.2)	106 (65.0)
1.1 to 2.0	9 (0.5)	12 (1.9)	23 (3.1)	44 (1.4)	1 (neg)	1 (0.2)	8 (1.2)	10 (0.3)	8 (15.7)	11 (18.3)	15 (28.9)	34 (20.9)
Beyond 2 Km.	6 (0.4)	4 (0.6)	25 (3.4)	35 (1.2)	1 (neg)	neg (neg)	11 (1.6)	12 (0.4)	5 (9.8)	4 (6.7)	14 (26.9)	23 (14.1)
All Distances/ Total	1666 (100.)	629 (100.0)	745 (100.0)	3040 (100.0)	1615 (100)	569 (100.0)	693 (100.0)	2877 (100.0)	51 (100.0)	60 (100.0)	52 (100.0)	163 (100.0)

Source: Computed on the basis of data given in Third All India Educational Survey, op.cit., Table 47.

Majority of the school going children, that is, 75 per cent from habitations without schooling facility in Coastal and Rayalaseema Regions go upto one kilometre distance whereas in Telengana, it is not so. This is because, as is already seen from Table 3.4, the proportion of population served with a school at longer distances is comparatively higher in Telengana than in the other two regions.

Expected School Age Population: Table 3.6 presents the expected child population aged 6 to 11 in habitations at varying distances from the school. The school age population in habitations with schooling facility is given under columns 2,4,6 and 8 of the first row and that in habitations without schooling facility is given under the same columns of the last row. The percentages of children without school in their own habitations to the total children are 10.5 in Coastal, 16.2 in Rayalseema, 13.2 in Telengana regions and 12.5 in the State as a whole.

Gross Enrolment Ratios: Table 3.7 shows the overall Gross Enrolment Ratios (GER) of children in habitations which have the school and those which do not have the school. The Table shows two explicit trends:

The first is that there are sharp inter-regional variations in overall GER. It is highest (79.5) in Coastal Andhra and lowest (44.3) in Telengana region. One reason for this, which we have already seen (from Table 3.4), is that in Telengana the percentage of population served by the schools within walking distance is lower than what is found in other

Table 3.6

Total Population and Expected School Age Population of Habitations According to Distance from the School

(000's)

Distance from the School of the Habitations	Coastal		Rayalaseema		Telengana		Andhra Pradesh	
	Total Population	Expected School Age Population	Total Population	Expected School Age Population	Total Population	Expected School Age Population	Total Population	Expected School Age Population
0	1	2	3	4	5	6	7	8
With S.F.	15480	1849	5933	715	11509	1462	32922	4026
Upto 1 Km.	1014	121	740	89	453	57	2207	267
1.1 to 2.0 Km.	409	49	266	32	398	51	1073	132
Beyond 2.0 Km.	393	47	141	17	897	114	1431	178
Total	17896	2096	7080	853	13257	1684	37633	4603
Without S.F.	1816	217	1147	138	1748	222	4711	577

Note: (i) Expected child population in the age group 6 to 11 is estimated by multiplying the corresponding total population of the habitations with the proportion arrived at by dividing the population in this age group with the total population in the respective Region as a whole. (The proportions come to: Coastal = 0.11943; Rayalaseema = 0.12054; Telengana = 0.12703; Andhra Pradesh = 0.12230.).

(ii) Figures of total population are computed on the basis of data given in Third All India Educational Survey, op.cit, Table 1.

(iii) First and last rows give figures w.r.t. habitations with schooling facility and without schooling facility respectively.

two regions; and hence the children in Telengana have to walk over longer distances for getting primary education. Other reasons for lowest GER in Telengana can be its highest proportion of SC/ST population, its lowest literacy rate and its overall economic backwardness. Taken together, all these factors have considerably depressed the Gross Enrolment Ratio in Telengana region in comparison to the other two regions.

The second is the sharp inter-regional differences in the decline of GER when the children are to walk over the distance for learning three R's. In comparison to the children who have the school within their habitations, the GER of those who are to walk over some distance, is just one fourth in Coastal Andhra, and about half in the other two regions.

Inter region-l differences in the GER of those children who are walking from habitations other than where the school is located and of those who are attending the school situated in their own habitation are made clear by the bar-diagram also.

Explanation of inter regional differences in the Gross Enrolment Ratio requires in depth, study at micro level, of the influence of demographic and socio-economic variables like sex ratio, school going age children, parents literacy, child labour, proportion of S.C/S.T., etc. on enrolments. An attempt of this kind is made in Chapter IV. The values of these factors at district level have been taken into account in order to predict the variations in the GER. The present study also tries to identify the best predictors of enrolment variations in the State.

Table 3.7

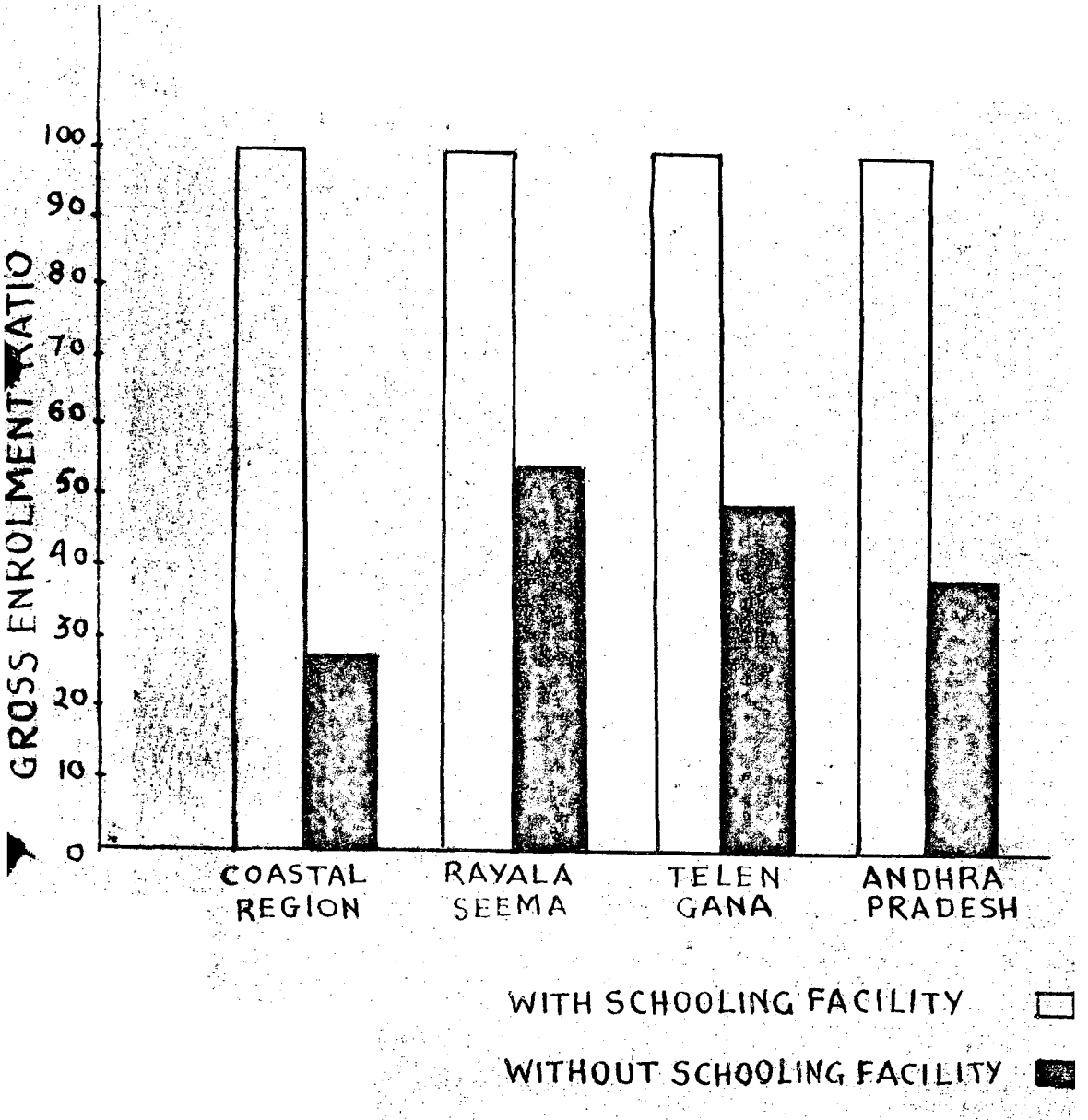
Gross Enrolment of Children from Habitations with and Without Schooling Facility

Regions	Gross Enrolment Ratio of Children from Habitations			Gross Enrolment Ratios in all the Habitations
	With S.F.	Without S.F.	Col. 2 as percentage of Col. 1	
0	1	2	3	4
Coastal	87.3	23.5	26.9	79.5
Rayalaseema	79.6	43.5	54.6	73.8
Telengana	47.4	23.4	49.6	44.3
Andhra Pradesh State	71.2	28.3	39.7	66.0

Note: (i) GER is based on the corresponding figures of enrolment and school age population given in Tables 3.5 and 3.6 respectively.

(ii) Figures on enrolment and school age population used for calculating GER are totals cutting across the distance walked over by the child. This is because it is not necessary that the distance walked by the child is the same as of his habitation from the school.

ANDHRA PRADESH - ITS REGIONS
GROSS ENROLMENT RATIO OF CHILDREN WITH SCHOOLING FACILITY AND CHILDREN WITHOUT SCHOOLING FACILITY



CHAPTER - IV

PREDICTORS OF ENROLMENT RATIOS AT PRIMARY AND MIDDLE STAGES

In the previous chapter, we observed the pattern of inter-regional differences in Gross Enrolment Ratios of the school going age children in the rural areas. In order to understand these differentials, the distributional pattern of schooling facilities in each of the three regions of the State was examined as one of the explanatory variables. This analysis has clearly pointed out towards the fact that the larger the distance of the school from child's home greater is the decline in the enrolment ratio of these children. But inter-regional differences in the GER are so sharp that they require in-depth diagnosis of the problem. There are number of factors which tend to influence and determine the enrolment of children in the school system. Such factors may be classified as demographic, social, economic and administrative. "For example, natural increase of population and trends in it, influx of migrants, enforcement of compulsory education, raising of school leaving age, increased enrolment of girls, development of rural schools, reduction of drop-outs, elimination of non-promotion, etc. are the various factors which work towards an increase in total school enrolment."[1]

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1. Premi, M.K., op.cit., p. 2.

As indicated earlier, the state of Andhra Pradesh is one of the educationally backward states. There exists not only the inter-regional differences in the GER but the over all level of the GER in the State has remained much behind the target of universal enrolment. The factors which influence and determine the GER can act differently in different areas and differently among boys and girls. There is, therefore, need of analysing the influence of these factors on enrolment of all these different kinds of children.

The factors, mentioned above, which influence and determine the enrolment indicate that there exists some relationship between each of these factors and the enrolment of children in the school. This means that it is possible to 'predict' or 'estimate' the extent of enrolment ratio with the help of the given values of these factors. One way of making 'prediction' of the enrolment ratio (criterion variable) from the given values of possible factors (explanatory or independent variables) is the technique of 'multiple regression analysis'. The present chapter, therefore, has the following objectives:

(i) to identify and measure the contributions of the 'best' predictors of GER both at Primary and Middle stages;

(ii) to identify and measure the contribution of the 'best' predictors of GER separately for boys and girls;

(iii) to identify and measure the contribution of the 'best' predictors of GER for the State as a whole and for its rural areas.

Keeping the objectives in view, we have first listed the values of GER and all possible factors with respect to each of 21 districts of the State. The year of reference is December, 1973 and wherever the values of any variable could not be available/estimated for this year, the same is taken for the 1971 census year. Finally, the techniques of 'step wise multiple regression' analysis is carried out which will provide the "multiple regression equation" of the variables for making 'best' prediction of the criterion variable.

Variables Included

There are two groups of variables considered in the 'multiple regression analysis' namely criterion or dependent variable and explanatory or independent variables.

Criterion Variable: In the present research, the criterion variable is the Gross Enrolment Ratio (GER). The GER is further classified as:

a) For Rural Areas

(i) GER of boys at Primary stage in the rural area, ... (X_1)

(ii) GER of girls at Primary stage in the rural area, ... (X_2)

(iii) GER of boys at Middle stage in the rural area, ... (X_3)

(iv) GER of girls at Middle stage in the rural area, ... (X_4)

b) For all areas of the State

(v) GER of boys at Primary stage in the state,... (X_5)

(vi) GER of girls at Primary stage in the State,... (X_6)

(vii) GER at Middle stage of boys in the state, ... (X_7)

(viii) GER at Middle stage of girls in the state,... (X_8)

Thus in all there are eight classificatory criterion or dependent variables.

Explanatory Variables: The explanatory variables included in the analysis are the factors which probably influence and determine the criterion variable. These are classified as educational, social, demographic and economic. The variables included are as given below:

Educational

(i) Number of Pre-primary Institutions per one lakh population ... (X_9)

(ii) Number of Primary Schools/Sections per one lakh population ... (X_{10})

(iii) Number of Middle schools/Sections per one lakh population ... (X_{11})

(iv) Percentage of rural population having Primary School/Section within habitation... (X_{12})

(v) Percentage of rural population having Middle School/Section within a radius of one km. (X_{13})

Social

(vi)	Percentage of urban population to total population...	X_{14}
(vii)	Percentage of literates among persons aged 25 and above...	X_{15}
(viii)	Percentage of S.C/S.T. to total population....	X_{16}

Demographic

(ix)	Percentage of children aged 5-14 to total population...	X_{17}
(x)	Females per 1000 males...	X_{18}

Economic

(xi)	Percentage of workers in the secondary sector to total workers	X_{19}
(xii)	Percentage of workers in the tertiary sector to total workers	X_{20}
(xiii)	Percentage of workers among persons below the age of 15...	X_{21}

Dummy

(xiv)	Influence of Rayalseema region	X_{22}
(xv)	Influence of Coastal Andhra region	X_{23}

Thus there are 15 explanatory variables in all.

Justification for Inclusion of Explanatory Variables: All the educational variables (X_3 to X_{13}) are the indicators of the availability of educational opportunity to the children and as such influence the enrolment. First two social variables (X_{14}, X_{15}) relate to urbanisation and literacy; and are the indicators of awareness among parents for sending their wards to school. The third social variable (X_{16}) i.e. percentage of S.C./S.T. indicates the backwardness and poverty among the masses. All these three social variables should influence the enrolment. The first demographic variable i.e. percentage of children aged 5-14 is a good proxi of school going age children i.e. 6-14; and the second demographic variable i.e. sex ratio is an indicator of sex dominance in the society. Both these variables can influence the enrolment. The first two economic variable i.e. proportion of workers in secondary and tertiary sector can be assumed as indicators of relatively more educated and enlightened persons than those in the primary sector. The third economic variable i.e. the child labour is an indicator of hinderance to the child in attending school. The dummy variables indicate the influence of comparatively more educationally advanced regions. The analysis of inter-regional differences in the GER has indicated that both Coastal and Rayalaseema are advanced more educationally advanced regions than Telengana region. As such the influence of these two regions only are considred necessary from the point of view of prediction of enrolment.

Values of each of the above mentioned variables is computed and presented alongwith a detailed note on the methodology of computation, sources, etc. in Appendix - I.

Hypotheses

Hypotheses to be tested are probable statements as narrated below:

(i) higher the values of each of the educational variables higher is likely to be the enrolment ratio;

(ii) higher the percentage of urban population to total population higher should be the GER;

(iii) higher the proportion of literates among persons aged 25 and above, higher should be the GER;

(iv) higher the percentage of S.C/S.T. lower should be the GER;

(v) higher the percentage of children aged 5-14, the GER is likely to remain either constant or lower down because of the difficulty in providing schooling facilities proportionately;

(vi) lower the sex ratio, more the society male dominated and thus higher is likely to be GER;

(vii) higher the percentage of workers in secondary and tertiary sectors, higher is likely to be GER;

(viii) higher the percentage of workers below 15, lower should be the GER.

Methodology and Operational Steps Taken

The statistical technique of 'stepwise multiple regression analysis' has been applied so as to derive the multiple regression equation for making the 'best' prediction of the

criterion variable. Two basic assumptions of the technique are (i) linier relationship between the criterion and independent variable and (ii) maximum 'criterion correlation' and minimum 'inter correlations' of explanatory variables. These two assumptions have been checked, first with the help of scatter diagram and second by having the correlation matrix, before the data are analysed. Zero order inter correlation matrix of the variables included in the study and the 'Analysis Plan' prepared for the purpose are given in Appendices II and III respectively.

Computer analysis sheets have provided at each step the values of multiple R as well as $\bar{R}$, F for variance, regression coefficient (b's) and T which are usable for deriving the multiple regression equation.

In addition to the above, we have computed the values of increment in the variance (ΔR^2) at each step due to the addition of one more explanatory variable; and the corresponding F value with the help of the following formulas:

$$\Delta R^2 = R_2^2 - R_1^2$$

$$F = \frac{R_2^2 - R_1^2}{1 - R_2^2} \times \frac{n-p-1}{1}$$

Where ΔR^2 = increment in the variance

R_2 = multiple R due to addition of one more explanatory variable

R_1 = multiple R preceding to R_2

n = number of observation

p = number of total variable i.e. both dependent and independent variables

F Test has been used for testing the significance of R^2 and ΔR^2 at 95 per cent and 99 per cent levels of confidence. The degrees of freedom for R^2 are given by $\{ p, (n-p) \}$ and for ΔR^2, by $\{ 1, (n-p-1) \}$.

The variables which do not contribute significantly, have been dropped from the multiple regression equation. The final multiple regression equation gives us the significant predictors as well as the contribution made independently by each of these to the variance of the criterion.

Multiple R and Multiple Regression Equation

(1) Multiple Correlation (R): = We know that multiple R tells us to what extent the criterion variable (GER) is determined by the combined action of given explanatory variables or to what extent the criterion variable (GER) is related to the given explanatory variables. R is called 'coefficient of multiple correlation' which explains the extent of correlation

between a set of 'obtained' or actual values of GER and the values 'predicted' from the 'multiple regression equation'. Multiple R is always positive, always less than 1.00 and always greater than the zero order correlation coefficients. In the present case, the size of sample is small and the number of variables is large and therefore there is every possibility of getting the R boosted or inflated. This needs correction. We, therefore, have taken into consideration the multiple R adjusted for the loss of degrees of freedom. This is denoted as (R)

(ii) Multiple Regression Equation: This equation expresses the relationship between the criterion variable to be predicted and any number of independent variables. This is expressed in the following form:

$$\bar{X}_1 = a + b_{12.34...n} X_2 + b_{13.24...n} X_3 + b_{1n.23(n-1)} X_n$$

This is used mainly to predict the criterion variable from the combined action of the explanatory variables; and to analyse the contribution of each variable made independently in determining the criterion variable. In deriving the multiple regression equation, we need to compute the regression coefficients (bs). These regression coefficients give the weights which each variable exerts in determining the criterion variable, when the influence of the other variables is excluded.

Predictors of GER at Primary Stage in the Rural Area

Predictors of Gross Enrolment Ratio at primary stage of elementary education have been analysed separately for male and female children in the rural area.

Gross Enrolment Ratio of Male Children (X_1): Table 4.1 shows the various values of $\bar{R}$, R^2, $\Delta \bar{R}^2$ and F corresponding to each explanatory variables entered at each successive 'step' of multiple regression analysis. By comparing the computed and table F values, the significance of variance ($\bar{R}^2$) of each variable and increment in variance ($\Delta \bar{R}^2$) has been tested at 95 per cent and 99 per cent level of confidence. Whether significant or not is mentioned against each variable under the columns no. 5 and 7.

It may be noted from the Table that the maximum variance in the criterion is explained to the extent of 90.6 per cent by the combined action of 12 variables namely (X_{21}, X_{22}, X_{23}, X_{17}, X_{10}, X_{11}, X_{16}, X_{14}, X_{19}, X_{18}, X_{15} and X_9). The corresponding multiple $\bar{R}$ is:

$$\bar{R}_{1\,(21\ 22\ 23\ 17\ 10\ 11\ 16\ 19\ 18\ 15\ 9)} = 0.952$$

Increment in the variance made by the variable X_{22} is significant at 95 per cent level of confidence. Thereafter

Table 4.1

Significance Test of Predictors of Enrolment Ratio of Male Students At Primary Stage to the Children in the Rural Area

Variable Entered at each Step	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F value for $\bar{R}^2$	Whether $\bar{R}^2$ Significant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Significant
	1	2	3	4	5	6	7
X_{21}	0.783	0.6131	-	30.136	Yes		
X_{22}	0.849	0.7208	0.1077	25.02	Yes	6.95	Yes*
X_{23}	0.860	0.7396	0.0188	18.57	Yes	1.23	No
X_{17}	0.877	0.7691	0.0295	16.42	Yes	2.05	No
X_{10}	0.890	0.7921	0.0230	15.031	Yes	1.65	No
X_{11}	0.904	0.8172	0.0251	14.711	Yes	1.92	No
X_{16}	0.918	0.8427	0.0255	14.944	Yes	2.10	No
X_{14}	0.939	0.8817	0.0390	18.036	Yes	3.94	No
X_{19}	0.941	0.8855	0.0038	16.523	Yes	0.37	No
X_{18}	0.943	0.8892	0.0037	16.126	Yes	0.33	No
X_{15}	0.951	0.9044	0.0152	16.383	Yes	1.43	No
X_9	0.952	0.9063	0.0019	15.257	Yes	0.16	No
X_{13}	0.949	0.9006	-0.0057	13.092	Yes	0.40	No
X_{12}	0.942	0.8874	-0.0132	10.464	Yes	0.70	No
X_{20}	0.932	0.8686	-0.0188	8.177	Yes*	0.72	No

* Significant at .05 level only.

ΔR^2 of each variable in the subsequent steps is not significant steps is not significant at either level of confidence and, therefore, all these variables can be dropped from the multiple regression equation.

The values relevant for deriving the final multiple regression equation are given as under:

Explanatory Variable	R	$\bar{R}^2$	$\Delta \bar{R}^2$	Intercept (K)	b	r
X_{21}	0.783	0.6131	-	-	-5.85	-0.783
X_{22}	0.849	0.7208	0.1077	139.45	15.83	0.455

Multiple Regression Equation

$X_1 = 139.45 - 5.85 X_{21} + 15.83 X_{22}$

Contribution towards explaining the variance in the criterion of

X_{21} ..... 61.3 per cent

X_{22} ..... 10.8 per cent

X_{21} and X_{22} combined ..... 72.1 per cent

From the above, it is clear that the 'best' predictors of Gross Enrolment Ratio of male children at the primary stage in the rural area are (i) the workers aged below 15 (λ_{21}) and (ii) influence of Rayalseema region (λ_{22}).

Workers aged below 15 (λ_{21}): The negative value of correlation (r) between the workers aged below 15 i.e. child labour and the GER indicates that higher the number of workers below 15 lower is the enrolment in primary classes. The factor of childr labour is quite prominent in the rural area of Andhra Pradesh and a very strong determinant of the enrolment in primary classes. It indicates that the male child can either earn or attend the school in the rural area of the state.

Influence of Rayalseema Region (λ_{22}): The contribution of Rayalseema region to the variance is 11 per cent. The positive value of r indicates the positive contribution of the enrolment in this region to the enrolment in whole of the State. As we have analysed in Chapter III that Rayalseema is quite educationally advanced region in so far as GER in habitations of all population sizes is concerned. Rayalseema can therefore make significant contribution towards the State enrolment of male children.

Gross Enrolment Ratio of Female Children (λ_2): Table 4.2 shows that maximum variance in the criterion is explained to the extent of 96.6 per cent by the combined action of

) variables namely (X_{21} , X_{15} , X_{23} , X_{13} , X_{17} X_{16} , X_{10} , X_{22} and X_{11}). The corresponding coefficient of multiple correlation i.e. $\bar{R}_2$ (21 15 23 13 17 16 10 22 11) = 0.983

Increment in the variance made by X_{15} is significant at both the levels of confidence, that by X_{23} is significant at)5 per cent level, and that by X_{13} is significant at both the levels of confidence. Thereafter $\Delta \bar{R}^2$ by all other variables is not significant and, therefore, they can be dropped from the multiple regression equation.

Following values are relevant for deriving the final multiple regression equation:

Explanatory Variable	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	K	b	r
X_{21}	0.887	0.7868	-	-	-0.36	-0887
X_{15}	0.932	0.8686	0.0818	-	2.55	0.870
X_{23}	0.952	0.9063	0.0377	-	19.13	0.806
X_{13}	0.963	0.9272	0.0211	20.55	-0.56	0.239

Table 4.2

Significence Test of Predictors of Enrolment Ratio of Female Student* At Primary Stage to the Children in the Rural Area

Variable entered at each Step 0	$\bar{R}$ 1	$\bar{R}^2$ 2	$\bar{R}^2$ 3	Computed F Value for $\bar{R}^2$ 4	Whether $\bar{R}^2$ Signi ficant	Computed F Value for $\Delta\bar{R}^2$ 6	Whether $\Delta\bar{R}^2$ Signi- ficant
X_{21}	0.887	0.7868		69.91	Yes	-	
X_{15}	0.932	0.8686	0.0818	63.50	Yes	11.20	Yes
X_{23}	0.952	0.9063	0.0377	62.58	Yes	6.85	Yes*
X_{13}	0.963	0.9274	0.0211	61.33	Yes	12.96	Yes
X_{17}	0.970	0.9409	0.0135	61.15	Yes	2.98	No
X_{16}	0.975	0.9506	0.0097	59.77	Yes	1.20	No
X_{10}	0.978	0.9565	0.0059	60.10	Yes	1.76	No
X_{22}	0.980	0.9604	0.0039	56.05	Yes	1.18	No
X_{11}	0.983	0.9663	0.0098	59.39	Yes	3.20	No
X_{20}	0.982	0.9643	-0.0020	50.01	Yes	0.56	No
X_{18}	0.981	0.9624	-0.0019	43.80	Yes	0.46	No
X_{19}	0.980	0.9604	-0.0020	37.30	Yes	0.40	No
X_{12}	0.980	0.9604	0.0000	34.29	Yes	0	No
X_9	0.978	0.9565	-0.0039	27.54	Yes	0.54	No
X_{14}	0.974	0.9487	-0.0078	21.73	Yes	0.76	No

*Significant at .05 level only

Multiple Regression Equation

$X_2 = 20.55 - 0.36 X_{21} + 2.55 X_{15} + 19.13 X_{23} - 0.56 X_{13}$

Contribution in the variance of

X_{21}	i.e. percentage of workers below 15	78.7 per cent
X_{15}	i.e. literacy among persons aged 25 and above.....	8.1 per cent
X_{23}	i.e. influence of Coastal region...	3.3 per cent
X_{13}	i.e. percentage of population having middle school....	2.1 per cent
X_{21} , X_{15} , X_{23} and X_{13} (Combined)		92.7 per cent

Child Labour (X_{21}): Out of the four predictors, the child labour in the rural area is the 'best' predictor of enrolment ratio of girls in the primary classes. This has the negative correlation with GER meaning there by that employment of girls forbid them to go to school.

Literacy among Parents (X_{15}): Another determinant of GER among girls is the parents literacy. This has positive impact on the enrolment of female children meaning thereby that educated parents alone understand this need of sending their daughters in the school.

Influence of Coastal Region (A_{23}): The third factor contributing to the GER is the influence of Coastal region. This too has positive correlation with GER but its contribution in the variance of the criterion is to the extent of 3.8 per cent only.

Schooling Facility (A_{13}): Availability of middle school within the radius of one Km. has also been one of the determinants of GER at primary stage, but its contribution in the variance is almost negligible i.e. 2.1 per cent. It means that availability of schooling facility beyond primary classes retains the female children in the earlier classes as well.

Predictors of GER at Middle Stage in the Rural Area

Gross Enrolment Ratio of Male Children (A_3): From Table 4.3 we gather that variables A_{15}, A_{18}, A_{10}, A_{12}, A_{19}, A_{22}, A_{16}, A_{17}, A_{23} and A_{11} together explain the variance upto 71.1% which is maximum. The corresponding $R_{3(15\ 18\ 10\ 12\ 19\ 22\ 16\ 17\ 23\ 11)} = 0.843$ which is significant at both the levels of confidence.

$\Delta \bar{R}^2$ of variable A_{18} is significant at 95 per cent level only. Thereafter the increment in $\bar{R}^2$ by the other variables is not significant.

Following values are relevant for deriving the final multiple regression equation:

Explanatory Variable	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	K	b	r
X_{15}	0.746	0.5565	-	-	0.55	0.740
X_{18}	0.809	0.6545	0.0980	97.96	-0.09	-0.465

Multiple Regression Equation

$X_3 = 97.96 + 0.55\ X_{15} - 0.09\ X_{18}$

Contribution made in the variance by

X_{15} i.e. literacy among persons aged 25 and above....	55.6 per cent
X_{18} i.e. sex ratio....	9.8 per cent
X_{15} and X_{18} (combined)	65.4 per cent

Literacy among persons aged 25 and above (X_{15}): Out of the two factors this is more powerful than the other and explains the variance in the criterion to the extent of 55.6 per cent. As the correlation between literacy among parents and the GER at middle stage is positive, more is the education among parents more they will send their children for middle

Table 4.3

Significance Test of Predictors of Enrolment Ratio of Male Students at Middle Stage to the Adolescents in Rural Area

Variable Entered at each Step	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F Value for $\bar{R}^2$	Whether $\bar{R}^2$ Significant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Significant
X_{15}	0.746	0.5565		23.88	Yes		
X_{18}	0.80)	0.6545	0.0)80	18.38	Yes	5.11	Yes*
X_{10}	0.820	0.6724	0.017)	13.5)	Yes	0.)3	No
X_{12}	0.830	0.688)	0.0165	11.15	Yes	0.85	No
X_{1})	0.831	0.6)06	0.0017	).11	Yes	0.08	No
X_{22}	0.828	0.6856	-0.0050	7.55	Yes	0.22	No
X_{16}	0.828	0.6856	0.0000	6.58	Yes	0.00	No
X_{17}	0.834	0.6)56	0.0100	6.0)	Yes	0.3)	No
X_{23}	0.834	0.6)56	0.0000	5.48	Yes	0.00	No
X_{11}	0.843	0.7106	0.0150	5.2)	Yes	0.52	No
X_{13}	0.834	0.6)56	-0.0150	4.57	Yes*	0.44	No
X_{1}	0.822	0.6757	-0.01))	3.)0	Yes*	0.4)	No
X_{21}	0.808	0.652)	-0.0228	3.35	No	0.46	No
X_{20}	0.777	0.6037	-0.04)2	2.67	No	0.74	No
X_{9}	0.734	0.5388	-0.064)	2.08	No	0.70	No

*Significant at .05 level only.

education, may it be available at some distance from the home of the adolescents.

Sex Ratio (X_{18}): This has negative correlation with the enrolment of adolescents in the middle classes. This means lower the sex ratio higher the enrolment ratio. In other words more the society is male dominated more will be the strength of male students in middle classes in the rural area of the State.

Gross Enrolment Ratio of Female Children (X_4): Table 4.4 shows that maximum variance in X_4 is explained by the combined action of (X_{15}, X_{22}, X_9, X_{18}, X_{11}, X_{20}, and X_{16}) to the extent of 91.6 per cent. The corresponding $\bar{R}_4$ (15 22 9 18 11 20 16) = 0.957 and is significant at both the levels.

Increment in variance ($\Delta \bar{R}^2$) made by X_{22} is significant at 95 per cent level of confidence only. Thereafter $\Delta \bar{R}^2$ by all other variables is not significant.

The values relevant for the final multiple regression equation are as under:

Explanatory Variable	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	K	b	r
X_{15}	0.892	0.7957	-		0.66	0.892
X_{22}	0.934	0.8724	0.0767	-4.0	-3.11	-0.085

Multiple Regression Equation

$X_4 = -4.0 + 0.66\ X_{15} - 3.11\ X_{22}$

Contribution in the variance made by

X_{15} i.e. literacy among persons aged 25 and above.....	77.6 per cent
X_{22} i.e. influence of Rayalaseema region....	7.6 per cent
X_{15} and X_{22} (Combined)	87.2 per cent

Literacy among Persons aged 25 and Above: Like male children, among female children also the literacy among parents plays the dominant role in sending their daughter for middle education. The multiple $\bar{R}$ between the predicted value and the actual values of GER of girls in the middle classes is as high as 0.892 and the variance explained is to the extent of 77.6 per cent.

Influence of Rayalaseema Region: This factor is explaining the variance to the extent of 7.6 per cent only and the $\bar{R}_{4\ (15\ 22)} = 0.934$.

Predictors of GER at Primary Stage in the Whole Area

Gross Enrolment Ratio of Male Children (X_5): As is clear from Table 4.5, the maximum variance in the criterion (X_5) is explained by the combined action of (X_{10}, X_{15}, X_{11}, X_{19}, X_{21}, X_{14}, X_{12}, X_9 and X_{23}) to the extent of

Table 4.4

Significance Test of Predictors of Enrolment Ratio of Female Students at Middle Stage to the Adolescents in Rural Area

Variable entered at each Step	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F Value for $\bar{R}^2$	Whether $\bar{R}^2$ Significant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Significant
X_{15}	0.892	0.7957		73.88	Yes		
X_{22}	0.934	0.8724	0.0767	64.78	Yes	10.82	Yes
X_9	0.943	0.8892	0.0168	50.87	Yes	2.58	No
X_{18}	0.953	0.9082	0.0190	48.92	Yes	3.31	No
X_{11}	0.956	0.9139	0.0057	40.29	Yes	0.99	No
X_{20}	0.956	0.9139	0.0000	33.84	Yes	0.00	No
X_{16}	0.957	0.9158	0.0019	29.53	Yes	0.29	No
X_{23}	0.955	0.9120	-0.0038	24.49	Yes	0.52	No
X_{21}	0.953	0.9082	-0.0038	20.74	Yes	0.46	No
X_{14}	0.951	0.9044	-0.0038	17.95	Yes	0.40	No
X_{12}	0.948	0.8987	-0.0057	15.35	Yes	0.51	No
X_{13}	0.944	0.8911	-0.0076	13.06	Yes	0.56	No
X_{10}	0.942	0.8874	-0.0037	11.50	Yes	0.23	No
X_{19}	0.936	0.8761	-0.0113	9.38	Yes	0.55	No
X_{17}	0.925	0.8556	-0.0205	7.37	Yes*	0.71	No

*Significant at .05 level only.

86.9 per cent. The corresponding $\bar{R}_{5(\ 10\ 15\ 11\ 19\ 21\ 14\ 12\ 9\ 23)} = 0.932$.

Increment in the variance made by X_{15} and X_{11} is significant at both the levels of confidence. Thereafter $\Delta \bar{R}^2$ by other variables in the subsequent steps is not significant.

The values relevant for deriving multiple regression equation are as given below:

Explanatory Variable	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	K	b	r
X_{10}	0.731	0.5344	-	-	0.47	0.731
X_{15}	0.831	0.6906	0.1562	-	0.93	0.432
X_{11}	0.916	0.8391	0.1485	42.18	-2.89	-0.593

Multiple Regression Equation

$X_5 = 42.18 + 0.47\ X_{10} + 0.93\ X_{15} - 2.89\ X_{11}$

Contribution made in the variance by

X_{10}	i.e. primary schools per 1 lakh population....	53.4 per cent
X_{15}	i.e. literacy among parents...	15.6 per cent
X_{11}	i.e. middle school per 1 lakh population.....	14.9 per cent

Table 4.5

Significance Test of Predictors of Enrolment Ratio of Male Students At Middle Stage to the Children in the State

Variable entered at each Step	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F Value for $\bar{R}^2$	Whether $\bar{R}^2$ Significant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Significant
X_{10}	0.731	0.5344		21.75	Yes		
X_{15}	0.831	0.6906	0.1562	21.55	Yes	909	Yes
X_{11}	0.916	0.8391	0.1485	33.64	Yes	15.69	Yes
X_{19}	0.924	0.8538	0.0147	28.30	Yes	1.61	No
X_{21}	0.924	0.8538	0.0000	22.70	Yes	0.00	No
X_{14}	0.928	0.8575	0.0037	19.55	Yes	0.36	No
X_{12}	0.929	0.8630	0.0055	17.54	Yes	0.52	No
X_9	0.926	0.8575	-0.0055	14.71	Yes	0.46	No
X_{23}	0.932	0.8686	0.0111	14.32	Yes	0.93	No
X_{22}	0.930	0.8649	-0.0037	12.38	Yes	0.27	No
X_{13}	0.932	0.8686	0.0037	11.61	Yes	0.25	No
X_{16}	0.924	0.8538	-0.0148	9.48	Yes	0.81	No
X_{20}	0.914	0.8354	-0.0184	7.60	Yes	0.78	No

Primary Schools/Classes per 1 lakh Population(x_{10}):

This factor is most powerful and plays positive role in determining the enrolment of boys in the State. This is an index of availability of schooling facility which has positive correlation with the GER.

Literacy among Persons Aged 25 and above (x_{15}): The contribution of parents' literacy in the determination of GER of boys in the State is to the extent of 16 per cent and is having positive correlation.

Middle Schools/Classes per 1 lakh Population (x_{11}):

This factor is contributing to the extent of 15 per cent and is having, surprisingly, negative correlation (-0.593) with the GER of boys in the State. This means higher the number of middle schools/classes per 1 lakh population lower will be the GER in primary classes among boys of the State. This could be possible because of the 'location' of the school. If the Middle School (which includes primary classes also) is situated at a distance far beyond the walkable distance of the child, it will naturally discourage the child to enrol himself in the primary classes of the middle school. However, the analysis of location of middle schools vis-a-vis its impact on enrolment needs further indepth study.

Gross Enrolment Ratio of Female Children (x_6): Table 4.6 shows that variables (x_{15}, x_{10}, x_{23}, x_{11}, x_{21}, x_{12}, x_{22}

$X_{}$ and X_{13}) predict the variance in the criterion variable (X_6) to the extent of 94.1 per cent which is maximum and significant at both the levels of confidence. The corresponding $\bar{R}_6$ (15 10 23 11 21 12 22 9 13) = 0.970.

Increment in the variance made by the first two variables i.e. X_{10} and X_{23} is significant at both the levels of confidence. Thereafter ΔR^2 by the other variables in subsequent steps becomes insignificant.

The values important for the framing of final multiple regression equation are given below:

Explanatory Variable	$\bar{R}$	R^2	ΔR^2	A	b	r
X_{15}	0.746	0.5565	-	-	1.52	0.746
X_{10}	0.888	0.7885	0.2320	-	0.37	0.511
X_{23}	0.942	0.8874	0.0989	-18.46	15.47	0.746

Multiple Regression Equation

$X_6 = -18.46 + 1.52\ X_{15} + 0.37\ X_{10} + 15.47\ X_{23}$

Contribution made towards the variance by:

X_{15} i.e. literacy among persons above 25... 55.6 per cent

X_{10} i.e. primary schools per 1 lakh population... 23.2 per cent

X_{23} i.e. influence of Coastal Andhra Region..... 9.9 per cent

X_{15}, X_{10} and X_{23} combined.... 88.7 per cent

Literacy among Persons aged 25 and above (X_{15}):

Unlike male students, parents literacy is most powerful determinant of enrolment among grils at primary stage in the state. This factor has contributed to the extent of 55.6 per cent whereas, among boys, this factor contributed 16 per cent only towards the variance in the respective criterion variables.

Primary Schools/Classes per 1 lakh of Population (X_{10}):

This is an index of schooling facility available to the children. This factor is next to parents literacy in determining the enrolment of girls and has contributed 23 per cent towards the variance; whereas schooling facility has been the dominant factor in determining the enrolment of boys and contributed 53 per cent towards the variance. However, both the factors i.e. schooling facility and parents literacy, combined together, are most powerful factors in the determination of enrolment of both, boys and girls, in the primary classes in the State.

Influence of Coastal Region (X_{23}): Its relationship withthe enrolment of girls is positive and has contributed to the extent of 10 per cent towards the variance of GER among girls.

Table 4.6

Significance Test of Predictors of the Enrolment Ratio of Female Students At Primary Stage to the Children in the State

Variable entered at each step	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F Value for $\bar{R}^2$	Whether $\bar{R}^2$ Signi ficant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Signi ficant
X_{15}	0.746	0.5565		23.88	Yes		
X_{10}	0.888	0.7885	0.2320	35.89	Yes	19.74	Yes
X_{23}	0.942	0.8874	0.0989	50.15	Yes	14.93	Yes
X_{11}	0.955	0.9120	0.0246	49.73	Yes	4.47	No
X_{21}	0.965	0.9312	0.0192	51.42	Yes	4.19	No
X_{12}	0.969	0.9390	0.0078	48.80	Yes	1.79	No
X_{22}	0.970	0.9409	0.0019	42.79	Yes	0.42	No
X_9	0.969	0.9390	-0.0019	36.66	Yes	0.37	No
X_{13}	0.970	0.9409	0.0019	33.69	Yes	0.35	No
X_{16}	0.968	0.9370	-0.0039	27.99	Yes	0.62	No
X_{19}	0.966	0.9332	-0.0038	23.32	Yes	0.51	No
X_{20}	0.965	0.9312	-0.0020	20.74	Yes	0.23	No
X_{14}	0.967	0.9351	0.0039	19.92	Yes	0.42	No

Predictors of GER at the Middle Stage in the Whole Area:

Gross Enrolment Ratio of Male Children (X_7): Table 4.7 shows that the variance of the criterion (X_7) explained by the variables(X_{15}, X_{22}, X_{20}, X_9, X_{23}, X_{12}, and X_{14}) is maximum (78.3 per cent) and is significant at both the levels of confidence. The corresponding R_7 (15 22 20 9 23 12 14) = 0.885

No variable has made any significant increment in the variance ($\bar{R}^2$) explained by X_{15}.

The values which are relevant in deriving the final multiple regression equation are given below:

Explanatory Variable	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	a	b	r
X_{15}	0.828	0.6856	-	14.29	0.76	0.828

Multiple Regression Equation

$$X_7 = 14.29 + 0.76 \; X_{15}$$

Contribution made by X_{15} towards the variance in the criterion variable (X_7) is 68.6 per cent.

Table 4.7

Significance Test of Predictors of Enrolment Ratio of Male Students at Middle Stage to the adolescents aged 11-14 in the State

Variable entered at each step	$\bar{R}$	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F Value for $\bar{R}^2$	Whether $\bar{R}^2$ Significant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Significant
X_{15}	0.828	0.6856		41.50	Yes		
X_{22}	0.857	0.7344	0.0488	26.7)	Yes	3.31	No
X_{20}	0.86)	0.7552	0.0208	20.06	Yes	1.44	No
$X_{}$	0.874	0.763)	0.00187	15.89	Yes	0.:59	No
X_{23}	0.877	0.769)1	0.0052	13.23	Yes	0.34	No
X_{12}	0.87)	0.7726	0.0035	11.36	Yes	0.22	No
X14	0.885	0.7332	0.0106	10.3)	Yes	0.63	No
X21	0.882	0.777)	-0.0053	8.93	Yes	0.2)	No
X16	0.878	0.770)	-0.0070	7.68	Yes	0.34	No
X1)	0.877	0.769)1	-0.0018	6.86	Yes	0.08	No
X10	0.864	0.7465	-0.0226	5.68	Yes	0.80	No
X11	0.848	0.719)1	-0.0274	4.62	Yes*	0.78	No
X_{14}	0.828	0.6856	-0.0335	3.74	Yes*	0.75	No

*Significant at .05 level only.

Literacy among Persons aged 25 and above (X_{15}): The only factor which determines the GER of boys at middle stage in the state is literacy among parents. Other factors do contribute in the variance but the same is not significant.

Gross Enrolment Ratio of Female Children (X_3): It is clear from Table 4.8 that maximum variance (95.5 per cent) in the criterion variable (X_3) is explained by the combined action of (X_{15}, X_{20}, X_{22}, X_{21}, X_{16}, X_9 and X_{23}) variables. The corresponding $\bar{R}_7$ (15 20 22 21 16 9 23) = 0.977 which is significant at both the levels of confidence.

The increment in the variance ($\Delta \bar{R}^2$) made by the first two variable (X_{20} and X_{22}) is significant, former at both the levels and the latter at 95 per cent level of confidence only. Thereafter $\Delta \bar{R}^2$ by other variables become insignificant and therefore may be dropped from the final multiple regression equation.

Values relevant are:

Explanatory Variable	$\bar{R}$	R^2	$\Delta \bar{R}^2$	a	b	r
X_{15}	0.935	0.8742	-	-	0.71	0.935
X_{20}	0.960	0.9216	0.0474	-	0.29	0.859
X_{22}	0.969	0.9390	0.0174	-5.94	-2.72	-0.096

Table 4.8

Significance Test of Predictors of Enrolment Ratio of Female Students At Middle Stage to the Adolescents aged 11-14 in the State

Variable entered at each step	R	$\bar{R}^2$	$\Delta \bar{R}^2$	Computed F Value for $\bar{R}^2$	Whether $\bar{R}^2$ Significant	Computed F Value for $\Delta \bar{R}^2$	Whether $\Delta \bar{R}^2$ Significant
X_{15}	0.9935	0.9742		133.13	Yes		
X_{20}	0.9960	0.9916	0.0474	113.20	Yes	10.83	Yes
X_{22}	0.9969	0.9930	0.0174	98.10	Yes	4.85	Yes*
X_{21}	0.9971	0.9928	0.0038	78.49	Yes	1.06	No
X_{16}	0.9971	0.9928	0.0000	63.64	Yes	0.00	No
X_9	0.9971	0.9928	0.0000	52.55	Yes	0.00	No
X_{23}	0.9977	0.9945	0.0117	56.04	Yes	3.34	No
X_{14}	0.9977	0.9945	0.0000	43.90	Yes	0.00	No
X_{19}	0.9977	0.9945	0.0000	42.77	Yes	0.00	No
X_{12}	0.9975	0.9506	-0.0039	35.86	Yes	0.79	No
X_{13}	0.9974	0.9487	-0.0019	31.12	Yes	0.33	No
X_{10}	0.9972	0.9448	-0.0039	26.17	Yes	0.57	No
X_{11}	0.9969	0.9390	-0.0058	21.32	Yes	0.67	No

*Significant at .05 level only.

Multiple Regression Equation

$X_3 = -5.94 + 0.71 X_{15} + 0.29 X_{20} - 2.72 X_{22}$

Contribution made towards the variance by

X_{15}	i.e. literacy among persons above 25...	87.4 per cent
X_{20}	i.e. workers in the tertiary sector...	4.7 per cent
X_{22}	i.e. influence of Rayalaseema region...	1.8 per cent
X_{15}, X_{20} and X_{22}	combined...	93.9 per cent

Literacy among Persons aged 25 and above (X_{15}): Parents literacy is the most powerful determinant of the GER of female children at middle stage in the state as a whole and explains the variance to the extent of 87 per cent. It has positive influence on the GER which will increase with the enhancement in the education of parents.

Workers in the Tertiary Sector (X_{20}): This ranks second in the order and explains variance to the extent of 5 per cent. The third factor is the influence of Rayalaseema Region on the GER but its contribution is only 2 per cent which is, though significant at 95 per cent level, negligible.

Best Predictors and Their Contributions

Table 4.9 summarises the significant predictors identified, contribution of each in the variance and the trend of relationship of each with the respective criterion variable. The predictors according to their rank in

determining the number of classificatory dependent variables are given below:

Significant Predictors		Number of classificatory Dependent Variables Determined	Rank
X_{15}	Percentage of literates among persons aged 25 and above	7	1
X_{22}	Influence of Rayalaseema Region	3	2
X_{21}	Percentage of workers among persons aged below 15	2	3
X_{10}	Number of Primary Schools/ Sections per 1 lakh population	2	3
X_{23}	Influence of Coastal Andhra Region	2	3
X_{11}	Number of Middle schools/ Sections per 1 lakh population	1	4
X_{13}	Percentage of rural population having middle school/section within a radius of 1 km.	1	4
X_{18}	Females per 1000 males	1	4
X_{20}	Percentage of workers in the tertiary sector to total workers	1	4

Out of 15 explanatory variables considered for the multiple regression analysis, 7 are identified as the significant or 'best' predictors of gross enrolment ratio of both, male and female children, in the rural and whole areas of

Table 4.9

Best Predictors and their Contributions towards Variance in the Criterion Variable

Criterion Variable	Maximum Variance Explained (%)	Significant Predictors (S.P)	Variance Explained by each (S.P) (%)	Correlation trend	Final R	Final R^2 (%)
0	1	2	3	4	5	6
I. Rural Area						
GER at Primary Stage of Boys (X_1)	90.6	X_{21}	61.3	(-)		
		X_{22}	10.8	(+)	0.849	72.1
GER at Primary Stage of Girls (X_2)	96.6	X_{21}	78.7	(-)		
		X_{15}	8.1	(+)		
		X_{23}	3.8	(+)		
		X_{13}	2.1	(+)	0.963	92.7
GER at Middle Stage of Boys (X_3)	71.1	X_{15}	55.6	(+)		
		X_{18}	9.8	(-)	0.809	65.4
GER at Middle Stage of Girls (X_4)	91.6	X_{15}	79.6	(+)		
		X_{22}	7.6	(-)	0.934	87.2
II. Whole Area (Rural + Urban)						
GER at Primary Stage of Boys (X_5)	86.9	X_{10}	53.4	(+)		
		X_{15}	15.6	(+)		
		X_{11}	14.9	(-)	0.916	83.9
GER at Primary Stage of Girls (X_6)	94.1	X_{15}	55.6	(+)		
		X_{10}	23.2	(+)		
		X_{23}	9.9	(+)	0.942	88.7
GER at Middle Stage of Boys (X_7)	78.3	X_{15}	68.6	(+)	0.828	68.6
GER at Middle Stage of Girls (X_8)	95.5	X_{15}	87.4	(+)		
		X_{20}	4.7	(+)		
		X_{22}	1.8	(-)	0.969	93.9

the State.

Out of 9 identified 'best' predictor, 6 (X_{21}, X_{22} X_{15}, X_{18}, X_{10}, and X_{11}) predict the GER of male children and 7 (X_{21}, X_{22}, X_{15}, X_{10}, X_{23}, X_{13} and X_{20}) predict the GER of female children both at primary and middle stages and in the rural and combined area of the State.

Similarly out of 9 best predictors, identified, 6 (X_{21}, X_{22}, X_{15}, X_{23}, X_{13} and X_{18}) predict the GER of children at both the stages in the rural area and 6 (X_{10}, X_{15} X_{11}, X_{23}, X_{20} and X_{22}) predict the GER of children at both the stages in whole of the area of the State.

The contribution made towards the variance of the respective criterion variable is given under col. 3 of Table 4.9. The final variance explained by each combination of predictors for the respective criterion variable is given under col. 6; and varies from 68.6 per cent in X_7 to 93.9 per cent in X_3 criterion variable. The trend of relationship of each predictor with the respective criterion variable is given under col. 4.

From the above analysis, it becomes explicit that literacy among persons aged 25 and above is the most powerful factor in determining the enrolment of the children at elementary stage. This is because parents of the school going

age children, more or less, are of this age group. Literate parents are surely aware of the value of educating their wards. This finding is supported by the results obtained in another study by Sharma and Sapra, who while talking of Educational Status of the Family, mentioned that "these values are suggestive of a negative relationship between the educational status of parents and families of school children and the rate of dropouts."[1]

Next to parents literacy is the factor related with the inter-regional differences in the educational development. As we have analysed in the last chapter that there are sharp inter-regional differences in the GER of three regions. These regional differences influence the GER for the State as a whole.

Next important factor is the proportion of workers aged below 15, specially in the rural area of the State. Child labour has the negative influence on the GER. Child labour in the rural area could be mainly because of poverty among masses. Naturally, the child can either earn or go to school. According to a recent report submitted to the U.N. Human Rights Commission, India has the largest child labour force in the world. "Of an estimated 52 million children below 15 years of age at work the world over, nearly one third are in this country."[2] In that case, it is quite natural

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1. Sharma, R.C. and Sapra, C.L., Op.Cit., p. 78.

2. Editorial Section, Born to Toil, appeared in the Indian Express News Paper, 13.9.79.

that child labour is an important factor in determining the GER.

Another equally important factor is the schooling facilities available to the children. Its impact on the GER has already been analysed in the previous chapter.

Appendix - I

Methodology of Computation and Sources of Data for the GER And Explanatory Variables of Multiple Regression Analysis

1. Gross Enrolment Ratio (GER): GER is the criterion variable in our analysis and is defined as the percentage of children studying at a given stage to the school going age children. Since analysis is carried out sex-wise, we need both enrolment and school age population in each of the two sexes.

The main source of data is the Third All India Educational Survey conducted by the NCERT. The Survey Report gives the enrolment figures in both the sexes separately but not the school age population. Hence there arose the necessity of estimating school going age population for each district separately for each sex. The year of reference, as already mentioned, is December, 1973.

Methodology for Estimating Sexwise School Age Population: This involved the following steps:

(i) Population in the age group 1-5 in 1971 will become 6-10 in 1976. Similarly population in the age group 6-8 in 1971 will become 11-13 in 1976.

(ii) Projected population for the age groups 6-10 for 1976, 6-8 for 1971 and 11-13 for 1976 are taken from the Second Export Committee Report and those for the age group 1-5 in 1971 are taken from the Age Tables prepared by the office of the Registrar General as these are not available from Expert Committee Report.

(iii) School age population for each sex for December 1973 was estimated by applying the following interpolation formula:

$$P_{Dec.1973} = P_{1971}^{1-5} + \left\{ \frac{P_{1976}^{6-10} - P_{1971}^{1-6}}{5} \times 2.75 \right\}$$

and

$$P_{Dec.,1973} = P_{1971}^{6-8} + \left\{ \frac{P_{1976}^{11-13} - P_{1971}^{6-8}}{5} \times 2.75 \right\}$$

where 2.75 is the difference between Dec. 73 and March 1971 to which the base figures relate.

(iv) This will give the sex-wise estimated population for the State as a whole. Proportion of male population to the total state population, when applied to each district total population will give the male population for each district. Similarly, the female population of each district can be obtained by multiplying the district total with the proportion obtained by dividing the state female population with the State totals. Thus State proportion is applied for obtaining the sexwise population for each district in each of the two school going age groups i.e. 6-11 or 6-10 and 11-14 or 11-13.

GER for both boys and girls at each stage, primary as well as middle, and for each area, rural and total are shown as X_1, X_2, X_3, X_4, X_5, X_6, X_7 and X_8 classificatory criterion variable.

2 . Explanatory Variables: All the five educational variables refer to December, 1973 as their values for each district are taken from Third All India Educational Survey Report. Remaining explanatory variables refer to 1971. Out of the three social variables, figures for the two i.e. urban and S.C./S.T. population are taken from 1971 census publication whereas figures for the third i.e. parents literacy are copied from unpublished data of 1971 census available in R.G. Office. Out of the two demographic variables, figures for the first i.e. child population aged 5-14 are copied from the unpublished data and those for the second are noted from the 1971 census publication. Figures for all the three economic variables namely workers in the secondary and tertiary and the child labour are noted from the unpublished data of 1971 census available in the R.G. Office, New Delhi. The last two dummy variables give 01 for Coastal Andhra, 10 to Rayalseema and 00 for Telengana region so as to reflect the influence of each region on the enrolment.

Appendix--II

Inter-Correlation Matrix of Variables for the Rural Area of The State

	X_1	X_2	X_3	X_4	X_5	X_{10}	X_{11}	X_{12}
X_1	1.00							
X_2	0.81	1.00						
X_3	0.64	0.63	1.00					
X_4	0.46	0.62	0.70	1.00				
X_5	-0.19	-0.24	0.08	-0.22	1.00			
X_{10}	0.78	0.59	0.51	0.28	-0.11	1.00		
X_{11}	-0.43	-0.29	0.15	0.07	0.40	-016	1.00	
X_{12}	0.21	0.39	0.38	0.33	0.26	0.01	0.18	1.00
X_{13}	-0.16	0.24	0.35	0.63	0.08	-0.28	0.52	0.54
X_{14}	0.13	0.11	0.21	0.13	0.49	-0.05	0.36	0.11
X_{15}	0.61	0.87	0.74	0.89	-0.03	0.44	-0.03	0.39
X_{16}	-0.30	-0.31	-0.32	-0.14	-0.27	-0.14	-0.09	-0.68
X_{17}	0.22	0.04	0.25	0.11	-0.04	0.06	0.14	0.07
X_{18}	-0.14	0.05	-0.46	-0.13	-0.20	-0.13	-0.24	0.03
X_{19}	-0.54	-0.52	-0.28	-0.32	0.09	-0.57	0.41	0.04
X_{20}	0.31	0.65	0.24	0.59	-0.07	0.14	0.01	0.32
X_{21}	-0.78	-0.89	-0.56	-0.68	0.24	-0.72	0.32	-0.13
X_{22}	0.46	0.09	0.47	-0.09	0.15	0.50	-0.15	-0.13
X_{23}	0.50	0.81	0.26	0.65	-0.44	0.33	-0.31	0.33

X_{13}	X_{14}	X_{15}	X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}
1.00										
0.19	1.00									
0.50	0.21	1.00								
0.21	0.02	-0.32	1.00							
0.07	0.26	0.12	0.06	1.00						
-0.02	-0.14	-0.18	-0.07	-0.69	1.00					
-0.26	-0.08	-0.42	-0.19	-0.08	-0.15	1.00				
0.45	0.36	0.58	-0.05	-0.12	0.35	0.05	1.00			
-0.08	-0.12	-0.76	0.20	0.04	0.03	0.60	-0.57	1.00		
-0.38	-0.06	0.22	-0.21	0.33	-0.52	-0.32	-0.40	-0.14	1.00	
0.27	0.05	0.58	-0.12	-0.30	0.47	-0.34	0.74	-0.77	-0.38	1.00

Inter-Correlation Matrix of Variables for the State as a Whole

	X_5	X_6	X_7	X_8	X_9	X_{10}	X_{11}	X_{12}	X_{13}	X_{14}	X_{15}
X_5	1.00										
X_6	0.82	1.00									
X_7	0.52	0.60	1.00								
X_8	0.28	0.61	0.84	1.00							
X_9	-0.18	-0.21	0.32	0.33	1.00						
X_{10}	0.73	0.51	0.04	-0.18	-0.42	1.00					
X_{11}	-0.59	-0.38	0.03	0.16	0.13	-0.33	1.00				
X_{12}	0.16	0.38	0.31	0.31	-0.09	-0.01	0.12	1.00			
X_{13}	-0.22	0.22	0.25	0.50	-0.14	-0.27	0.52	0.54	1.00		
X_{14}	0.05	0.24	0.67	0.82	0.68	-0.44	0.13	0.11	0.19	1.00	
X_{15}	0.43	0.75	0.82	0.94	0.29	0.03	0.03	0.34	0.46	0.72	1.00
X_{16}	-0.22	-0.30	-0.34	-0.25	-0.14	-0.06	-0.12	-0.09	-0.23	-0.22	-0.37
X_{17}	0.27	0.08	0.20	0.01	-0.01	0.05	-0.05	0.03	-0.01	-0.04	0.01
X_{18}	-0.07	0.06	-0.56	-0.38	-0.54	0.18	-0.28	0.09	-0.01	-0.44	-0.31
X_{19}	-0.39	-0.27	0.24	0.34	0.40	-0.65	0.47	0.15	0.33	0.36	0.20
X_{20}	0.07	0.32	0.68	0.86	0.63	-0.37	0.18	0.17	0.25	0.08	0.16
X_{21}	-0.58	-0.72	-0.61	-0.68	-0.24	-0.29	0.29	-0.21	-0.09	-0.55	-0.78
X_{22}	0.48	0.15	0.35	-0.10	0.17	0.45	-0.22	-0.13	-0.38	-0.06	0.12
X_{23}	0.46	0.75	0.17	0.39	-0.52	0.33	-0.34	0.33	0.27	0.05	0.43

X_{16}	X_{17}	X_{18}	X_{19}	X_{20}	X_{21}	X_{22}	X_{23}
.00							
.06	1.00						
0.08	-0.56	1.00					
0.29	0.02	-0.26	1.00				
0.22	-0.14	-0.30	0.54	1.00			
0.29	0.24	0.13	0.09	-0.62	1.00		
0.19	0.40	-0.42	-0.24	-0.14	-0.04		
0.13	-0.34	0.53	-0.22	0.17	-0.57	-0.38	1.00

Appendix - III

Analysis Plan for Multiple Regression Analysis

I **Classificatory Criterion Variables:** Gross Enrolment Ratio of Male and Female children at Primary and Middle Stages in Rural and whole Area of the state. In all there are 8 such variables - first 4 for the rural and next 4 for the whole area. These are indicated as:

X_1, X_2, X_3, X_4, X_5, X_6, X_7 and X_8

II **Explanatory Variables:** In all there are 15 such variables for the rural area and 13 for the whole area. They are indicated as:

Rural - X_9, X_{10}, X_{11}, X_{12}, X_{13} ..... X_{23}

Whole State: X_9, X_{10}, X_{11}, X_{14}, X_{15}, X_{16}... X_{23}

(This encludes X_{12} and X_{13})

III **Technique to be Used:** Stepwise Multiple Regression Analysis. This is to be applied separately for the rural and whole area of the State.

IV. **Out-put Required:** The following values are required to be computed:

(a) Correlation Matrix w.r.t. all the variables in the respective area.

(b) Coefficient of multiple correlation at each step (R)

(c) Coefficient of multiple correlation adjusted for the loss of degree of freedom at each step (R)

(d) F for the variance.

(e) Partial regression coefficients (b) and their respective T values.

(f) Standard error of measurement at each step.

(g) Intercept (a).

CHAPTER - V

AGE-ADMISSION IN THE PRIMARY GRADES I-VII -- A CRITICAL ANALYSIS

Although the minimum age of admission to Class I in Andhra Pradesh is 5 +, a number of children have been reported to be below 5 in that class. Similarly, a number of children admitted in the various classes have been found to be much above the normal age. This has resulted in the heterogeneity of age-composition in various classes. Whatever may be the reasons for heterogeneity in the age-composition, this creates several pedagogic problems in the classroom and also leads to stagnation and wastage. While examining the difference between dropouts and stayings at the primary stage because of the age of admission to Grade I, Sharma and Gupta found that "the value of Chi-square (χ^2 obtained (with regard to dropouts and stayings) was 109.25 which is highly significant. This means that at the time of admission to Grade I, most of the dropouts are over aged, while a large majority of stayings belong to the age prescribed by the Department of Education."[1] The educationists have, therefore, been suggesting to strive to change the age composition by reducing the proportion of under age and overage students. A clearer understanding of the processes involved in bringing

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1. Sharma, A.C. and Gupta, C.L., op. cit., p. 71.

the desired change can be had by making a time series analysis of the gradewise data by age and sex for the primary and middle classes.

The present chapter, therefore, aims at analysing the following aspects of age composition by sex of the pupils in the grades I-VIII for the period 1956-57 to 1969-70:

(i) mean age

(ii) variations from the mean age

(iii) proportion of under and over age students.

The variables, mentioned above, will provide us with an understanding of the degree of heterogeneity in the age composition of the students in different grades. This information can prove useful for taking steps for reducing heterogeneity in the age composition of the pupils so as to minimise the dropouts and the padagogic problems in the classroom.

Mean Age

Table[8] 4.1 and 4.2 show the mean age of the students in Classes I to VIII for both boys and girls separately during 1956-57 to 1969-70. These tables reveal the following trends:

(i) Mean age at grade one has remained around seven during the period under study.

(ii) Mean-age rises to the next age slab in each subsequent class, except from Class V to VI during 1956-57 to 1963-64 where age slab (i.e. 11-12) does not change. The reason for this could be that during 1956-57 to 1963-64,

students aged above 12 might have dropped from the school system after passing Class V and those below 11 in Class V might have joined Class VI for further education; thus resulting in the same mean age slab for both Class V and Class VI students. The possibility of higher rate of dropouts among students older than the mean age after passing Class V could be because of the nonavailability of middle school within reasonable distance of the adolescents home and also the reluctance of parents, specially in the rural area, to send their daughters of higher age for middle education even if the facility becomes available within reasonable distance. Similarly the older boys in the rural areas may withdraw from the school system because of the fact that 13, 14 year old children are expected to share full responsibility in earning bread. This is especially so in areas where marriage age is low.

(iii) The mean age of students in Class I is either in the age slab of 6-7 or in the age slab of 7-8. Although the mean age of students in Class I is around 7 years, the dichotomy of actual mean age into two different age slabs has resulted in the substantial differences in the proportions of under and over age students in Class-I.

(iv) Inter-grade difference in the mean-age of students becomes less and less i.e. from more than one to less than one, as the students progress to next higher grade. By and large, the difference in the mean ages remains 1 upto Class V and thereafter it becomes less than one.

Declining inter-grade difference in the mean age suggests proportion of drop outs of comparatively older children with advancement ofboth grade and age. Inter grade difference in the mean ages of students in Classes V onwards suggests that a lot of students older than the mean age has not joined the middle classes. Students below the mean age in grade V seem to have joined higher classes.

Table 5.1

Mean Age of Boys at Classes I-VIII during 1956-57 to 1969-70

Grade	I	II	III	IV	V	VI	VII	VIII
1956-57	7.00	8.23	9.29	10.38	11.31	11.68	12.58	13.59
1957-58	7.02	8.30	9.39	10.39	11.39	11.71	12.63	13.65
1958-59	7.00	8.20	9.31	10.35	11.30	11.70	12.61	13.62
1959-60	6.94	8.20	9.28	10.37	11.35	11.63	12.62	13.61
1960-61	6.89	8.51	9.31	10.34	11.31	11.71	12.67	13.72
1961-62	7.01	8.23	9.32	10.32	11.30	11.74	12.71	13.71
1962-63	7.06	8.14	9.26	10.27	11.35	11.73	12.74	13.79
1963-64	7.03	8.27	9.26	10.30	11.23	11.60	12.64	13.79
1964-65	6.84	7.87	9.00	9.95	10.85	11.58	12.57	13.56
1965-66	6.74	7.77	8.81	9.90	10.89	11.49	12.55	13.56
1966-67	6.61	7.59	8.57	9.74	10.71	11.33	12.30	13.30
1967-68	6.64	7.66	8.85	9.80	10.67	11.39	12.36	13.24
1968-69	6.57	7.62	8.70	9.77	10.64	11.43	12.29	13.07
1969-70	6.56	7.61	8.71	9.72	10.61	11.44	12.41	13.41

Source: Computed on the basis of Unpublished Data Collected by Ministry of Education and Social Welfare, New Delhi.

Table 5.2

Mean Age of Girls at Classes I-VIII during 1956-57 to 1969-70

Year	Grade							
	I	II	III	IV	V	VI	VII	VIII
1956-57	7.03	8.19	9.29	10.27	11.21	11.53	12.34	13.39
1957-58	7.00	8.27	9.37	10.31	11.25	11.60	12.39	13.22
1958-59	7.00	8.18	9.31	10.31	11.15	11.53	12.30	13.28
1959-60	6.91	8.18	9.23	10.26	11.11	11.44	12.31	13.34
1960-61	6.84	8.16	9.29	10.30	11.16	11.50	12.47	13.45
1961-62	6.98	8.19	9.31	10.23	11.12	11.50	12.46	13.42
1962-63	7.06	8.17	9.30	10.21	11.20	11.53	12.50	13.50
1963-64	7.12	8.20	9.31	10.28	11.13	11.46	12.49	13.53
1964-65	6.84	7.84	8.93	9.82	10.65	11.45	12.31	13.35
1965-66	6.74	7.76	8.78	9.76	10.74	11.33	12.32	13.34
1966-67	6:60	7:54	8:50	9:62	10:66	11:28	12:23	13:19
1967-68	6.58	7.58	8.60	9.68	10.52	11.22	12.14	13.06
1968-69	6.51	7.55	8.70	9.61	10.43	11.34	12.24	13.06
1969-70	6.50	7.56	8:64	9.60	10.48	11.39	12.29	13.32

Source: Ibid.

(v) There is declining trend in the mean age of students in different grades over the period 1956-57 to 1969-70. The declining trend in the mean age is comparatively more sharp in grades I-V than in grades VI-VIII. This suggests that degree of hetrogeneity has been reducing over the period under study.

(vi) The pattern of mean age of male and female students in the grades I-VIII is more or less the same in each year of the period. The mean age of girls after class V is little less than that of boys suggesting comparatively higher rate of drop outs among girls of higher ages than the boys.

Variation from the Mean Age

Variation from the mean age has been measured in terms of standard deviation which summarises the deviations of the age of each student in a given grade from their mean age. Table 5.3 and 5.4 give the values of S.D. of ages of the students in grades I-VIII for each year of the period for both boys and girls separately.

From these two tables it is observed that:

(i) Seeing vertically, the values of S.D. in different grades slides down slowly from 1956-57 to 1969-70. However, the rate of sliding down over the period increases, though slowly in each subsequent higher grade. This suggests that the state has been more conscious about the heterogeneity of age composition in the early classes and has been making deliberate efforts to reduce it by enroling more and more children of appropriate age group. Higher rate of decline in S.D. in the subsequent grades suggests higher rate of dropouts among overage students over the period of 1956-57 to 1969-70.

Table 5.3

Standard Deviation from the Mean Age of the Boys in Grades I-VIII during 1956-57 to 1969-70

Year	Grade I	II	III	IV	V	VI	VII	VIII
1956-57	1.21	1.35	1.48	1.55	1.57	1.55	1.63	1.71
1957-58	1.22	1.37	1.46	1.48	1.53	1.54	1.62	1.66
1958-59	1.24	1.38	1.45	1.54	1.58	1.52	1.56	1.61
1959-60	1.24	1.39	1.46	1.52	1.53	1.46	1.58	1.62
1960-61	1.22	1.29	1.47	1.53	1.56	1.48	1.52	1.58
1961-62	1.20	1.38	1.47	1.57	1.63	1.53	1.56	1.68
1962-63	1.21	1.32	1.45	1.53	1.57	1.48	1.49	1.54
1963-64	1.27	1.34	1.45	1.54	1.58	1.45	1.44	1.44
1964-65	1.27	1.43	1.36	1.42	1.45	1.44	1.43	1.48
1965-66	1.25	1.36	1.39	1.41	1.38	1.41	1.44	1.49
1966-67	1.15	1.26	1.24	1.41	1.48	1.34	1.40	1.32
1967-68	1.18	1.25	1.44	1.42	1.53	1.38	1.48	1.43
1968-69	1.15	1.21	1.20	1.34	1.33	1.36	1.43	1.41
1969-70	1.17	1.26	1.29	1.33	1.34	1.29	1.38	1.28
RANGE	1.15-1.27	1.21-1.43	1.24-1.48	1.33-1.57	1.33-1.63	1.29-1.55	1.38-1.63	1.28-1.71

Table 5.4

Standard Deviation from the Mean Age of Girls in Grades I--VIII during 1956-57 to 1969-70

Year	Grade I	II	III	IV	V	VI	VII	VIII
1956-57	1.22	1.31	1.45	1.53	1.51	1.52	1.59	1.73
1957-58	1.20	1.35	1.43	1.46	1.48	1.46	1.54	1.64
1958-59	1.19	1.36	1.47	1.51	1.53	1.61	1.50	1.59
1959-60	1.20	1.39	1.42	1.49	1.55	1.34	1.41	1.50
1960-61	1.17	1.35	1.43	1.49	1.50	1.35	1.41	1.44
1961-62	1.14	1.35	1.45	1.52	1.53	1.35	1.38	1.43
1962-63	1.18	1.31	1.51	1.51	1.52	1.34	1.35	1.41
1963-64	1.25	1.33	1.41	1.51	1.55	1.34	1.32	1.34
1964-65	1.26	1.41	1.32	1.35	1.35	1.32	1.33	1.39
1965-66	1.22	1.33	1.39	1.36	1.26	1.25	1.24	1.26
1966-67	1.11	1.18	1.04	1.41	1.51	1.24	1.24	1.17
1967-68	1.15	1.20	1.35	1.42	1.35	1.24	1.27	1.28
1968-69	1.11	1.19	1.23	1.20	1.22	1.23	1.27	1.31
1969-70	1.15	1.21	1.28	1.27	1.30	1.29	1.29	1.21
RANGE	1.11-1.26	1.18-1.41	1.04-1.51	1.26-1.53	1.22-1.55	1.23-1.61	1.24-1.59	1.17-1.73

(ii) Seeing diagonally, the values of S.D. for each of the cohort of children in the respective years increase slowly till they reach Class V thereafter the value falls down a little in the next higher grade and then it again rises. Decline in S.D. from Class V to VI could be because of larger number of dropouts among over age students. The slow rise in S.D. at the primary stage could probably be due to the progress of proportionately less number of over age students in the next higher grade. Horizontally also we observe more or less the same trends.

(iii) The trends, observed above, are more or less the same among male and female children. The only difference is in the absolute values of S.D. which is slightly lower among girls than the boys. This means that degree of heterogeneity in age composition has been slightly less among girls than the boys.

Under Age and Over Age Students

Under and over age students have been defined as those students who are below and above the normal age students respectively. Proportions of each category of students to the total students in the class are taken as proportions of under and overage students respectively.

We have defined normal age as that age which falls within the range of plus and minus one of the mean age of the students in that class. In taking the normal age as $(\bar{A} \pm 1)$ the following considerations have been taken into

account.

The first is the heterogeneity in the age composition in the classroom. Whatever may be the value of mean age, the age composition in the classroom will be more or less homogeneous if ages of the majority of the students in that class fall within the range of plus and minus one of the mean age of those children.

The second is that the figures of age, etc. refer to 31st March of the year whereas the admission data falls in the early months i.e. April or June of the previous year. This gives rise to a difference of almost one year. As such subtracting one year from the mean age will bring it nearer to the admission date of the children. Students below this limit are actually the under age students. Similarly the students above the limit of one year more of their mean age are the over age students.

Tables 5.5 and 5.6 show the percentages of under age and overage students to the total students in a particular grade and year of both males and females separately from 1956-57 to 1969-70. The general pattern of proportions of under age and over age students, as revealed by these Tables, is narrated below:

(1) Seeing vertically, proportion of under age students in each grade does not deviate

much till 1963-64. Thereafter, it falls down steeply in each grade. Proportion of over age students in each grade remains more or less the same during the period under study.

(ii) Seeing horizontally, proportion of under age students moves up and down except when students pass from Class V to VI during 1956-57 to 1963-64 when it declines sharply. Similarly percentages of over age students in classes from I-VIII changes only marginally during the period 1956-57 to 1969-70.

(iii) Seeing diagonally, proportion of under age students declines sharply in most of the subsequent grades whereas the proportion of overage students varies up and down marginally as the cohort of children moves towards higher grades. We have seen in the analysis of mean age of students that inter grade differences in the mean age goes on reducing at each subsequent higher grade. Meaning thereby that more and more under age students are coming nearer the mean age or within the range of minus one of their mean age. Thus this leaves out a smaller proportion of under age students as they proceed to the next higher grade. Proportions of over age students remain more or less the same at each higher grade could be because either much of these students do not pass their respective grade, or their number is already so high that droppingout of some of them do not bring much change in their proportion.

(iv) In some of the years viz. 1959-60, 1960-61, we observe a very low proportion of under age students and correspondingly very high proportion of overage students in Grade I, which is in contradiction to the trends in other years. If we

Table 5.5

Percentage of Under and Over Age Male Students at Classes I to VIII During 1956-57 to 1969-70

Year	Grade I	II	III	IV	V	VI	VII	VIII
1956-57								
Under Age	22.3	18.4	20.4	20.8	20.8	10.0	15.7	16.7
Over Age	6.0	9.7	12.9	13.7	13.7	18.9	18.6	19.3
1957-58								
Under Age	20.3	16.4	16.8	16.8	18.1	8.7	13.6	14.3
Over Age	6.3	10.9	13.4	13.7	14.6	19.2	19.1	19.8
1958-59								
Under Age	22.5	19.5	18.5	18.9	20.9	8.6	12.2	12.8
Over Age	6.3	10.0	12.4	14.0	14.3	18.8	17.5	18.1
1959-60								
Under Age	0.4	19.5	19.9	18.4	19.2	7.0	11.4	12.9
Over Age	17.1	10.5	12.3	13.9	14.0	16.7	17.8	17.7
1960-61								
Under Age	0.4	4.8	18.8	20.2	20.6	6.1	9.1	9.6
Over Age	16.0	12.4	12.9	14.2	14.1	18.3	18.5	19.3
1961-62								
Under Age	18.8	17.9	18.4	20.4	22.0	6.2	8.3	9.0
Over Age	6.0	10.1	12.8	14.2	14.8	19.2	18.8	18.8
1962-63								
Under Age	19.5	18.5	19.2	21.3	20.4	4.5	6.5	6.3
Over Age	6.2	11.1	12.1	13.4	15.1	18.7	18.4	19.4
1963-64								
Under Age	19.6	17.0	18.8	19.8	21.6	6.6	4.7	3.6
Over Age	8.2	9.7	11.7	13.4	14.1	16.6	17.9	18.2

Year	Grade I	II	III	IV	V	VI	VII	VIII
1964-65								
Under Age	0.2	4.8	1.3	3.0	5.6	6.6	6.5	8.9
Over Age	16.1	19.9	21.2	21.1	20.6	15.4	21.8	16.0
1965-66								
Under Age	0.2	1.6	2.7	3.2	3.6	6.5	6.6	6.0
Over Age	14.7	18.1	19.4	20.2	19.5	14.2	15.0	15.4
1966-67								
Under Age	0.2	2.2	2.5	2.3	5.0	5.9	10.9	7.7
Over Age	11.7	12.9	12.2	16.3	16.9	10.8	11.3	10.2
1967-68								
Under Age	0.4	1.5	0.9	2.1	5.7	9.6	11.8	12.5
Over Age	12.6	14.9	18.4	19.0	17.0	13.2	13.7	11.6
1968-69								
Under Age	0.5	1.3	1.7	1.2	2.8	7.0	14.4	16.5
Over Age	10.9	12.6	14.7	16.4	15.2	12.9	12.3	9.7
1969-70								
Under Age	0.3	1.0	1.8	2.0	4.3	5.4	8.4	6.1
Over Age	11.9	13.9	15.9	16.2	15.1	11.8	12.4	12.1

Source: Ibid

Note: (i) Normal Age Students are those students whose age falls within the range of $(\bar{X} - 1)$ and $(\bar{X} + 1)$.

(ii) Under Age Students are those students whose age falls below the range of $(\bar{X} - 1)$.

(iii) Over Age Students are those students whose age falls above the range of $(\bar{X} + 1)$.

(iv) $\bar{X}$ is the mean age of students in the respective grade and year.

Table 5.6

Percentages of Under and Over Age Female Students at Classes I-VIII During 1956-57 to 1969-70

Year	Grade I	II	III	IV	V	VI	VII	VIII
1956-57								
Under Age	21.4	18.7	19.6	21.2	21.3	13.2	19.2	21.1
Over Age	6.4	8.8	12.3	12.6	12.0	15.8	14.2	16.3
1957-58								
Under Age	20.8	17.1	16.6	18.4	19.3	10.8	16.3	19.3
Over Age	6.0	10.3	12.9	12.5	11.9	14.9	14.1	13.9
1958-59								
Under Age	22.1	19.6	18.5	19.2	23.1	10.1	15.9	18.9
Over Age	5.4	9.7	12.2	13.3	11.3	13.7	12.4	13.1
1959-60								
Under Age	0.4	20.2	20.5	20.1	23.8	8.5	14.1	15.3
Over Age	16.4	10.4	11.4	12.5	11.2	12.3	11.6	12.2
1960-61								
Under Age	0.4	19.9	18.9	20.6	22.7	7.8	11.5	11.9
Over Age	14.5	9.4	12.0	13.0	11.6	13.2	13.4	12.5
1961-62								
Under Age	0.2	18.7	18.3	21.6	23.9	7.7	9.7	11.9
Over Age	15.5	9.5	12.6	12.5	11.4	13.4	12.7	12.4
1962-63								
Under Age	18.5	18.6	19.7	23.2	22.7	6.5	8.9	9.5
Over Age	5.6	8.8	12.1	12.9	12.1	14.1	12.8	12.8
1963-64								
Under Age	18.5	16.8	17.0	20.1	24.0	7.2	5.1	6.6
Over Age	8.4	9.6	11.7	13.2	12.0	12.8	12.7	13.4

Year	Grade I	II	III	IV	V	VI	VII	VIII
1964-65								
Under Age	0.2	5.0	1.4	2.9	6.2	7.2	10.1	10.5
Over Age	16.3	1).4	20.0	18.6	15.9	12.2	10.5	10.1
1965-66								
Under Age	0.2	2.4	2.4	2.6	3.8	10.4	9.2	7.5
Over Age	14.4	17.4	18.5	17.9	15.9	10.8	9.6	10.1
1966-67								
Under Age	0.1	0.4	2.5	2.0	3.8	8.2	9.9	9.6
Over Age	10.9	11.4	9.7	13.9	14.7	8.7	7.9	7.4
1967-68								
Under Age	0.5	1.7	0.7	2.1	6.3	10.2	13.4	12.7
Over Age	11.2	12.5	17.1	16.6	13.8	9.1	8.6	7.8
1968-69								
Under Age	0.4	2.0	1.1	1.3	3.7	5.8	11.2	13.8
Over Age	9.9	11.8	13.9	13.7	11.8	9.8	9.9	8.3
1969-70								
Under Age	0.3	1.1	1.7	2.0	5.9	5.6	7.7	4.5
Over Age	11.1	12.3	14.9	13.4	13.4	11.8	10.9	9.8

Source: Ibid.

Note: (i) Normal Age Students are those students whose age falls within the range of $(\bar{X} - 1)$ and $(\bar{X} + 1)$.

(ii) Under Age Students are those students whose age falls below the range of $(\bar{X} - 1)$.

(iii) Over Age Students are those students whose age falls above the range of $(\bar{X} + 1)$.

(iv) $\bar{X}$ is the mean age of students in the respective grade and year.

look at the mean ages of students in grade 1 during 1959-60 and 1960-61 we observe that these fall in the age slab of 6-7 whereas the mean ages of students in grade 1 in all other years fall in the age slab of 7-8. The difference in the age slab of these two groups has led into these two different sets of proportions. Since the difference in the mean age is only marginal, the pattern, analysed above, seems to hold good.

(v) By and large, the pattern of under age and over age students holds good both for male and female students.

In the State of Andhra Pradesh, the hetreogeneity in the age composition during 1956-57 to 1969-70 has declined marginally. Similarly, the degree of hetreogeneity changes only marginally as the Cohort of children move towards higher classes. The proportion of under age students shows a declining trend, the proportion of over age students remain more or less the same as the cohort of children move towards higher classes. As we have mentioned earlier, the first trend could be because of declining inter grade differences in the mean age and the second trend could probably be because of that the number of over age students has already been so high that droppingout of some of them has not produced any substantial change in the proportion of these students.

However, the problem of progression among children of different ages needs indepth study. An attempt in this

direction has been made in the next chapter wherein the progression of a cohort of students in different age groups has been analysed by 'grade progression' technique.

CHAPTER - VI

GRADE-PROGRESSION OF A COHORT OF CHILDREN ENTERING INTO GRADE-I

In our attempt to universalise elementary education, we have been trying since independence to provide adequate schooling facilities for all children. But not much attention has been paid to assess the continuation of children who join the school. This exercise is important from universal retention point of view which is as crucial as the universal enrolment.

One way of assessing the continuation of enrolled children is to analyse the progress of a given cohort of children through each successive grade. This method is called 'Cohort survival' or 'grade succession' technique and is said to be the most accurate method "among the various methods utilized for enrolment projections"[1], which forms the basis of educational planning.

As we know that under age and over age students make the age composition heterogenous which, in turn, leads to high degree of wastage and stagnation in the education, analysing the grade progression only of those children who lie within the

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Premi, M.K., op.cit, p. 83.

range of normal age, will be an interesting study. It will reveal the pattern of wastage and stagnation among children of normal age only.

As we have indicated in Chapter V, we consider normal age to lie within the range of plus and minus one year of the mean age of the children in the particular grade ($\bar{X} \pm 1$). We have further seen the mean age of children in grade I lie around seven. We have, therefore, taken three age groups of 6-7, 7-8 and 8-9 years as the range of normal age of children at grade I.

We have data by age, sex and grade from 1956-57 to 1969-70. This gives us six cohorts of children in grade I for the year 1956-57, 1957-58, 1958-59, 1959-60, 1960-61 who complete grade VIII within the time span for which data are available to us. The career of these cohorts is followed till their children progress to grade IX from grade VIII.

The present chapter, therefore, analyses the progression of each cohort of children:

(i) through each successive grade of elementary education till they pass grade VIII;

(ii) separately in each of three normal age groups of 6-7, 7-8 and 8-9 years at grade I;

(iii) separately for males and females.

Grade Progression of Boys

Table 6.1 shows the percentage progression to each next higher grade of a cohort of male children in the age-groups

of 6-7, 7-8 and 8-9 separately. The analysis includes six cohorts of male children relating to each of the years 1956-57 to 1961-62. For calculating the percentage of progression, the children in the next higher grade and age group in the subsequent year are first divided by the number of children in a particular grade and specific age-group in a given year and then multiplied by hundred.

The Table is divided into three parts according to three age groups of 6-7, 7-8 and 8-9. Each figure in the Table shows the percentage of male children progressed to the class mentioned over the figure in each column from the preceding class mentioned against the figure in the row of the Table.

The Table reveals the following general trends:

(i) Among the children in the age group 6-7:

(a) the percentage progression to grade II from grade I is the <u>lowest</u>. It varies from 42.6 to 47.0 in the given six cohorts;

(b) thereafter it starts rising till the progression to grade V from grade IV;

(c) the progression of children in grade VI from grade V falls down in case of each of the six cohorts. But the quantum of fall is not as much as in case of other age groups. It varies from 1 to 3 per cent whereas in other higher age groups (cohorts of age 7-8 and 8-9 in grade I), it

Table 6.1

Grade Progression of Cohorts of Boys in Grade I in the Years 1956-57 1957-58, 1958-59, 1959-60, 1960-61 and 1961-62

(In the Age Group 6-7)

Progression in the next Grade Year (X)	Grade ↓	Year (X + 1) II	III	IV	V	VI
Cohort of 1956-57	I	45.5				
1957-58		45.0				
1958-59		47.0				
1959-60		45.4				
1960-61		45.9				
1961-62		42.6				
Cohort of 1956-57	II		74.1			
1957-58			75.6			
1958-59			73.0			
1959-60			77.2			
1960-61			75.4			
1961-62			73.1			
Cohort of 1956-57	III			79.3		
1957-58				75.9		
1958-59				77.4		
1959-60				76.5		
1960-61				79.6		
1961-62				82.0		
Cohort of 1956-57	IV				82.8	
1957-58					85.4	
1958-59					83.6	
1959-60					86.8	
1960-61					84.5	
1961-62					89.0	
Cohort of 1956-57	V					77.2
1957-58						84.1
1958-59						80.4
1959-60						83.3
1960-61						76.1
1961-62						81.7

	Grade	VII	VIII	IX
Cohort of 1956-57	VI	92.9		
1957-58		82.9		
1958-59		85.0		
1959-60		80.6		
1960-61		78.1		
1961-62		72.0		
Cohort of 1956-57	VII		98.1	
1957-58			91.5	
1958-59			100.4	
1959-60			73.9	
1960-61			77.4	
1961-62			74.6	
Cohort of 1956-57	VIII			82.8
1957-58				96.6
1958-59				89.6
1959-60				76.4
1960-61				74.7
1961-62				84.8

(In the Age Group 7-8)

Year (X + 1)

Progression in the next grade / Year (X)		Grade ↓	II	III	IV	V	VI
Cohort of	1956-57		62.3				
	1957-58		56.1				
	1958-59	I	58.3				
	1959-60		63.4				
	1960-61		64.7				
	1961-62		52.5				
Cohort of	1956-57			77.0			
	1957-58			77.8			
	1958-59	II		81.0			
	1959-60			78.6			
	1960-61			75.1			
	1961-62			72.3			
Cohort of	1956-57				80.5		
	1957-58	III			77.8		
	1958-59				76.6		
	1959-60				78.2		
	1960-61				76.7		
	1961-62				67.6		
Cohort of	1956-57					82.1	
	1957-58					85.1	
	1958-59	IV				82.9	
	1959-60					84.7	
	1960-61					72.2	
	1961-62					79.2	
Cohort of	1956-57						55.7
	1957-58						56.4
	1958-59	V					54.1
	1959-60						52.8
	1960-61						62.7
	1961-62						57.7

		Grade ↓	VII	VIII	IX
Cohort of	1956-57	VI	89.0		
	1957-58		79.1		
	1958-59		83.0		
	1959-60		85.1		
	1960-61		70.0		
	1961-62		81.4		
Cohort of	1956-57	VII		97.2	
	1957-58			93.1	
	1958-59			89.0	
	1959-60			65.7	
	1960-61			83.9	
	1961-62			72.1	
Cohort of	1956-57	VIII			74.9
	1957-58				80.7
	1958-59				94.9
	1959-60				89.8
	1960-61				77.8
	1961-62				120.7

(in the Age Group 8-9)
Year (X + 1)

Progession to next grade / Year (X)	Grade	II	III	IV	V	VI
Cohort of 1956-57	I	83.1				
1957-58		69.7				
1958-59		73.8				
1959-60		77.8				
1960-61		81.4				
1961-62		55.6				
Cohort of 1956-57	II		82.7			
1957-58			86.2			
1958-59			90.9			
1959-60			93.2			
1960-61			74.2			
1961-62			103.5			
Cohort of 1956-57	III			86.3		
1957-58				84.7		
1958-59				81.3		
1959-60				76.3		
1960-61				80.2		
1961-62				63.6		
Cohort of 1956-57	IV				80.5	
1957-58					80.1	
1958-59					88.2	
1959-60					86.0	
1960-61					64.2	
1961-62					79.0	
Cohort of 1956-57	V					47.5
1957-58						52.4
1958-59						42.5
1959-60						62.8
1960-61						56.2
1961-62						47.1

		Grade	VII	VIII	IX
Cohort of	1956-57	VI	82.9		
	1957-58		75.8		
	1958-59		79.9		
	1959-60		79.3		
	1960-61		81.6		
	1961-62		91.8		
Cohort of	1956-57	VII		92.5	
	1957-58			87.6	
	1958-59			90.5	
	1959-60			56.4	
	1960-61			89.6	
	1961-62			84.6	
Cohort of	1956-57	VIII			81.9
	1957-58				69.9
	1958-59				80.8
	1959-60				109.7
	1960-61				83.9
	1961-62				112.8

Source: Computed on the basis of data compiled from Ministry of Education and Social Welfare, New Delhi.

Note:

$$\text{Proportion of Progression to the next Grade} = \left\{ \frac{S^{x+1}_{g+1}}{S^{x}_{g}} \times 100 \right\}$$

where S is number of students
x is the year
g is the grade

goes upto 33 per cent. This implies that wastage and stagnation is comparatively more among children of higher ages than the lower ages after class V.

(d) the progression to classes VII, VIII and IX from the immediate preceeding class remains quite high i.e. above 72 per cent.

(ii) Among the children aged 7-8 years:

(a) the proportion of children progressed to grade II from grade I is higher than that among the children in the age group 6-7. It varies from 53 to 65 per cent in all the six cohorts of children.

(b) like the children aged 6-7 years, the proportions of male children moving to next higher classes goes on rising till grade V.

(c) thereafter, the proportion of children progressing to grade VI from grade V falls down to a larger extent than among children in the age cohort of 6-7 years.

(d) the proportion of children passing to grades VII, VIII and IX from the immediate preceding grade remains as high as among the children aged 6-7 years i.e. above 70 per cent.

(iii) Among the children in the age group 8-9 years:

(a) the proportion of children passing to grade II from grade I is higher than that in the other two age groups i.e. 6-7 and 7-8 in each of the six cohorts. The range of variation is from 56 to 83 per cent. The plausible reason for this kind of trend could be that in grade I, there has been 'spurious' enrolment comparatively more among lower age group children than among higher age group children. Such children whose enrolment is false are

declared as failures and do not progress to class II. Thus progression to class II amongst the children in low age group becomes less than that of children in higher age groups. Another reason could be that in Andhra Pradesh, specially in rural areas, a little higher age at entry into the school system is probably prefered and parents normally do not withdraw their children early. However, all these plausible reasons need indepth study based upon factual information from the state.

(b) the proportion of children progressing to next higher grade remains more or less the same till grade V.

(c) thereafter, there is a sharp decline in the proportion of children progressing from grade V to grade VI. Wastage at grade V is higher in higher age group children than in the lower age group. This could be because the economic importance of the children increases as they become older and as such their parents withdraw these children from the school system.

(d) the proportion of children passing to grade VII, VIII and IX from the immediate preceding grade remains high but not as much as among the children in the other two age groups. It remains above the level of 62 per cent. It is thus interesting to note that those children who are able to join the middle school classes in grade VI, try to continue in the school system till they complete that stage irrespective of their age.

Grade Progression of Girls

Table 6.2 shows the percentage of female students progressing to each next higher grade out of a given cohort in a particular year. As in the case of males, six cohorts

of female children in the year 1956-57, 1957-58, 1958-59, 1959-60, 1960-61 and 1961-62 have been taken into consideration. The children of each cohort are further divided into three age groups of 6-7, 7-8 and 8-9; and the grade progression of each group is analysed separately. The Table, therefore, comprises three parts, each dealing with one of the three age groups.

The Table reveals the following general trends:

(i) Among the children in the age group 6-7:

(a) the proportion of girls progressing to grade II from grade I is lower than that in all other grades. As such the progression to grade II remains the lowest and it varies from 37 to 46 per cent among the six cohorts.

(b) thereafter, it starts rising at each grade till grade V.

(c) from grade V to VI, the progression of girls slows down at a speed higher than that among boys. The range of decline in the progression from Class V to VI is from 19 to 32 per cent among girls whereas it has been from 1 to 9 per cent among boys. This partly shows the reluctance of parents to send their daughters after class V to a middle school available at far off distances.

(d) the proportion of girls passing to grade VII, VIII and IX from the immediate preceding grade remains quite high i.e. above 65 per cent.

(ii) Among the female children in the age group 7-8:

Table 6.2

Grade Progression of Chorts of Girls in Grade I in the Years 1956-57, 1957-58, 1958-59, 1959-60, 1960-61, 1961-62

(In the Age Group 6-7)
Year (X + 1)

Progression in the next grade / Year (X)	Grade ↓	II	III	IV	V	VI
Cohort of 1956-57	I	42.3				
1957-58		43.8				
1958-59		45.5				
1959-60		45.0				
1960-61		44.6				
1961-62		37.3				
Cohort of 1956-57	II		66.8			
1957-58			71.6			
1958-59			69.2			
1959-60			73.6			
1960-61			64.2			
1961-62			70.1			
Cohort of 1956-57	III			77.5		
1957-58				70.5		
1958-59				76.2		
1959-60				68.5		
1960-61				82.0		
1961-62				76.3		
Cohort of 1956-57	IV				73.0	
1957-58					82.7	
1958-59					75.9	
1959-60					88.3	
1960-61					84.4	
1961-62					84.3	
Cohort of 1956-57	V					53.8
1957-58						56.3
1958-59						54.9
1959-60						57.4
1960-61						51.8
1961-62						54.3

		Grade	VII	VIII	IX
Cohort of	1956-57	VI	86.0		
	1957-58		78.4		
	1958-59		78.2		
	1959-60		78.9		
	1960-61		79.2		
	1961-62		73.4		
Cohort of	1956-57	VII		89.4	
	1957-58			91.0	
	1958-59			101.6	
	1959-60			69.0	
	1960-61			65.1	
	1961-62			64.7	
Cohort of	1956-57	VIII			75.1
	1957-58				80.4
	1958-59				72.8
	1959-60				72.7
	1960-61				79.0
	1961-62				77.7

(In the Age Group 7-8)

Progression in the next grade / Year (x)	Grade ↓	II	III	IV	V	VI
Cohort of 1956-57	I	58.1				
1957-58		53.4				
1958-59		54.1				
1959-60		60.6				
1960-61		63.7				
1961-62		47.1				
Cohort of 1956-57	II		73.8			
1957-58			73.8			
1958-59			77.9			
1959-60			77.5			
1960-61			71.7			
1961-62			69.1			
Cohort of 1956-57	III			70.9		
1957-58				72.3		
1958-59				72.1		
1959-60				68.0		
1960-61				74.0		
1961-62				59.7		
Cohort of 1956-57	IV				75.9	
1957-58					79.6	
1958-59					76.4	
1959-60					79.4	
1960-61					59.5	
1961-62					69.6	
Cohort of 1956-57	V					35.7
1957-58						35.5
1958-59						47.2
1959-60						38.2
1960-61						53.1
1961-62						49.4

	Grade ↓	VII	VIII	IX
Cohort of 1956-57	VI	83.4		
1957-58		79.4		
1958-59		76.2		
1959-60		84.8		
1960-61		69.6		
1961-62		57.5		
Cohort of 1956-57	VII		82.5	
1957-58			88.2	
1958-59			92.1	
1959-60			59.5	
1960-61			58.2	
1961-62			68.6	
Cohort of 1956-57	VIII			77.7
1957-58				63.6
1958-59				71.1
1959-60				68.1
1960-61				87.2
1961-62				89.3

(In the Age Group 8-9)

Year (X + 1)

Progression to next grade / Year (X)		Grade I	II	III	IV	V	VI
Cohort of	1956-57	I	81.5				
	1957-58		68.6				
	1958-59		69.8				
	1959-60		80.1				
	1960-61		90.2				
	1961-62		65.0				
Cohort of	1956-57	II		78.3			
	1957-58			80.2			
	1958-59			89.8			
	1959-60			85.8			
	1960-61			87.5			
	1961-62			85.2			
Cohort of	1956-57	III			72.1		
	1957-58				79.2		
	1958-59				69.4		
	1959-60				68.5		
	1960-61				65.2		
	1961-62				51.8		
Cohort of	1956-57	IV				72.7	
	1957-58					67.5	
	1958-59					82.3	
	1959-60					73.1	
	1960-61					52.9	
	1961-62					66.4	
Cohort of	1956-57	V					26.8
	1957-58						31.8
	1958-59						38.6
	1959-60						30.8
	1960-61						42.7
	1961-62						34.6

		Grade	VII	VIII	IX
Cohort of	1956-57		79.0		
	1957-58		70.5		
	1958-59	VI	67.2		
	1959-60		69.1		
	1960-61		51.9		
	1961-62		74.0		
Cohort of	1956-57			90.4	
	1957-58			71.5	
	1958-59	VII		96.7	
	1959-60			55.7	
	1960-61			76.5	
	1961-62			67.5	
Cohort of	1956-57				61.9
	1957-58				64.8
	1958-59	VIII			71.0
	1959-60				80.7
	1960-61				89.5
	1961-62				96.3

(a) the proportion of children passing to grade II from grade I is higher than that among children aged 6-7 in each of the six cohorts. But it is less than those among boys. The range of variation is from 47 to 64 whereas it is from 53 to 65 per cent among boys.

(b) proportion of girls passing to next higher grades goes on rising till grade V.

(c) thereafter, the proportion of children progressing to grade VI from grade V falls down to a larger extent than among the children aged 6-7 years. The range of variation is from 36 to 53 per cent, whereas it is from 53 to 63 per cent among boys.

(d) proportion of children going to grade VII, VIII and IX from their immediate preceding grade remains above the level of 58 per cent.

(iii) Among the children in the age group 8-9 years:

(a) proportion of girls in grade II to those in grade I is higher than that in the other two age groups in each of the six cohorts. The range of variation is from 65 to 90 per cent whereas it is from 56 to 83 per cent among the cohorts of male children.

This trend of increasing proportion of progression in grade II from grade I as the children grow older in age has been observed in case of both male and female students. The same reasons as have been guessed for male children seem to apply to female students also.

(b) thereafter, the proportions of girls passing to the next higher grade remain more or less the same till grade V.

(c) proportion of girls progressing to grade VI from grade V declines sharply. The degree of decline is higher than that in the other two age groups of 6-7 and 7-8. The range of variation over time is from 27 to 43 per cent whereas it is 47 to 63 per cent among the cohorts of male children.

This trend implies that the progression of class V girls to next class declines as the girls become older in age; and their progression to class VI has been lower than that among male children. The possible reasons for this trend could be the non availability of middle schools for girls within the village; and reluctance on the part of the parents to send their daughters after a certain age, even if the schooling facility exists within the village. Thus as the girls progress in age they are withdrawn more and more from the school system.

(d) but, it is interesting to note that those girls who are able to enter the middle classes try to complete that stage of education irrespective of their age. This fact is reflected in proportions of girls passing to grade VII, VIII and IX from their immediate preceding grade.

Explicit Trends

From the above analysis of grade progression among the six cohorts of male and female students, the following

explicit trends emerge:

(i) the pattern of general trends of grade progression is more or less the same among both male and female students.

(ii) by and large, the level of progression among girls has remained lower than among boys.

(iii) proportion of children progressing to grade II from grade I rises as the children move from lower to higher age group. It is highest among the children in the age group of 8-9 years. As we shall see in the next chapter that there is some amount of 'spuriousness' among the students in grade I. This is quite possible that quantum of 'spurious' enrolment might have been comparatively more among students of lower ages than higher ages. As the students whose enrolment in gradeIis largely just for name, are shown generally as dropouts, the progression among children of lower age would be less than higher age students.

Another plausible reason could be that parents, specially in the rural areas, take their children to school when they are little older and do not withdraw them from the school system easily.

Moreover older children are comparatively more mature than the younger ones and chances of their retention after a certain stage are less than their counterparts.

(iv) Proportion of children passing to grade VI from grade V falls as they move from lower to higher age groups. In other words, the number of dropouts increases with the increase in age. This has been comparatively more prominent among girl students. The reasons for such a trend could be either non-availability of schooling facility after class V within the range of walking distance or the economic importance of children of higher age to their parents especially in the rural area. In case of girls, most probably

marriage comes in their way of continuing with higher education. Moreover, a large majority of girls who continue in middle classes belong to urban areas which can become clear if the data on enrolment by grade with rural urban break down become available.

(v) once the children join middle classes, their progression to each next higher grade remains more or less at the high level.

Some Inconsistencies: In the Tables 6.1 and 6.2, there are some grade progression ratios to the extent of more than one hundred. This is theoretically inconsistent. This could happen because of the following reasons:

(i) The data used for the analysis of grade progression is ungraduated and therefore suffers from age misreporting. As we know that at the time of admission of the child in grade I, the age is entered as is stated by the parents and there exists no provision of asking for the production of age proof of the child. Other sources of age misreporting at the time of child's admission could be the digital preference and recall lapse on the part of the parents.

(ii) Each grade enrolment consists of new comers and repeaters, the sizes of which are not known separately. There is every possibility that during the particular year number of repeaters might have occured mainly in that age group to which the newcomers have entered from the immediate preceding age-group resulting in higher number of children in that particular age group than the immediate preceding age group of the cohort. This will naturally give a proportion higher than a hundred.

Borrowing words of Premi, "the grade succession method requires detailed and historical data on school enrolment by sex, age and grade, number of new enrolments, number of repeaters, etc... Moreover, the grade cohort method implies a regular progression of the grade cohorts with nil or negligible dropouts or repeaters in different grades during the compulsory school age... But in India there is ample number of repeaters and each grade enrolments consists of newcomers as well as repeaters, the sizes of which are not known separately."[1] These limitations have, therefore, resulted in some inconsistencies as we have seen at some places in Tables 6.1 and 6.2.

Inspite of these limitations, the analysis of grade progression among normal age students have revealed interesting patterns of dropouts and repeaters at each grade. Significant among them is the number of dropouts and repeaters at grade I. Although the proportion of children progressing to grade II from grade I has remained low in comparison to that in other grades till grade V, the pattern is different in different age groups. The progression is lower in early age groups than in late age groups of children in grade I.

This low level of progression among children at grade I in comparison to those at other grades needs further investigation. There is every possibility that enrolment at

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1. Premi, M.K., op.cit., p. 84.

grade I may contain a component of 'false enrolment' and thereby exaggerating the wastage at this grade. There is, therefore, need of highlighting this component of enrolment at grade I. Some efforts in this direction has been made in the next chapter.

CHAPTER - VII

ESTIMATION OF SPURIOUS ENROLMENT IN GRADE-I

As we have seen in the previous chapter that the progression of a cohort of children through successive grades of elementary education is different in different grades. The progression of children from grade I to II has been found low in comparison to that in all other grades particularly upto grade V. Sharma and Sapra in their study on Wastage and Stagnation have observed that, "the rate of wastage and stagnation significantly differs as pupils move from grade to grade. The rate is highest (39.33 per cent) when children move from grade I to II. It is 11.06 per cent when they go from grade II to III. The rates for grade III (7.59 per cent) and IV (7.32 per cent) are almost similar. This means that the chances of wastage and stagnation among pupils are highest in grade I."[1]

What could be that which makes the rate of dropouts and repeaters highest among pupils of grade I. In this respect Govind Nayar says, "I have seen that many of the schools do not have the percentage of attendance they claim to have. Many of the students whose names are on the rolls attend the school very rarely. They just show their face on the inspection day... so their presence in the schools has only statistical importance. These students later on figure in the statistical data as dropout

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1. Sharma, R.C. and Sapra, C.L., op.cit., p. 37.

from schools which they are not actually because they never attended school in the true sense."[1] There is, therefore, every possibility of having larger number of such dropouts in grade I than in other grades of elementary education. Enrolment of students who remain on the roll just for the name sake may be defined as 'spurious enrolment.' The present chapter, therefore, aims at:

(i) explaining a methodology for estimating the component of 'spurious enrolment' at grade I; and

(ii) estimating the extent of spurious enrolment at grade I in some years.

Spurious Enrolment and its Causes:

The simple meaning of spurious is 'false' or 'not genuine'. Spurious Enrolment means that children enrolled in different grades are not genuine. However, operationally we have defined the term 'spurious enrolment' as those students who have been continuing to remain on the roll but their attendance is almost negligible.

Spurious enrolment may occur because of many factors different in different areas. In the urban area it may occur because of the fear on the part of the teacher to get declared as surplus and thus be transferred to a place not suitable to him. In the rural area, it may occur mainly because of the

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1. Govind Nayar, T.V., "Elementary Education, State Governments' Failure" appeared in the Indian Express, Newspaper, New Delhi, January 4, 1978.

economic need of the children by their parents who may become apathetic towards attendance of their ward. Another probable cause could be the pressure of universal enrolment from the authority on the poor teacher and as such he may enrol all the eligible children without caring whether they actually attend the school. Like that there could be some other reasons for this type of enrolment especially at grade 1. But the main aim of this chapter is to make an estimate of spurious enrolment at grade I and not merely to discuss the various causes of it.

Methodology for Estimating Spurious Enrolment

The students who donot progress to the next higher grade in one academic year can be divided into three categories- (a) those who actually repeat or dropout, (b) those who die, and (c) those who were enrolled 'superficially'. Dropouts from the school system are both true as well as false. The trend in the data depicts that after grade II, the reduction in the enrolment in each successive grade of a cohort is normal and may, mainly, be because of the effect of mortality and true dropouts. The following one example reflects this point more clearly:

Cohort of Children of Grade-I in the year 1956-57 of Andhra Pradesh

(000's)

Grade	I	II	III	IV	V	VI	VII	VIII
Boys	59	33	27	22	19	15	13	12
Girls	39	21	16	12	9	5	4	3

Abrupt fall is when children move from grade I to II and thereafter the enrolment declines gradually. This suggests two things:

(a) abrupt fall in enrolment from grade I to II may be taken to be made of three components - false dropouts, true dropouts, and mortality;

(b) gradual decline in enrolment after grade II presumably shows the effect of mainly two components--true dropouts and mortality.

If we assume that decline in enrolment after grade II is only because of true dropouts/repeaters and mortality, and the relationship between two variables (enrolment from grade II onward and each subsequent grade) is linear, we can fit a straight line by 'least squares' for grades II to VIII and their respective enrolment after computing the values of the parameters a and b. The equation of the straight line can be made use of for 'backward extrapolation' of enrolment for grade I. This will give value of 'expected' enrolment and its deviation from the 'actual' enrolment will give the estimated quantum of 'spurious enrolment' at grade I. The percentage of estimated spurious enrolment to the actual enrolment will give the 'extent' of spurious enrolment at grade I. The technique to be used for estimating spurious enrolment at grade I is 'backward extrapolation' by 'least square' method.

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Operation Steps Involved

Following operational steps are involved in the

methodology of 'backward extrapolation' for estimating spurious enrolment at grade I:

(i) Independent Variable (X): grades I to VIII are taken as independent variables. In all there will be eight such variables.

(ii) Dependent Variable (Y): enrolment in each of the next higher grade in the subsequent year is taken as dependent variable. In other words, the career of a cohort of pupils in grade I is followed till it reaches grade VIII through subsequent years. For example, a cohort of pupils of grade I in 1956-57 enters grade II in 1957-58, grade III in 1958-59 and so on. Like this the enrolment corresponding to each grade is noted and taken as dependent variable.

(iii) A Line of 'Best Fit' or 'Least Squares': For drawing the line of 'best fit', seven independent variables from grade II to VIII and their corresponding enrolment are taken into consideration. On the basis of these pairs of seven values, values of the parameters 'a' and 'b' are computed. We know that the equation of a straight line is $y = a + bx$ where 'a' is the intercept on the y axis and 'b' is the slope of the line. Values of 'a' and 'b' are computed by applying the following formulae:

$$b = \frac{\Sigma (X - \bar{X})(Y - \bar{Y})}{\Sigma (X - \bar{X})^2} \quad \text{and} \quad a = \bar{y} - b\bar{x}$$

where $\bar{X}$ is the mean of X values
$\bar{Y}$ is the mean of Y values
Σ is the summation.

When values of the parameters 'a' and 'b', are computed, we get the equation for the line of 'best fit' with the help of which we can estimate the value of Y for any given value of X. Let the computed equation for the line of 'best fit' or trend line is:

$$Y = a' + b' x$$

(iv) Expected Enrolment: As we are to estimate the enrolment for grade I, substitute '1' for X in the above equation. This will give a corresponding value for Y which is 'expected enrolment' in grade I. Let it be Y'_1.

(v) Spurious Enrolment: Excess of actual enrolment over the expected enrolment is spurious enrolment. If actual enrolment is denoted by Y_1 and expected enrolment by Y'_1 then spurious enrolment

$= (Y_1 - Y'_1)$

(vi) Extent of Spurious Enrolment: This is taken as the percentage of spurious enrolment to the actual enrolment in a given cohort of children. If spurious enrolment is denoted as Y_s then the extent of spurious enrolment

$$= \left\{ \frac{Y_s}{Y_1} \times 100 \right\}$$

Spurious Enrolment among Boys in Grade-I

Table 7.1 shows the actual, expected and spurious enrolment in grade I of a cohort of male children in the year 1956-57, 1957-58, 1958-59, 1959-60, 1960-61, 1961-62 and 1962-63. The last column gives the extent of spurious

Table 7.1

Spurious Enrolment among Boys in Grade I--Estimated on the basis of a Cohort of Male Children in each of the Year 1956-57 to 1962-63

(000's)

Year	Enrolment in Grade I			Extent of Spurious Enrolment Col. 3 as % of Col.1
	Actual	Expected	Spurious	
0	1	2	3	4
Cohort of 1956-57	590	340	250	42.4
1957-58	630	362	268	42.5
1958-59	650	377	273	41.9
1959-60	680	377	303	44.6
1960-61	740	392	348	47.1
1961-62	870	460	410	47.1
1962-63	850	479	371	43.7

Source: Computed on the basis of data compiled from Ministry of Education and Social Welfare, New Delhi for the years 1956-57 to 1969-70.

enrolment as percentage of it to the actual enrolment in that particular year.

The Table reveals that the extent of spurious enrolment in grade I varies from 42 to 47 per cent during the period from 1956-57 to 1962-63.

The quantum of spurious enrolment in grade I has been lowest (250,000) in 1956-57 and highest (410,000) in 1961-62, whereas the extent of spurious enrolment has been lowest (41.9 per cent) in 1958-59 and highest (47.1 per cent) in 1960-61 and 1961-62.

Spurious Enrolment among Girls in Grade-I

Table 7.2 shows the actual, expected and spurious enrolment in grade I of the cohort of female children in the year 1956-57, 1957-58, 1958-59, 1959-60, 1960-61, 1961-62 and 1962-63. The last column shows the extent of spurious enrolment as percentage to the actual enrolment in the particular year.

The Table reveals that the extent of spurious enrolment in grade I varies from 40 to 51 per cent among the seven cohorts for the year 1956-57 to 1962-63.

The quantum of spurious enrolment in grade I is lowest (168,000) in 1956-57 and highest (330,000) in 1961-62 whereas the extent of spurious enrolment has been lowest (39.9 per cent) in 1959-60 and highest (50.8 per cent) in 1961-62.

Table 7.2

Spurious Enrolment among Girls in Grade-I--Estimated on the Basis of a Cohort of Female Children in each of the year 1956-57 to 1962-63

(000's)

Year	Enrolment in Grade-I			Extent of Spurious Enrolment Col. 3 as % of Col.1
	Actual	Expected	Spurious	
0	1	2	3	4
Cohort of 1956-57	390	222	168	43.2
1957-58	410	233	177	43.3
1958-59	420	244	176	42.0
1959-60	450	270	180	39.9
1960-61	480	287	193	40.2
1961-62	650	320	330	50.8
1962-63	650	334	316	48.6

Source: Computed on the basis of data compiled from Ministry of Education and Social Welfare, New Delhi for the years 1956-57 to 1969-70.

The above analysis of the extent of spurious enrolment at grade I among the cohorts of male and female children during the period from 1956-57 to 1962-63 proves the existence of the same in each year. It further shows that the extent of spurious enrolment revolves around 40 per cent of the children enrolled in Grade-I.

Consistency in the extent of spurious enrolment at grade I in various years prove that the technique used in estimating the same is, more or less, valid. However, the technique is still unrefined and requires to be developed further.

As we have seen in the previous chapter that there are inter-age differences in the proportion of progression of students in grade I to II. There has been lowest progression from grade I to II among children in the age group 6-7; and the progression has been increasing as the students progress in age. As we have mentioned earlier that one possible reason for this kind of trend could be the inter-age differences in 'spurious enrolment'. There is, therefore, need to refine the methodology by estimating 'spurious enrolment' in different age groups of students in grade I.

We have taken the students, who do not progress to grade II, as made of false dropouts, true dropouts and mortality. The estimates of 'spurious enrolment' in grade I needs further improvement by knowing the exact values of dropouts by death, false dropouts and true dropouts.

We have discussed the possibility of different causes of 'spurious enrolment' in rural and urban areas. Different

causes may result in different amount of 'spurious enrolment'. As such there is need to estimate 'spurious enrolment' in rural and urban areas separately. Similarly estimates can also be made for children coming from different socio-economic groups.

All these refinements require detailed data which are not available in any form. Presently our aim has been to suggest a methodology for estimating spurious enrolment in grade I and to highlight the existence of this problem. However, these refinements can be considered only when detailed data become available.

CHAPTER - VIII

SUMMARY AND CONCLUSIONS

Ever since our country became independent, universalisation of elementary education has been our cherished goal. But, despite various efforts, the goal of universal elementary education still remains unachieved. During 1977-78, only 82.8 per cent of the children in the age group 6-11 and 37.9 per cent in the age group 11-14 were going to school. This low achievement from the view point of universalisation of elementary education even after 27 years since the adoption of the Constitution requires an indepth study of the impact of various factors on the progress of elementary education.

The analysis in the present study rests on three pillars of expansion of elementary education. These are universal provision of school, universal enrolment and universal retention. In each of these three stages of expansion of elementary education, there are number of demographic characteristics which interact and try to influence the programmes of educational development. These characteristics include population size of the habitation, age composition of students in various grades, sex ratio, school going age population, literacy rate, etc. All these demographic aspects have been studied here in order to analyse the progress of elementary education.

For the purpose of our analysis, we selected Andhra Pradesh because this is one of those states which has been depicting some disturbing trends in the enrolment as well as in the enrolment ratios during certain years of the last decade. The analysis has also been carried out separately for the rural area of the state, wherever it was feasible.

Time series analysis refers to the period beginning from 1956-57 to 1969-70. The data on enrolment and age relate to March 31 of each year of the period from 1956-57 to 1969-70. The analysis of 'school provision' vis-a-vis population size of the habitation refer to December, 1973 and the source of these data is Third All India Educational Survey conducted by the National Council of Educational Research and Training. For the time series data, the source is the data collected on enrolment by sex, age and grade through the 'State forms' by the Ministry of Education and Social Welfare.

Findings

While analysing the provision of primary schools in the rural areas and its impact on the enrolment, we have studied the pattern of spatial distribution of population, first at the state level and then at the regional level. It is observed that at the state level, the population size of the habitation determines both, school location as well as the flow of children in the school. Larger the population size of the habitation more is the probability of having the schooling facility within the habitation itself, as also

greater is the enrolment of children in the school from that habitation itself. On the other hand, schools in smaller habitations depend largely on the population of nearby habitations for filling even their minimum quota of enrolment. These children generally walk one to two kms.

The analysis at the regional level has revealed that there are inter-regional differences both in the provision of schools and gross enrolment ratios (GER). In Telengana, the proportion of population served by the schools within walking distance of a kilometer is lower than what is found in the other two regions viz. Coastal Andhra and Rayalaseema. This along with certain other reasons has resulted in sharp inter-regional differences in the GER at the primary level. It is lowest (44.3 per cent) in Telengana and highest (79.5 per cent) in Coastal Andhra region. Similarly there are inter-regional differences in the decline of GER when the children are required to walk over a certain distance for learning three R's. In comparison to the children who have a primary school within the habitations, the GER of those who are to walk over some distance, is just one fourth in Coastal Andhra and about half in the other two regions.

The analysis of universal enrolment requires the identification of the factors which influence the enrolment of these children. We made an attempt to identify the 'best' predictors of enrolment ratio at Primary and Middle stages by sex and separately for rural and whole area of the State.

The stepwise multiple regression analysis shows that literacy among persons aged 25 and above is the most powerful factor in determining the enrolment of children at elementary stage in the State. This is because the parents of school going age children, more or less, comprise this age group; and literate parents are comparatively more aware of the value of educating their wards than their counterparts. Next to this, are the factors relating to inter-regional differences in the educational development, child labour and the availability of school within reasonable distance from child's home. The factor of child labour is dominant in the rural area only and has depressing influence over the enrolment ratios of male and female children at the primary stage.

In order to understand the pattern of retention of the pupils in the school system through the elementary stage, we analysed the same in two different ways, namely, (i) heterogeneity in the age composition of the students as they progress to higher grades; and (ii) progression of a cohort of children thmugh each successive grade.

We analysed the mean age, variation from the mean age and proportions of under and over age students in various grades separately for boys and girls. It has been observed that the mean age of students in class I is around 7; and the inter grade differences in the mean age reduces from more than one year to less than one year as the children move to higher grades. This suggests increasing rate of dropouts of students older than the mean age. Variation in the mean age has slided down over the period under consideration suggesting

that the state might have been striving to reduce the heterogeneity in the age composition of the pupils right from grade I onward. Proportions of under age students declines and that of over age students changes marginally probably because the number of overage students had remained so high that droppingout of some of them could not make much difference in their overall proportions. The trends, mentioned above, are almost the same for both boys and girls, except that the degree of heterogeneity is little less among girls than boys.

The analysis of progression of a cohorts of male and female children through each successive grade takes into account the children of three age groups viz 6-7, 7-8 and 8-9 separately. The analysis gives rise to an explicit trend that the progression from grade I to II rises and that from grade V to VI falls as the children grow in age. The first trend might be because of inter-age differences in 'spurious' enrolment in grade I; and the second trend might be because of nonavailability of girl schools within the village and the economic importance of the older children than the younger ones. The level of progression among girls has remained, by and large, lower than among boys, particularly from grade V to VI. But once the students are able to enter the middle classes, they try to complete that stage of education irrespective of their age. Progression from grade I to II has been lower than in other grades particularly

upto grade V.

The study also provides an analysis of 'spurious' enrolment in grade I. The progression of children from one grade to the other grades has revealed that there has been lowest progression from grade I to II than in all other grades. Some other studies have also revealed the same trend. This gives rise to an idea of estimating and highlighting the existence of spurious enrolment in grade I. For this purpose, backward extrapolation technique has been used here by using cohort enrolment data for grades II to VIII. The analysis indicates that there is roughly 40 per cent spurious enrolment in grade I both among boys and girls; and this estimate does not change very much over the years for which the cohorts could be built.

Policy Implications

It is believed that some of the findings of the present study have important policy implications, if the goal of universal elementary education is to be achieved in the foreseeable future.

Sharp inter-regional differences in the decline of GER when the children in the age group 6-11 are to walk over a certain distance from their own habitation to some other habitation for learning the three R's implies that either a school be provided within each habitation irrespective of its size or schools be established in such a way that children of 6-11 age groups do not have to walk

more than a kilometer or so. However, as mere provision of a school within the walkable distance from child's home does not ensure universal enrolment of the children in those villages which the school is supposed to serve, efforts would be needed to motivate children of such villages to attend school.

Literacy among persons aged 25 and above has been identified as the most dominating factor in determining the enrolment of children at the elementary stage. This implies that the National Adult Education Programme launched on October 2,1978, if taken in all seriousness, can help a lot not only in enhancing the enrolment but also in retaining the child in the school system. We can expect its impact in this direction during 1980's.

Similarly, the child labour, identified as a big obstacle in his education, has far reaching policy implication. Despite the legislative measures adopted from time to time, the child labour in our country has been increasing. Recently, J.B. Patnaik, our Tourism Minister, told the Parliament that "the proportion of child labour in all plantations rose from 4.9 per cent at the first survey to 8.4 per cent during the third survey."[1] This means that mere legislative measures can not eliminate the child labour. The crux of the problem is mass poverty.

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1. Indian Express, dated March 26, 1980.

.Parents send their children for bread earning only under severe economic conditions. Overall economic development can, to some extent, reduce the child labour. Simultaneously, the society should also realise its responsibility to let the child go to school.

Declining trend over time in the mean age of children in successive grades implies that we can hope of lesser degree of heterogeneity in the age composition in future and, as such, less pedagogical problems in the classroom. Still the only marginal change in the proportion of over age children suggests that we should make much more efforts in reducing this proportion.

Sudden decline in the proportion of students in Class VI implies that there is a shortage of middle schools in rural areas and more and more middle schools should be provided near the homes of the adolescents, especially for girls.

The existence of spuriously enrolled children in grade I has wide repercussions for the policy makers. This will change the very base of enrolment figures on which the current policies have been framed and, therefore, will need revision of these policies. The present enrolment when adjusted for the spurious enrolment can provide the real state of affairs in different states in India.

Data Gaps

As has been pointed out at various places in this study, there are many gaps in the data which put limitations

on further analysis of the problem. For example, while analysing the inter-regional differences in the schooling facility and enrolment, we could not take into consideration the population size of the habitation because district level data in this respect were not available.

The data collected on enrolment by sex, age and grade through state forms, apart from poor quality, also suffer from certain other limitations. For example, had the data on enrolment by sex and grade with rural-urban break down been available, we would have analysed the areawise continuation of students, particularly girls, in middle classes. Similarly, there is need of collecting data on new comers and repeaters in each grade in order to make the real analysis of grade succession of the children.

Inter-age differences in the progression from grade I to II suggested the possibility of inter-age differences in the degree of spurious enrolment. This required data on enrolment by age, sex and socio-economic status with rural-urban break down. Simultaneously there is need of having mortality by age, sex and area of residence in order to have the real picture of the spuriously enrolled children. Non-availability of these data have limited our exercise in this direction.

Areas of Further Research

The inter-age differences in the progression of children from grade I to II suggest the possibility of inter-age differences in the extent of spurious enrolment in grade I.

Moreover, segregating the effect of mortality amongst the children enrolled superflously will give a refined picture of the problem of spurious enrolment in grade I. This can be further refined by analysing the extent of spurious enrolment for different areas of residence and socio-economic groups to which the children belong. All these questions are suggested for further research on this issue.

Similarly, inter regional differences in the decline of GER when the children are to walk over a distance for attending the school, suggest to conduct a diagnostic study of probable causes of the same. This may need an indepth study of the factors at the village level such as infra-structure facilities like road, conveyance, etc., geographical conditions and socio-economic groups like the proportion of scheduled castes and scheduled tribes population vis-a-vis the availability of the schooling facility.

Conclusions

The present research, on the one hand, has tried to look into some of the issues such as the impact of spatial distribution of population on programmes of educational development and identification of 'best' predictors of enrolment ratios, on the other hand, it has indicated areas for further research by raising issues like inter-grade differences in the mean age, inter-age differences in progression from grade I to II and possibility of inter-age differences in the extent of spurious enrolment in grade I. These aspects need closer examination with the help of more detailed and refined data and can form topics for further research.

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