PLANNING ELEMENTARY TEACHER EDUCATION IN PUNJAB FOR THE PERIOD UP TO 2015 - PROJECTED TEACHER DEMAND

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21 – SS/Ph.D(Edu)/03

DEPARTMENT OF EDUCATION

FACULTY OF SOCIAL SCIENCES

INTERNATIONAL ISLAMIC UNIVERSITY

ISLAMABAD

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A thesis submitted in partial fulfillment

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2012

In the name of Allah,
The Beneficent, the merciful.

Dedicated

To

MY PARENTS

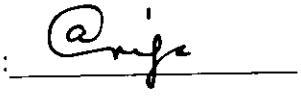
WHOSE PRAYERS AND LOVE

TAKE ME TO APEX OF GLORY AND

TRANSFORM MY DREAM INTO REALITY

STATEMENT OF UNDERSTANDING

I, Arifa Awais Reg. No. 21 – SS/Ph.D(Edu)/03 and student of PhD Education, International Islamic University do hereby solemnly declare that the thesis entitled "PLANNING ELEMENTARY TEACHER EDUCATION IN PUNJAB FOR THE PERIOD UP TO 2015 - PROJECTED TEACHER DEMAND" submitted by me in partial fulfillment of PhD degree is my original work, except where otherwise acknowledged in the text, and has not been submitted or published earlier and so not in future, be submitted by me for any degree from this University or institution..

Signature: 

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(To be submitted to the Department/Institute at the time of Submission of Thesis by the Supervisor)

FORWARDING SHEET

The thesis entitled "PLANNING ELEMENTARY TEACHER EDUCATION IN PUNJAB FOR THE PERIOD UP TO 2015 - PROJECTED TEACHER DEMAND" submitted by Arifa Awais in partial fulfillment of the requirements of PhD degree in Education has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow her to submit this thesis for further process as per IIUI rules & regulations.

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A.A

ABSTRACT

The study was designed to analyze the demographic and enrolment data regarding elementary education in Punjab and to project demand of elementary teachers in Punjab up to the year 2015. The study aimed at estimating the year wise demand of school teachers for classes I to VIII for efficient planning of elementary teacher education in Punjab for the period up to 2015. For this purpose, projected population data were obtained from the National Institute of Population Studies Islamabad for the period upto 2015 and five year population age groups were split into year wise age groups. In this way probable age groups of classes I to VIII for each of the years 2006 to 2015 were obtained. The education statistics on elementary education were obtained from the Bureau of Education Punjab and Academy of Educational Planning and Management Islamabad in order to observe the past trend of the statistics and make decisions for projecting future demand of elementary teachers in Punjab. The education policies were also studied to set the targets for projecting future requirements both in the enrolments for classes I to VIII and projecting demand of elementary teachers up to 2015. The target of bringing 100 percent of 05 year old children to class I by 2015 was set. Similarly year wise pupil teacher ratios of primary and middle classes in Punjab during the years upto 2006 were calculated and, on the basis of this analysis, pupil teacher ratios of 40:1 and 25:1 for primary and middle classes respectively were decided to be used during the projection period. It was found that the year wise demand for additional teachers for classes I to VIII was 17518 in 2009 and 25814 in 2014. It was recommended to manage the supply of elementary teachers accordingly and to manage quality teacher training by matching the demand and supply of teachers in the years to come.

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CHAPTER 1

INTRODUCTION

A programme is likely to prove successful if suitable planning is made well ahead of time. Importance of planning is recognized by all the developed and developing countries of the world as zaidi (2012) defines it "a process of taking decisions for future actions in order to achieve pre-determined objectives". Planning has to be based on accurate data as far as possible. To draw a long-term plan, it is necessary to make projections of the future needs in various sectors of life. It is also necessary to indicate the implications of human resources involved in meeting those needs and set future targets. Establishment of planning Commission by Government of Pakistan is the result of need felt for planning future requirements. In education, planning plays an important role. Education has come to be regarded as a public investment in economic development. It is, therefore, necessary that educational planning should go hand in hand with planning in other national sectors.

In educational planning one has to start the work from population projections and calculate class-wise enrolments in the years to come. The planners in education then calculate the total teacher requirement for these classes. Additional teacher requirements are determined year-wise and thus projected teacher demands are calculated. By determining future demand about teachers with this method, there is possibility of proper match between demand and supply of teachers with the resultant effective planning of teachers.

1.1 RATIONALE OF THE STUDY

Educational plans were developed in Pakistan since independence. These plans have been annual or of five year duration. It was observed that these plans could not achieve their targets. One of the factors in the non achievement of the set targets in education has been the mechanism of the plan development. In the previous plans of education, while calculating the enrolment projections, five year age groups of population were taken as such specially in the area of primary education. The enrolments of class I to V were calculated directly on the basis of 5-9 age groups of the population projections with the result that year wise and class wise dropout rates in classes I to V could not be kept in view. This study calculated year wise and class wise retention rates in the flow of the enrolment data of classes I to V and in classes VI to VIII in Punjab during the period 1995 to 2005 and the retention rates during the projection period (2006 to 2015) were estimated on year wise and class wise bases. Hence this study is an objective effort to work out the future demands for elementary teachers in Punjab.

This study also designed to study the targets set by the previous plans and polices in education and designed to set achievable targets in the years to come. Hence this study is a compromise between the previous slow trend in achieving targets and ideal targets set by the education polices.

1.2 STATEMENT OF THE PROBLEM

Mismatches have been observed in the demand and supply of teachers in Punjab under the "New Educational Policy 1972-80". New primary schools were established in

bulk in 1976-77 and there was shortage of trained primary school teachers at that time. Hence untrained teachers were recruited at certain points of time. In later decades there was surplus of trained elementary teachers but these trained teachers remained unemployed. The planners of elementary education are, therefore, required to work out demand of elementary teachers in such a way that elementary teachers are trained according to the demand in the respective years.

This study was, therefore, designed to analyze the population data of the age groups likely to be the students of classes I to VIII in Punjab, to make enrolment projections of classes I to VIII in Punjab for the years from 2006 to 2015 and to work out the demand of elementary school teachers for these classes for the years 2006 to 2015.

1.3 OBJECTIVES OF THE STUDY

Following were the objectives of the study;

1. To analyze the population data of the age groups likely to be the students of classes I to VIII in Punjab for the years 2006 to 2015
2. To project year wise enrolments of classes I to VIII in Punjab for the years 2006 to 2015
3. To project elementary teacher demand in Punjab for the years 2006 to 2015
4. To make recommendations about elementary teachers required in Punjab during the projection period.

1.4 SIGNIFICANCE OF THE STUDY

Teaching is a challenging profession and as such educational planners need adequate preparation to meet various responsibilities of this challenge. In view of the demand made on teachers by the society, teacher education programmes particularly those leading to the preparation of elementary teachers become more important.

This study is likely to be helpful in ascertaining the demand situation of teachers in classes I to VIII in Punjab for the years up to 2015. Thus findings of this study may be helpful for the planners and educators in preparing future plans in the area of elementary teacher education.

The findings of this study determine year wise requirements of elementary teachers in Punjab on the basis of growing enrolments in classes I to VIII calculated on the basis of future population of increasing age-groups for different classes. Thus the findings of this study are may be helpful for the educational planners in:-

i. setting realistic future targets of elementary education in Punjab,
ii. calculating school enrolments for the plan period,
iii. working out total and additional teacher demands for the plan period and
iv. estimating cost for preparing the required number of elementary teachers.

It is observed that the budget allocations for education in the previous Five Year Plans have been insufficient with the resultant low financial allocations for Teacher Training Programmes. It might have partly been due to the reason that future teacher requirements were not accurately estimated. This study provides reliable information about the future demand for elementary teachers so that the expenditures to be incurred for teacher training programmes are objectively estimated. This study may also serve as

a guideline for the planners in planning elementary Teacher Training Programmes as it focuses on the teacher demand for classes I to VIII.

Keeping in view the additional teacher requirements in future, the curriculum planners may also reassess the needs of teacher training and can focus on the preparation of quality teacher. For this purpose they may determine the teaching methods to be used in the overcrowded classes and may devise special techniques of planning curricula for the enhancement of quality education both in teacher training institutions as well as in elementary schools. In this way this study may also provide guide lines for the curriculum planners.

1.5 METHODS OF THE STUDY

Methods of the study involved document analysis, and projection calculations. These aspects are described as under:

1.5.1 Document Analysis:

An analysis of related documents was made to determine the demand of teachers for elementary classes in Punjab upto the year 2015. Such documents included official documents of Bureau of Education Punjab, and printed documents of Academy of Educational Planning and Management Islamabad.

Besides, pertinent research studies, public documents like statistical year books and Education Index were also used to find out the base line data for the study. Study of education policies and five year plans was also of great use in determining the targets for future plans.

1.5.2 Projections:

There are three stages in making projections:

1. **Population Projections**: Population projections for the period from 2006 to 2015 were obtained from the National Institute of Population Studies Islamabad. These projections were available in the form of five year age groups i.e., 0-4, 5-9, 10-14, 15-19, and 20-24. Internationally accepted Sprague Multipliers (appendix-A) were applied to split these five year age groups into year wise age groups for the age groups 05 to 12 as these age groups were assumed to be the relevant age groups for classes I to VIII during the projection period. Sprague multipliers were used to split five year age groups into year wise age groups, because year wise age groups were not available with the National Institute of Population Studies and the researcher planned to use year wise age groups for projecting class wise enrolments during the projection period as this was the special feature of the study.
2. **Enrolment projections**: These projections were the enrolment estimates of classes I to VIII in Punjab from 2006 to 2015. Past trends of the enrolments were observed on the basis of the enrolments of classes I to VIII in Punjab for the years from 1995-96 to 2005-06. Keeping in view the past trends and targets of education policies, decisions for the future projections were made and year wise enrolment projections for the years up to 2015 were made.
3. **Teachers Projections**: The number of the teachers required in the years 2006 to 2015 were calculated from the enrolment projections for classes I to VIII from 2006 to 2015 in Punjab. Year wise pupil teacher ratios of primary and middle classes in Punjab during the years 1995 to 2006 were calculated. On the basis this analysis,

pupil teacher ratios of 40:1 and 25:1 for primary and middle classes respectively were decided to be used during the projection period for the calculation of teacher requirement of the projection period. The projected teacher requirements thus calculated were recommended to be used as basic data for preparation and supply of elementary teachers for classes I to VIII in Punjab during the period up to 2015.

1.5.3 Projection Calculations:

For enrolment projections, National Educational Policies were reviewed and the trends of enrolments in primary and middle classes prevailing in the province of Punjab were observed and the targets of the National Educational Policy 1998-2010 were studied to decide about the targets set for the projection period.

As regards teacher requirements, the process was completed in two steps:

1. Year-wise total teacher requirements, and
2. Year-wise additional teacher requirements.

In calculating total teacher requirements, previous trends of teacher pupil ratio in the province were studied and latest trends of teacher pupil ratio were calculated to be used in projecting teacher demands for classes I to VIII.

For the purpose of the study the future sizes of school-age population for elementary schools were basically derived from population projections for the period 2006-2015. Enrolments for each year from 2006 to 2015 were calculated by using the enrolments of 2005-06 as base data. All the calculations were carried out manually. The procedures used for calculating enrolment projections, total teacher requirements and additional requirements have been given in chapter 3.

1.6 DELIMITATIONS OF THE STUDY

The study was delimited to the province of Punjab as it is the biggest province of Pakistan having 56 percent of the population of Pakistan. Once the planning of elementary teacher education is developed for the province of Punjab, the other provinces are likely to get the guide lines for the preparation of similar plans in the area of teacher education.

As the study was started in 2007, the base line year was to be taken as 2006 because published statistics on education were available in the government documents upto 2005-06. The period of projection was therefore delimited from the years 2006 to 2015, keeping in view the targets of educational plans and policies.

1.7 ASSUMPTIONS OF THE STUDY

It was assumed for the purpose of enrolment projections that 05 year population age groups are to be admitted as class I students. Similarly the population age groups of 6 to 12 years were assumed to be the relevant age groups for classes II to VIII.

1.8 DEFINITIONS OF TERMS

1 Elementary school level: The school level having classes I to VIII.

2 Attrition Rate: The rate of teachers leaving the schools due to retirement, death, resignation, termination, dismissal or any other reason.

3 Participation Rate: The enrolment in a class as a percentage of the relevant population age group.

4 Wastage Rate: It means percentage of the students who dropout and leave the school due to all reasons

5 Retention Rate: It means the percentage of the retained students after the dropout or wastage.

6 J.V. (Junior Vernacular), 8+1 for primary classes (1-5)

7 S.V. (Senior Vernacular), 10+1 for classes (1-8)

8 C.T. (Certificate in Teaching), 12+1 for classes (1-8)

9 O.T. (Oriental Teacher), one year training after a certificate in oriental language for the instruction of oriental languages.

10 B.T. (Bachelor in Teaching), 14+1 for classes (6-10)

11 IER Institute of Education and Research

12 PITE Provincial Institutes of Teacher Education

13 NITE National Institute of Teacher Education

14 AEPAM Academy of Educational Planning and Management

15 Year-wise means for every year

16 NIPS stands for National Institute of Population Studies

CHAPTER 2

REVIEW OF RELATED LITERATURE

The study was to project enrolment for classes I to VIII in Punjab for the years from 2006 to 2015 and to workout demand of teachers for these classes during the projection period. For this purpose relevant literature was studied and has been presented in this chapter.

2.1 CONCEPT OF PLANNING

According to Robbins (2010) planning is the process of defining an organization's goals, establishing an overall strategy for achieving those goals, and developing plans to integrate and coordinate work activities.

Aggarwal (2008) stated that planning is the formal process of making decisions for the future of individuals and organizations. Planning involves dealing with aims and objectives, selecting correct strategies and programs to achieve the aims, determining and allocating the resources required and ensuring that plans are communicated to all concerned. Plans are statement of things to be done and the sequence and timing in which they should be done in order to achieve a given end.

Zaidi (2012) defined planning as "a process of taking decisions for future actions in order to achieve pre-determined objectives by optimum utilization of available resources in a limited time frame". Thus constraints in the achievement of objectives are time and resources. Here resources include all the three types of resources namely physical (or material), financial and human resources. It is said that

we plan because we have limited resources and we have to achieve our objectives within the constraint of these limited resources.

According to N.K.Mohanty (2012) there can be a possibility of developing plans at various levels in the field of education in any country. Planning is undertaken at more than one level, that is, at various hierarchical administrative units in big and medium sized countries. In many countries the hierarchical units available for planning are national, provincial, district, sub-district and village levels. It may, therefore, be noted that planning for education can possibly be undertaken at these levels. Undertaking planning at lower levels along with the higher units is referred to as decentralized planning. As regards the methodology of planning for education it remains the same whether plans are formulated at higher level or at the lower level.

2.2 TYPES OF PLANNING

There are many types of planning. According to Aggarwal (2008) some of the types of planning are as under:

a. Strategic Planning: It is also known as comprehensive, long ranged, managerial and overall planning. Normally it has three dimensions:

a) Identification of future threats, opportunities and consequences;
b) Process of analyzing the environment of an organization to develop compatible objectives and appropriate strategies to achieve these objectives;
c) Integration of various elements of planning to an overall plan so that everyone in the organization knows in advance what must be done, when and by whom.

b. Operational Planning: It is also known as divisional planning and is concerned with the implementation of long term goals and strategies which have been determined by strategic planning; it is also concerned with improving current operations and with the allocation of resources through budget.

c. Macro Planning: It deals with broad entities having large magnitude, aggregates, averages as national income, per capita income, national expenditure on consumption and income, balance of trade and payment, national population, total enrollment, ratio, age structure etc. It deals with broad plans and it is not concerned with breakdowns between skills and scheme implementation at grass root level.

d. Micro Planning: It starts from grass root level and the heads of schools plan how to bring children in schools and how to retain them.

e. Decentralized Planning: The emphasis of this planning is to delegate the powers from central to periphery levels. In education, planning starts from schools like micro planning in consultations with local authorities according to the constitutions. The planning goes upward to the district, provincial and national level. Different levels of education come under different authorities and they stand accountable for planning these levels.

f. Rolling Plan: In rolling plan, long term plan is revised and each revision is projected forward again for the same period.

g. Contingency Planning: It is a planning technique, which determines actions to be taken by individuals and groups at specific places and times if unusual threats or opportunities arise.

h. Corporate Planning: It is also a technique which integrates all the planning activities of a company, organization or department and relates these to the best overall objectives.

i. Indicative Planning: It focuses on agreement and indication of desirable targets rather than compulsion or decree. It is also known as participative planning.

2.3 MANPOWER PLANNING

It deals with the aspect of future manpower requirement, deployment or development needs. Teachers are principal manpower in the field of education due to which manpower planning is being discussed here in more detail.

Aggarwal, (2008) cited the definitions of manpower planning given by Geisler, Vetter and Coleman. According to Geisler, "manpower planning is the process-including forecasting, developing and controlling by which a firm ensures that it has the right number of people and the right kind of people, at the right places and at the right time doing work for which they are economically most useful". To Vetter "it is the process by which management determines how the organization should move from its current manpower position to its desired manpower position. Through planning the management strives to have the right number and the right kinds of people at the right places, at the right time doing things which result in both the organization and individuals receiving the maximum long-run benefits." To Coleman, the manpower planning is "the process of determining manpower requirements and the means for meeting those requirements in order to carry out the integrated plan of the organization."

Manpower planning according to Aggarwal (2008) has many characteristics, some of the salient ones are; systematic approach, continuity of process, and flexibility. For the purposeful and meaningful planning, systematic approach is the only way to follow otherwise it may give some problems. Systematic approach ensures proper staffing at proper places at proper time in the department to achieve its targets easily. Manpower planning is a continuous process with flexibility of making any change according to the needs and circumstances of the organization.

2.3.1 Aims and Objectives of Manpower Planning:

According to Aggarwal (2008) following aims and objectives of manpower planning are being outlined keeping in view the individual's needs and desires in an organization, company or the department.

1. To ascertain and forecast accurately with the purpose of future requirements of manpower in terms of requisite number and qualified, skilled and talented personnel to meet the future needs, expansions, plans, and new projects.
2. To ensure sufficient data and information available regarding personnel for staff appraisal and their effective and proper utilization in available resources
3. To maintain information, reports and data collection as a continuous exercise of personnel management and to answer any queries about staff situations to the higher management.
4. To find solutions of any personnel problems e.g. any shortage or surpluses and to suggest steps to be taken for the budget for short and long terms.

5. To train and develop manpower potential in the department or organization in terms of performance, skills and capacity.
6. To suggest to the management, formulating transfer, promotion and succession policies regarding managerial and other personnel in the undertaking.
7. To bring about an intelligible and realistic understanding to ensure the management that the department or organization adapts technological, social, political, economical and environment changes according to the needs of the times and situations.
8. To afford an individual opportunities for growth and development of his/her skills, talents, abilities and potential and to ensure that his/her capacities are utilized fully and to the optimum in the best way.

2.3.2 Uses, Benefits and Advantages of Manpower Planning

Aggarwal (2008) has mentioned following important uses, benefits and advantages of manpower planning.

1. Manpower planning ensures effective and optimum utilization of human resources of an organization for the benefit of organization in terms of both quantitative and qualitative requirement in order to meet the target. It also identifies any shortage of skilled manpower and suggests appropriate actions for recruitment, selection and capacity building.

2. It tackles the problems of anticipated surpluses in the organization in a rational way and acts as an efficient control device in the matter of labor costs for the organization.
3. It lends a helping hand in the improvement of overall planning process by emphasizing the importance of sound manpower management.
4. It assists in career planning and management succession plans of the organization.
5. It plays an active role in the stable employment of personnel.

2.4 EDUCATIONAL PLANNING

Educational planning is defined in different ways. The literature available at website: http://www.articles-central.net/Article/Education-Planning.aspx retrieved on October 3. (2009), provides following definitions of educational planning.

1. Educational planning is describing or determining events, conditions or needs of some future point in time. For example: Forecasting number and types of students and expansion of facilities needed for them.
2. Educational planning is a preparation phase in decision making process. It helps to determine the optimal decision.
3. Educational planning is also perceived as a means of generating relevant present or future goals and objectives for the organization.
4. Educational planning is also perceived as operations optimization or performance improvement. It is for the enhancement of existing conditions rather than for those that exist in the uncertain future.

5. Educational planning is problem prevention i.e. it minimizes the magnitude of an educational problem likely to be encountered at some future point in time. It also implies in this sense that educational planning should spell out the procedures to be followed if some crisis arises. For example: Planning for maintaining quality of teaching in case the teachers go on strike.

According to Zaki (1989), in the process of educational planning some basic skills are necessary. The concept of skills in educational planning is the ability to translate knowledge into action simultaneously using the three skills of:

a) Coordinating and integrating all the activities and interests of the education system and society at large- conceptual skills;

b) Understanding and motivating individual and groups – human skills; and

c) Performing the technical activities and analytical tasks – technical skills.

Summing up on education planning, Zaki (1989) says it is:

1. future-oriented and directed toward action;
2. deliberative behavior;
3. related with interlocked decisions in the education and other sectors;
4. allocation of resources among various possibilities of action;
5. an attempt to bring about a balanced development of all sectors of educational system;
6. the correlation of the educational effort with the national policy for economic and social development;

7. an effort to coordinate the quantitative expansion necessitated by demographic factors and social demand with qualitative improvement in content, structure and methods;
8. to ensure that the investment in education brings good dividends in the form of the fulfillment of manpower needs and the overall development of the individual to get maximum out of the limited resources;
9. To accelerate national economic, social and cultural development' to harmonize the desire of parents to have best possible education for their children with the available resources and manpower needs.

2.5 CHARACTERISTICS OF EDUCATIONAL PLANNING

Educational planning as a science has tremendously grown in the last few decades and many new and more sophisticated strategies and techniques have been developed. As per website: http://www.articles-central.net/Article/Education-Planning.aspx, (2009) some of the most important characteristics of modern educational planning are as follow:

1. To set objectives of education after comprehensive and detailed discussions with all the concerned stakeholders in a logical, systematic and scientific manner.
2. The experts and implementers determine the goals and appropriate ways to attain these goals.
3. In the process of educational planning, active participation of all the members of the society particularly parents and teachers are secured.

4. For the implementation of changes in the plan, planning anticipates probable developments and needed changes for the future ahead of time.
5. The planning is remedial and guidance oriented which helps to identify the causes of problems in education and also suggests solution for these.

2.6 APPROACHES OF EDUCATIONAL PLANNING

According to UNESCO (2005), in many countries around the globe, the modernization of public sector management utilizes the design and testing of approaches to the planning and development of education sectors. Some of these approaches are, Medium-Term Expenditure Framework (MTEF), Targeted Budget Support (TBS) and Sector-Wide Approach (SWAp).

MTEF refers to programme and programme budgets and it is contrary to traditional practice of single year budget. It usually covers a period of several years. The following features highlight its importance;

1. It is a detailed sector development programme to identify priorities and set targets to be achieved at the end of medium-term period.
2. It is a detailed estimate of material, personnel and financial resources which are essential for the implementation of programme activities.
3. The allocation for annual budget depends upon the achievement of targets.
4. It is a continuous process which starts at the end of every year with the assessment of progress and it is extended to next year to cover medium-term period.

The MTEF approach of education planning allows the provinces to make a foreseeable budget and flexibility to sequence the activities of the programmes and use of available resources.

TBS is a means which helps to focus the use of resources to achieve the set targets and objectives of an education plan. For example if we focus on the improvement in the quality education at elementary level, the programmes include all related activities essential for the achievement of the target along with resources allocation. It will include teacher recruitment, teacher training, construction and equipment for schools, provision of learning materials for teachers and students etc.

SWAp is a framework of government and donor cooperation in implementation of programmes with joint financial resources. The main focus of SWAp is to increase the cost effectiveness of programmes. The main features of the SWAp concept are that:

1. Donor agencies and government prepare and agree on a sector or sub-sector development programme;
2. Government and donor agencies jointly finance the target sector programme;
3. In this approach, the government is responsible for implementation of the programme.

These approaches namely, MTEF, TBS, and SWAp are often referred to as a Programme-Based Approach (PBA) to planning.

2.7 MODERN EDUCATION PLANNING

According to UNESCO (2005), salient features of educational planning relate to decentralization and programme based approach. In the context of decentralized

educational planning, the central level agency Ministry of education mainly focuses on the responsibilities like;

1. Form, reform and develop strategies of education and national educational plans;
2. Monitor the implementation procedures of national education policies, plans and targets;
3. Ensure proper curriculum development process, training of teachers and student and teachers performance to improve quality of education;
4. Advise provincial level authorities on effective management of education on the bases of results and utilization of resources in cost effective manners.

The functions of provincial level authorities of education also change significantly. Their responsibilities in education are:-

1. Allocation of resources in the province, between different sectors like education, health etc. and within the sub-sectors of education such as Pre-primary, Primary, Elementary, Secondary education etc.
2. Negotiation on the proposed education budget for public funding at provincial level with provincial government and at national level with ministry of Finance, ministry of Planning and other ministries;
3. Drawing medium-term provincial education plans;
4. Setting the priorities of provincial education sectors
5. Monitoring and evaluation of provincial education plans;
6. Preparation of Medium-Term Expenditure Frameworks (MTEF);
7. Preparation and implementation of Targeted Budget Support (TBS) programmes at provincial level;

8. Implementation of large-scale programmes which the government is undertaking in co-operation with donors.

There is another salient feature of the modernization of education management and planning related to the use of programme-based approaches. In a coherent framework, a programme consists of the following elements:

1. Present situation and sector analysis of education;
2. setting of targets and goals to be reached in the future;
3. Assessment of the personnel, material and financial resources required to achieve the set goals and targets of education;
4. List of activities on the bases of priorities;
5. Arrangements of implementation;
6. Arrangements of mentoring.

2.8 PURPOSES AND STEPS OF EDUCATION PLANNING AT PROVINCIAL LEVEL:

According to UNESCO (2005), there are numerous purposes and principles of developing provincial education plans. Some of the main purposes of provincial education planning are:

1. To ensure effective implementation of national education policies, national goals and targets of education to be achieved;
2. To ensure that the targets of education are set and reached at provincial level according to the needs of the province;

3. To convince ministries at central level, education authorities at provincial level, teachers and parents to implement the education reforms;
4. To convince ministry of Finance, Planning and other funding resources to provide required funds;
5. To mobilize private sector and community contribution, particularly to education sub-sectors that are not compulsory and not free (e.g. secondary education and pre-school).

The principle steps of education planning at provincial level include:

Step 1: Situation Analysis

Situation analysis is the first step of educational planning. It includes comprehensive overview of present situation with strengths and weaknesses to identify their causes that point to possible solutions for which targets and action programmes should be included in the plan. The preparation of a comprehensive situation analysis requires a reliable data and analytical tool such as Analysis and Projection model (ANPRO-Model).

According to Caillods.F, to understand the educational situation one may have to analyze education related factors which may have direct bearing on education. Hence an analysis of immediate external environment may be quite helpful in order to understand the educational process that is taking shape in schools and their immediate surroundings. Focus on such education related dimensions is more important to identify constraints.

Step 2: Target Setting

According to UNESCO report (2005), it is the most critical step in the process of educational planning. It is carried out in the form of dialogue among all the possible stakeholders in education, e.g. the office of Prime Minister, the Education Commission of Parliament, the Ministries of Finance, Planning, Education etc., the provincial education authorities and representatives of teachers and parents. The set target written in operational terms indicate what to achieve and when to achieve. Setting realistic targets of education and priorities require a good understanding of present functioning process of education sectors and how present resources are being used. It also requires a thorough understanding of what are the most likely resources available during the plan period, and how we improve the cost-effectiveness of resources. Targets must fulfill the following two conditions;

1. The targets must be in line with the policy goals set by the central government and;
2. The targets must be realistic and feasible in terms of human, material, financial and implementation capacity of the management of education.

The decisions about which targets to be included in the education plan must be result of an extensive dialogue process between the policy level and technical level of planning. Generally the process of dialogue includes;

- Firstly, the education authorities at provincial level identify targets closely reflecting the policy goals;
- Secondly, the planners of education assess the required resources to achieve these proposed targets and;

Thirdly, the discussion proceeds between the education planners and stakeholders about the achievement of initial targets in the light of resources needed. The proposed targets are adjusted if seem unfeasible.

Step 3: Operational Areas

In the preparation of planning document, mainly, three operational areas are included. These operational areas are; access, quality and the management. Each of these operational areas brings together the required actions in terms of goals, technical characteristics, organizational aspects, principal actors, regulatory framework and the specific implementation approach.

Access in education requires all actions needed to achieve set targets aimed at ensuring access of basic education to all school age children with possibility of completing the entire cycle. The actions might be construction of schools, provision of human resources, provision of teaching and learning materials, and particular provisions for minorities.

Quality education is also an important target of an educational plan. It comprises of all actions which are necessary for the provision of quality education. These actions include; curriculum development, teaching-learning materials, teacher training, student assessment, and special actions for specific population groups etc.

Management is the central part of education planning. Actions aimed at improving management skills at all sectors of education, planning and monitoring, evaluation of resource utilization, process of decision making based on information gathered, and financial planning etc. are included in this operational area of planning.

Step 4: Action Programmes

The provincial authorities of education outline the action programmes necessary for the achievement of set targets. These actions identify and spell out what shall be undertaken by whom, when and how. These action programmes also indicate the overall magnitude of the required resources. The examples of action programmes outlined by provincial government will be; an action programme of teachers' recruitment, an action programme of teacher training, and an action programme of setting indicators for quality education etc.

Step 5: Monitoring

Modern education sector management requires planning as a continuous process. Implementation of planning may change the set targets, some targets might be achieved in shorter time; other might require more time to achieve and some times, assumptions may also change. To meet these challenges and threats a regular monitoring of the implementation of the plan provides the information required to update the plan. To enable monitoring to be carried out consistently throughout the plan implementation period, the plan must contain indicators against which the implementation progress can be measured.

Step 6: Provincial Education Plan Document

All the steps described above shape the provincial education plan document. This document is formulated on the bases of the analysis, projections, assessment of resources, needs, and assessment of feasibility.

2.9 FUTUROLOGY AND ESTIMATION

Futurology, according to the website World.princeton.edu (2009), is the science, art and practice of postulating possible, probable, and preferable futures. Futures studies seek to understand what is likely to continue, what is likely to change, and what is novel. In this way Futures studies try to understand future in the light of the past and present.

According to Bell.(1997) future is a field, studying yesterday's and today's changes, and forming opinions with respect to tomorrow. It includes analyzing the sources, patterns, and causes of change and making an attempt to develop foresight about futures. The field is referred to as futures studies, strategic foresight, futurology, futures thinking, and forecasting. According to Bell (1997) futurology is defined as the "study of the future". The term was coined by German professor Ossip K. Flechtheim in the mid 1940s. They proposed it as a new branch of knowledge that would include a new science of probability.

Aggarwal (2008) describes estimation as a process to assess the magnitude of an already existing quantity. It is concerned with inference about the numerical value of unknown population values from incomplete data such as a sample. If single figure is calculated for each unknown parameter, the process is called point estimation. If an interval is calculated with which the parameter is likely, in some sense, to lie, the process is called interval estimation.

According to Siddiqui, (2010) planning involves our perception about future either on short term or long term basis. Perspective planning requires a more critical

look into the alternative futures on fairly long term basis. This crucial need of our time has given rise to a new discipline called Futurology or Future Science. Education being an interdisciplinary subject needs to benefit from the works on futurology. This is so because the children who are born today will start their education five years later and will complete their education about twenty five years hence after. According to Siddiqui (2010) futurology can assist in developing necessary insight and skills to foresee alternative futures and plan to meet the demands of these futures.

2.10 PROJECTION, PREDICTION AND FORECASTING

According to Aggarwal (2008), projection is an estimate of future values based on current trends. This term is used in two connected senses:

a) In relation to a time series, it means the forecast value of the series; a value projected forward from current experience;

b) More recently, it has been used in probability theory to denote the conditional expectation of a variable. Since a regression equation gives the expected value of the dependent variable based upon the values of the predicted (independent) variable, such equations are used for forecasting or prediction.

Prediction is defined by Aggarwal (2008) as 'to tell in advance; to foretell the future; prophesy; to predict the weather and to predict the fall of a civilization etc. It is also referred to the process of forecasting the magnitude of statistical variable at some future point of time. Prediction in the educational context is defined as a probability statement of the degree of scholastic success likely to be achieved by a student,

judgment being based on the case study method with particular emphasis on the result of the scholastic aptitude test scores.

Slaughter (1995) defined prediction as ' to tell in advance; to foretell the future; prophesy; to predict the weather; to predict the fall of a civilization'. It is also referred to the process of forecasting the magnitude of statistical variable at some future point of time. He further defined the prediction in the educational context as a probability statement of the degree of the scholastic success likely to be achieved by a student and judgment being based on the case study method with particular emphasis on the result of the scholastic aptitude test scores.

To Aggarwal (2008), forecasting and Prediction are used synonymously for assessing the magnitude or quantity at some future point of time, as distinct from estimation – which attempts to assess the magnitude of an already existing quantity. It is an estimate of a future trend, event or magnitude on the basis of previous experience.

According to Mehta A.C. (2012), projections are conditional statements about the future. They refer mostly to the exercises of extrapolation of the past trends into the future; and they do not take into account changes in the policy parameters. Projections are based on the assumption that the past trends will continue to operate in the future. The reliability and usefulness of projections depend on the assumption and their closeness to reality. In the long run, the policy parameters are to be incorporated in the projections. When an element of judgment is added to the projections, it becomes a forecast. Forcasts enjoy the advantage of being based upon the assumption or a set of assumptions which are likely to be realized in the near future and can yield a relatively

more realistic picture of the future. In general projections are treated as predictions and are never be termed as final.

2.11 PROJECTION TECHNIQUES

According to UNESCO material presented in the "Processes of Educational Planning" (2011), projection techniques have been discussed in the following phases.

2.11.1 Projection Techniques of School Enrolment

For this purpose the following data needs to be made available.

i. Population projections over the projection period.

ii. Enrolment by grade in the years preceding the base year and

iii. Enrolments and repeaters from the previous years by grade

In estimating the likely trend in the rate during the plan period, the educational planner may base judgment either on the past trends in the admission rates or on policy targets or on the combination of the both. Then the planner has to determine trends of repetition and dropout rates at each grade of the cycle over the plan period. The simplest assumption may be that these rates remain constant over the projection period. Alternatively, a political target might be set for reducing both repetition and dropout rates to zero either immediately on gradually over the projection period. In order to avoid being either too mechanical or over optimistic, the planner needs to bear in mind the following two points.

i. First, in addition to knowing the figures for repetition and dropout rates in the base year, some understanding of why they are and what they are is essential.

ii. Secondly, whatever assumptions are chosen by planners about repetition and dropout rates should be reflected in educational programme.

The discussion on enrolment projection techniques (2011) is concluded on these remarks.

a. Enrolment projections on student flow are based on these factors.

- Population growth
- Higher admission rates
- Changes in repetition, dropout and promotion rates

b. Enrolment projections may be in the form of alternatives each one based on specific policy assumptions

c. The figure work may be handled manually or with the use of computer.

2.11.2 Projection Techniques for the Personnel.

This part includes the techniques for projecting the demand and supply of teachers during the projection period and following steps were proposed by the UNESCO material (2011).

i. The present stock of teachers is measured

ii. Estimation of the number of teachers, who are likely to leave the profession each year.

iii. Calculation of the number of teachers in each year during the projection period and consideration of other factors that affect the future demand of teachers.

iv. Calculation, on the basis of these data, the number of new teachers needed each year during the projection period.

v. The planner has to estimate the number of teachers who leave their jobs. In case there is a fixed retirement age, the number of teachers who will retire each year can be computed. A study of the previous trends is also a method of estimating this loss.

vi. Projecting the need for new teachers amounts to an exercise in manpower planning for the teachers. Once the required manpower is determined, it is the responsibility of the teacher-education institutions to produce the required number of teachers at the required time. For this purpose the pattern of student flow in these teacher training institutions has to be analyzed to establish the input –output ratio. It is to be decided as to how many students should be enrolled in the teacher training colleges in order to produce the required number of new teachers assuming that all graduates do not usually join the schools and some of the enrolled students repeat and dropout.

2.11.3 Projection Techniques of Resources

AIOU (2011) revised the UNESCO material on projection technique (cost & resources) and presented in the book "Processes of Educational Planning". According to this material the projection of resources needs to be done before the projection of cost for the adjustment of cost estimates to the resource ceiling. For this purpose following data are required.

i. Total public educational expenditure (recurring and non-recurring) incurred by the country.

ii. Total Government budget of the country, indicating the ratio of Government budget available for education.

iii. The Gross national or domestic product or national income of the county, enabling the planner to find out the part of GNP devoted for education.

iv. The private investment in education through private schools and parents.

v. Total amount of foreign aid to education sector.

With the use of above data, the educational planner derives the following trends.

a. Trend of growth in public educational expenditure.

b. Trend of growth in education's share for Government budget.

c. Trend of growth in education's share of the Gross National or Domestics product or national income.

Thus the educational planner can estimate the resources available from Government resources. But this much is not sufficient. There are contributions which parents and private organizations make to education in the form of fee, donations and voluntary services.

A certain amount of foreign aid is also available for education through Government policies. Projections have also to be made for these sources on the same lines as done for the public sources of funds. These projections give approximately accurate

estimates of the funds expected for education during the projection period and can be helpful in setting the plan targets.

2.11.4 Projection Techniques of Cost

According to UNESCO material on projecting costs revised by Allama Iqbal Open University (2011), educational cost projections translate qualitative and quantitative plan targets into expenditures which are needed to put the plan into practice. Only when an educational plan has been translated into an educational budget, it can be submitted to the Ministry of Finance for approval. As a rule educational cost projections are not in a single step but in a series of steps. The first step of the cost projection is to project capital cost and recurring cost separately and to combine the projections in order to get total cost projections over the plan period.

2.11.5 Projecting Capital Cost

"Processes of Educational Planning" (2011) has presented the following procedural steps in projecting capital costs.

i. The cost of additional schools to be built, furnished and equipped during the plan period depends on the plan increase of the number of students at different levels of education, and in different areas of the country.

ii. In order to calculate the capital cost required to accommodate these new students, one needs to know the techniques which link up the increase of student numbers with that of capital costs.

iii. The standard, used by educational planners to accomplish this, is the concept of capital cost per students place.

iv. To obtain figures on capital costs per student place, the planner depends on the advice of the architect and cost expert. They will tell how much space is required for each student in terms of classrooms, labs, library, administrative offices, toilets, etc and how much it will cost to provide this standard space per student. To this they will add the cost of utilities, site works as well as furniture and non expendable equipment per student place.

v. Capital cost per student place is thus a normative figure decided upon after consultation with experts. It is not an empirical figure which one might obtain by dividing the capital expenditure of recent years by the number of students in these years.

vi. Once this is clarified, how the planner calculates the required capital cost, a decision will have to be made on the desirable average school size that is, n the number of student places to be provided in each new school. Let us assume that the desirable school size was fixed at 300 student places per school. We would then have to build 10 such schools to accommodate 3000 new students, and each school would cost us 300 times the capital cost per student place which was determined in consultation with the school architect and building cost expert.

vii. One standard cost figure per student place cannot be applied to all types of schools in different parts of country. The planner uses and combines different standards for primary and secondary schools in urban / rural schools.

viii. The planner also has to bear in mind that construction cost will rise during the plan period. A carefully timed building programme is, therefore, necessary to keep capital costs at reasonable levels.

ix. The procedure applied in the costing of capital items may also be modified on account of two considerations in case of under utilizied schools. Firstly, the planner should carry out a survey to identify degree of underutilization of exiting schools before calculating the total number of new schools required. Secondly the planner should also identify the needs for replacement and quality improvement of exiting schools before calculating the total number of new schools required. This type of information is to be used by the planner as the basis for an accurate costing of replacement and improvements.

2.11.6 Projecting Recurrent Cost

The planner projecting the recurrent costs needs to understand and work with the tool of unit cost. Following are the considerations in projecting recurrent cost.

i. Unit cost denotes the amount of recurrent expenditure expended per student in a given year.

ii. Unit cost figures are used to denote the cost structure of the educational system in various ways. Comparison of unit costs at different levels of education may indicate that too much or too little is spent per student at one level.

iii. When using unit cost as a tool of retrospective expenditure analysis, one should always remember that the computation of unit cost in itself does not tell us much. It is only through comparisons that unit costs become significant.

iv. When future student numbers, as foreseen by the plan, are multiplied with unit cost, the planner obtains a crude estimate of future recurrent costs.

v. This basic exercise can be done in a more or less sophisticated manner. As a minimum requirement, it should be carried out separately for primary, secondary, and higher education, because both the amount of unit cost and their developments over time differ widely between these three levels of education.

vi. If data constraints allow only a very crude costing exercise, the planner will take the unit cost figures found for primary secondary and higher education in the base year, assuming that somehow these figures will not undergo any major change in the plan period ahead. He will them multiply these unit cost figures with the students number implied by the plan targets for yeas 1, 2, 3, etc of the plan period.

vii. Unit costs will not remain constant, due to general price increase and also due to improvement in the quality of educational services and facilities provided per student. The planner will take these factors in account by either extrapolating the trend of unit cost over the past

few years or if he fails to have such data, by issuing some realistic future growth rates.

viii. Behind recurring projections are a number of factors which contribute to the growth of recurrent education expenditure. Such factors are teacher salaries, the teacher students' ratio, population growth trends and social demand as reflected in rising enrolment ratios, etc.

ix. In any given year and at any level of education, the recurrent expenditure is equal to the size of the corresponding population age group, multiplied by the enrollment ratio for that level, multiplied further with the sum of average salary and other recurrent costs per teacher, and divided by the student/teacher ratio.

2.11.7 Projecting Aggregate costs

The costing of an education plan requires first a distinction between capital and recurrent costs. For each of these, cost projections are carried out separately. The projection of recurrent costs is, in term, done separately for different levels of education, i.e. primary and secondary. Then at each level, a projection formula is used to expresses recurrent costs in terms population enrolment ratio, teaches salaries, etc. After all this dis-aggregating and separating , the final step of costing an educational plan involves reassembling the partial cost projections to yield an estimate of the total costs implied by the plan in years 1,2,3.....etc. of the plan period. This is also named as the total of capital and recurring costs.

2.12 MULTIPLIERS

Multiplier is a number which indicates the magnitude of a particular macroeconomics policy measure. In other words, the multiplier attempts to quantify the additional effects of a policy beyond those that are immediately measurable.

2.12.1 Multiplier Effect

The multiplier effect describes how an increase in some economic activity starts a chain reaction that generates more activity than the original increase. The multiplier effect demonstrates the impact that reserves requirements, set by the Federal Reserve, have on the U.S. money supply.

2.12.2 A Brief History of Multipliers

According to wikipedia.org/wiki/Multiplier (economics) (2010) past 200 years of Western history can be seen as the story of people gaining access to greater and greater multipliers. Compound interest is one of the greatest new multipliers.

The politics and economics of the world have also evolved over these past two centuries to support the expansion of technological multipliers. Political leaders and regimes only remain popular if they keep increasing the number of multipliers people have access to.

People understand one side of the multiplier mindset that we live in a world of multipliers and they expect things to keep getting better, that things will become easier and more enjoyable, and that ever-bigger results will happen more quickly. But, this is

just one side of the multiplier mindset. The other side is essential. Without it, growth can't be sustained, and dissatisfaction is essential even in this age of multipliers.

2.12.3 Multiplier (Economics):

According to Wikipedia, the free encyclopedia in economics (2010), a multiplier is a factor of proportionality that measures how much an endogenous variable changes in response to a change in some exogenous variable.

2.12.4 Common uses

Two multipliers are commonly used in introductory macroeconomics.

2.12.5 Money multiplier

The money multiplier measures how much the money supply increases in response to a change in the monetary base.

2.12.6 Fiscal multipliers

Fiscal multipliers can be calculated to analyze the effects of fiscal policy, or other exogenous changes in spending on aggregate output.

2.12.7 Keynesian multiplier

According to Wikipedia (2010) Keynesian economists often calculate multipliers that measure the effect on aggregate demand only. Opponents of Keynesianism have sometimes argued that Keynesian multiplier calculations are misleading and it is impossible to calculate the effect of deficit-financed government

spending on demand without specifying how people expect the deficit to be paid off in future.

2.12.8 Sprague Multipliers Used in Population Studies

Sprague multipliers are used in splitting the 5 year age groups of population into year wise age groups. These multipliers are given in appendix A. The use of these multipliers have been given in chapter 4, where the five year age groups have been split for the projected population groups in Punjab for the years 2006 to 2015.

2.13 ELEMENTARY EDUCATION IN EDUCATIONAL POLICIES

a. Major challenges and Issues of Elementary Education

National Educational Policy 1998-2010(1998) summarized major issues and challenges of elementary education which are as follows;

1. More than 5.5 million primary school age (5-9) children were left outs according to the data of 1998. It means that 5.5 million children in Punjab could not be enrolled even in class I.
2. Approximately 45% children dropped out of school at primary level i.e. after enrolment in class I, 45% of the children dropped out at different stages upto class V; thus increasing the number of left outs.
3. Teacher absenteeism is common in schools, especially in the rural areas. Teacher lack commitment and motivation.
4. Instructional supervision is weak at elementary level.

5. About one-fourth of primary school teachers are untrained. However, the present training infrastructure does not appear to improve the quality of instruction.
6. Learning materials are inadequate and of poor quality. Teaching methods are harsh and uncongenial for learning and motivating pupils.
7. Above all, character building, which is the basic fundamental objectives of education and training, is neglected creating serious problems both for the individual and the nation.

b. Objectives of Elementary Education

National Education Policy-1998-2010(1998) highlighted the importance of elementary education as a fundamental right of all people irrespective of gender, sect, religion or any other denomination. The following objectives were set for elementary education in Pakistan:

1. To integrate primary (I-V) and middle level (VI-VIII) education into elementary education (I-VIII).
2. To enhance the gross participation rate at primary level from 71% in 1998 to 90% by the year 2002-03 and 105% by 2010. This can be done by bring the left outs in school system from six year age groups.
3. To increase participation rate at middle level from 46% in 1998 to 65% by 2002-03 and 85% by 2010.
4. To enhance the retention and completion of primary education cycle up to 90% by the year 2010.

5. To ensure the achievement of minimum level of learning up to 90% primary education students by the year2010.
6. To expand and strengthen the base for secondary education.
7. To meet the basic learning needs of the child in terms of essential learning tools as well as the basic learning content.
8. To reduce the existing disparities to half by the year 2010.

c. Implementation Strategy for Elementary Education

National Educational Policy-1998-2010(1998), focused on quality education at elementary level and highlighted the following important steps;

1. Teachers

Service structure of teachers will be revised and merit based hiring of teachers shall be instituted. The transfer rate of teachers will be reduced and effort will be made to recruit local teachers in the schools. The process of leave and attendance will be revised and effective ways will be adopted to check the teachers' absenteeism. In-service teacher training for working teachers shall be revamped and over a period of five years, all elementary school teachers shall be provided with in-service training opportunities and resultantly in-service training on a 3-year cycle basis shall be institutionalized. In-service teacher training shall be reformed and strengthened and best available services such as mechanism of cluster delivery, mobile training in Baluchistan, the experience of Agha Khan in Northern Areas, Teacher Resource Centers (TRCs), shall be evaluated and quality improvement centers will be established in Community Model Primary Schools. The qualification of entry level for Primary teachers shall be raised from Secondary School Certificate (SSC) to Higher Secondary

School Certificate (HSSC) and a new 10+3 diploma course for elementary teacher will be launched. The curricula and instructional material for pre-services teacher training shall be revised. The annual confidential reports shall be revised and linked with performance and promotion possibilities. For the improvement of teachers' performance, incentives and accountability system shall be institutionalized. Qualification and age limit for entry of female teachers shall be relaxed.

2. Innovations in Teacher Training

Following innovations in teaching learning process were set in NEP 1998-2010(1998). Learner centered teaching methodologies and highly interactive process shall be focused. The concept of active learning, development of critical thinking, and creativity shall be encouraged. Teaching of young children at initial stages of education shall be researched and reflected in a suitable training program. For the purpose of good teaching and learning process material like; peer group discussions, class observations, distance education self-study, on-site visits and multi-grade teaching shall be introduced. The theory and practice shall be integrated to the pedagogy and with the content of the knowledge. Teacher training will be given in school in spite of training sites. To improve the teacher training procedures, the partnership between public and NGO/private sector shall be expanded and strengthened.

3. Textbooks and Instructional Materials

The procurement of textbooks shall be non-monopolized along with improving their quality and lowering the cost. At primary level 'Takhti' and 'Slate' shall be re-introduced. Non-Salary recurrent expenditures on texts, basic school supplies, learning materials and procurement shall be increased substantially. Free of charge basic

textbooks and learning materials for poor children shall be ensured at the start of the school year. The availability and use of supplementary reading materials, library books and children literature shall be ensured.

4. Curricula

It has been ensured that, with the passage of time, the curricula of both the private and public schools become uniform. Curriculum of classes from 1-12 shall be re-vamped and linked with teacher training and textbooks reform. All the stakeholders shall be involved in developing new and demanding curriculum. Some emerging issues such as, computer literacy, population and environmental studies, health education, AIDS education, and values education shall be introduced and integrated in the curricula.

5. Access

Approximately 45,000 new primary schools including 20,000 mosque schools and evening/ second shift in 20,000 existing primary schools shall be opened. 187,500 additional teachers for new primary schools shall be recruited. Whereas, 45,000 primary schools shall be upgraded to middle level improving the existing ratio of 1:6 between middle and primary schools to 1:3 by the year 2010. For the promotion of elementary education area/district based targets and programs shall be developed which may be supervised by District Education Authority. Free and Primary Education Act shall be promulgated and enforced in a phased manner.

6. Management and Supervision

An adequate number of competent and committed learning coordinators and supervisory staff shall be deployed for effective management and supervision of

schools. District Education Officers, Assistant District Education Officers, Learning Coordinators and Village Education Committees shall be imparted training in management to improve the quality of administration and teaching in the schools. Technical support shall be provided to the teachers for their improvement in performance and monitoring. The directorates of elementary education shall be strengthened to promote elementary education. Selected management functions in elementary education shall be decentralized towards the district, the school and the community, while helping communities and local bodies organize their effort more effectively. This can be done by the authorities of education at district level in accordance with their needs.

7. Examination and Assessment

A national assessment capacity shall be built by laying down a set of procedures to monitor the aggregate performance at Classes five to eight. The provincial authorities shall be trained to monitor and evaluate the performance of schools and study the associated reasons for their success and failure. Capacity of school teachers shall be improved to measure the student learning systematically. The current examination system administered at the end of primary and middle level shall be reformed.

8. Character Building and Personal Development

The teacher is a role model for the students in the school. It shall be necessary for every institution to design and effectively implement programs and activities for

personality development of the child. Moral values shall be developed in each class from kachi to VIII for practical training and Tarbiyya through various activities such as morning assembly, speeches, declamation contests and other literary programs, games and sports, compulsory 'salat' in school premises, social welfare work, competition in cleanliness etc.

9. Political Will

A high level bipartisan political approach to persuade politicians to lend support to elementary education in achieving policy objectives and resource mobilization and to agree not to be involved in micro management of elementary schools shall be adopted.

10. Monitoring

Performance review studies shall be conducted on key sector institutions for their restructuring

2.13.1 Elementary Education in National Education Policy-2009

a. Suggested Policy Actions

According to National Education Policy-2009(2009) following policy actions were suggested to be taken in order to make the elementary education more effective;

1. All children, boys and girls, shall be brought inside school by the year 2015
2. Government shall make efforts to provide the necessary financial resources to achieve the goals for "Education for All"(EFA).
3. Wherever feasible, primary schools shall be upgraded to middle level.

4. International Development Partners shall be invited through a well-developed plan for expanding school facilities.
5. High priority shall be paid to reduce the drop-out rates. An important element of this effort should be to provide financial and food support to children who drop out because of poverty.
6. Food based incentives shall be introduced to increase enrolment and improve retention and completion rates, especially for girls.
7. Schools shall be made more attractive for retaining the children by providing attractive learning environment, missing basic facilities and other measures.
8. Government shall establish at least one "Apna Ghar" residential school in each province to provide free high quality education facilities to poor students.
9. Every child, on admission in Grade I, shall be allotted a unique ID that will continue to remain with the child throughout his or her academic career.

2.14 DEVELOPMENT OF TEACHER EDUCATION IN PAKISTAN

a. Development of Teacher Education Before 1947

In order to understand the development of teacher education in Pakistan, it is necessary to look in retrospect at the several facets. According to Farooq (1994) the first facet deals with the values that are fundamental and that education remained at high priority in Muslim worlds. The second facet is the creation and development of educational institutions based on the values of a Muslim society. During the Pre-British and British period the character and objectives of educational institutions fluctuated and remained uncertain as a matter of private concern. The third facet is the

development and expansion of curriculum. In the Maktabs (Schools), the curriculum included those portions of the Holy Qura'an which every Muslim was expected to know by heart in order to perform his devotions and religious functions.

The fourth facet is developing the role and status of the teacher in the Muslim society. The domestic system of teaching was practiced during pre-Mughal period in the homes of learned men and women. Mostly the maktabs were adjacent to mosques and the imams were teachers. The income of these teachers were derived from endowments rather than from fees for services rendered as teachers. These teachers were self trained and self appointed and teaching profession was considered a position which did not require any remuneration as such and therefore, everyone was good enough to teach. The system of teacher education did not exist and at the beginning of the British period, the general education of the average primary teacher was poor, hardly better than that of the pupils whom he was expected to teach. Hence training facilities, such as normal schools and training colleges were established.

Evolution of teaching methods in the society of Muslims is the fifth facet of education. As early as the fourteenth century, Ibne-Khuldun was protesting against the methods of teaching that were prevalent in the Muslim West, and he was boasting of the superiority of Oriental methods by which the teaching of the art of writing was separated from instruction in the Qura'an. Akbar introduced a teaching reform which permitted students to learn things in months that previously took years. There were others who were interested in seeking improvement of teaching methods especially Aurangzeb, who objected to learn things without being able to relate them to one's own environment. During the British period, an increased awareness of the needs for the

improvement of methods of instruction was evidenced and attempts at improvement were made through the development of training institutions.

In 1804, two teacher training institutions were established at Karachi and Lahore to impart non-formal teacher training programmes. The institution of Karachi was shifted into normal school in 1854 and it began to offer J.V. (Junior Vernacular) certificate. In 1856, the institution of Lahore was also made a normal school to offer J.V. certificate.

B. Development of Teacher Education After 1947

According to Farooq (1994) in 1947, when Pakistan came into being, the following were the programmes for training of the teachers for different stages of education:

1. J.V. (Junior Vernacular), 8+1 for primary classes (1-5)
2. S.V. (Senior Vernacular), 10+1 for classes (1-8)
3. C.T. (Certificate in Teaching), 12+1 for classes (1-8)
4. O.T. (Oriental Teacher), one year training after a certificate in oriental language for the instruction of oriental languages.
5. B.T. (Bachelor in Teaching), 14+1 for classes (6-10)

2.15 TEACHER EDUCATION IN EDUCATIONAL POLICIES

a. The First Educational Conference-1947(1947)

A committee on teacher training agreed that a properly trained and reasonably well paid profession of teaching was essential to build up a great nation. It was

suggested that the provinces should take necessary action to ensure proper training of teachers.

b. Commission on National Education-1959(1959)

The report of commission on National Education-1959(1959) presented a comprehensive report on development of teacher education and suggested that it was necessary to establish training colleges for teacher training. According to the Commission 1959, the following programmes were essential:

1. There should be a staff training college in each wing of Pakistan to impart training to primary school teachers
2. The proposed training institutes should include a research unit where educational problems relating to training of teachers can be investigated
3. The selection of each member of these institutions should be made at the end of every five years- to serve as a teacher in a typical school so that he or she may keep him/herself thoroughly acquainted with school needs and problems.

c. The National Educational Policy, 1972-80 (1972)

In 1972, there were 160,000 teachers at elementary and secondary school levels in Pakistan and it was estimated that in next eight years 250,000 elementary and secondary teachers were required along with 3,00,000 additional adult and continuing teachers. In 1972, there were 12 teachers training colleges and 55 teacher education institutions, and these institutions had the capacity of producing about 104,000 teachers in next eight years. In order to meet the additional requirements of trained teachers, the study of education as a subject, was suggested to be introduced in secondary schools and in general colleges. The students passing in this subject at the matriculation,

intermediate and degree level were suggested to qualify as primary, middle, and secondary teachers respectively.

d. The National Education Policy-1979 (1979)

Teachers play important role in nation building process through promotion of quality education in the classrooms. Good teaching demands that besides possessing adequate knowledge of the subject matter and techniques of teaching, the teacher must also exhibit full commitment to the ideology of Pakistan. In order to ensure continued professional growth, the teacher was required to undergo at least one in-service training course during every five years. In Pakistan, Allama Iqbal Open University (AIOU) had already launched a comprehensive programme for the training of teachers. This programme was recommended to be further strengthened to orientate the massive number of teachers at all levels. In order to promote pre-service teacher training, all the primary teacher training institutes and normal schools were recommended to be upgraded to colleges of elementary teachers. The Academy of Higher Education of the University Grants Commission (UGC) was also to provide pre-service and at least one in-service training opportunity to all the university and college teachers every five years.

e. The National Education Policy-1992(1992)

This policy recommended improving the quality of education at all levels and delivery of primary, middle and high school levels of education through improvement of teacher training programmes and enhancement of instructional material and teaching aids. The policy emphasized the need to motivate teachers to improve the effectiveness

of teaching learning process. For this purpose, it was suggested to start a system of rewards, incentives, career opportunities, teaching facilities and to provide prominent status to the teachers in the society.

f. The National Education Policy-1998-2010(1998)

The policy emphasized that the duration of primary school teaching certificate was far below the norm of other developing countries in the world. To overcome this deficiency, it was proposed that the primary level teacher training programmes should start after matriculation and of three years of duration. In this three years diploma, the teacher was exalted to study up to the higher secondary school level as well as to obtain pedagogical skill for teaching at primary level. In 1998 only a few institutions in the country offered an integrated programme at B.Sc plus B.Ed. level known as BS.Ed programme. This programme proved successful as it attracted students at F.Sc. level and inducts them in the teaching profession. It was proposed to expand this facility horizontally to general education to obtain B.A. B.Ed in the same manner. The students of these programmes were recommended to have the opportunities to continue their studies at M.A., M.Sc. or M.Ed. level.

The M.Ed. degree was proposed to be improved to produce a corps of trained educational administrators and supervisors. The university departments of education and Institutes of Education and Research (IERs), the leading colleges of education in the country were also recommended to offer this degree programme so as to cater to the expanding needs of the country.

Provincial Institutes of Teacher Education (PITE) were decided to impart training in management and supervision to all headmasters/headmistresses and personnel of supervisory cadres to achieve the good governance in educational institutions. A National Institute of Teacher Education (NITE) was proposed to be set up at national level for the improvement of capacity of the academic staff working in teacher training institutes in the country. The curricula of teachers' training programmes offered by different institutes and department will be improved so as to make these programmes learner-centered (GoP, 1998).

g. National Education Policy- 2009(2009)

According to National Education Policy- 2009(2009), there was a consensus amongst all stakeholders that the quality of teachers in the public sector was unsatisfactory. Poor quality of teacher in the system in large numbers was owed to the mutations in governance, an obsolete pre-service training structure and a less than adequate in service training regime. Presence of incompetence in such a huge quantity and permeation of malpractices in the profession have eroded the once exalted position enjoyed by teachers. Teaching has become the employment of last resort of most educated young ones; especially males. Reform is required in all areas: pre-service training and standardization of qualifications; professional development; teacher remuneration, career progression and status; and governance and management of the teaching workforce. The growth of private sector was considered to be adding new complexities to the teaching profession and needed to be taken into account in any reform of the system.

h. Suggested Policy Actions

According to National Education Policy-2009(2009), following were the suggested policy actions:

1. A Bachelors degree, with a B.Ed., shall be the requirement for teaching at the elementary level. A Masters level for the secondary and higher secondary, with a B.Ed., shall be ensured by 2018. PTC and CT shall be phased out through encouraging the present set of teachers to improve their qualifications, while new hiring shall be based on the advanced criteria. Exceptions shall be made in case of less developed areas where teachers with relevant qualifications are not available. Diploma in Education (D.Ed) may be used as an intermediate qualification till B.Ed teachers are available universally.
2. Teacher training arrangements and certification procedures shall be standardized and institutionalized.
3. Teacher education curriculum shall be adjusted to the needs of the school curriculum and scheme of studies. The curriculum shall include training for student-centered teaching, cross-curricular competencies, and an on-site component.
4. A separate cadre of specialized teacher trainers shall be developed.
5. Governments shall take steps to ensure that teacher recruitment, professional development, promotions and postings are based on merit alone.
6. All teachers shall have opportunities for professional development through a programme organized on a three-year cyclic basis. Progress in career shall be linked to such professional development.

7. In service teachers training in mathematics shall be given with due attention to developing conceptual understanding, procedural knowledge, problem solving and practical reasoning skills.
8. In service teacher training in science shall be based on real life situations, use of science kits and provision of science kits to all primary and middle schools.
9. Teacher allocation plans, likewise, shall be based on schools needs and qualifications of teachers. Over the course of next two years, Governments shall develop a rationalized and need-based school allocation of teachers, which should be reviewed and modified annually.
10. Provincial and Area Administrations shall develop effective accountability mechanism including Educational Management Information Services (EMIS) data on teacher deployment, to control absenteeism and multiple job-holding,
11. Institutionalized and standardized in-service teacher training regime shall be established in those provinces where it has not already been done.
12. In-service training shall cover a wide range of areas: pedagogy and pedagogical content knowledge; subject content knowledge; testing and assessment practices; multi-grade teaching, monitoring and evaluation; and programmes to cater to emerging needs like trainings in languages and ICT.
13. Training needs shall be assessed on the basis of research and training programmes.
14. Governments shall take steps to improve social status and morale of teachers. These include: Upgrading of teacher salaries as part of establishing a separate

teaching cadre and teaching career; teachers' professional development, and a reward system based on performance measures.

15. Incentives shall be given to teachers in rural or other hard areas at least to compensate for loss in salary through reduction of various allowances given for urban but not for rural postings.
16. The teaching workforce shall be managed on a truly professional basis, organized as a specialized function.
17. In-service teacher training institutions shall pay emphasis on developing the capacity of teachers and schools managers for school development plans to overcome low achievement scores.
18. Special short terms courses for improvement of language skills for rural areas teachers shall be designed.
19. The voice of teachers associations shall be given due consideration in decisions on collective issues affecting teachers.
20. Governments shall aim to draw upon resources from the private sector through public-private partnerships, especially in the areas of teacher education and professional development programmes.
21. International Development Partners' resources shall be harnessed within a broad national programme of teacher improvement for the country as a whole through inter-tier collaboration.
22. Maximum age limit shall be waived off for recruitment of female teachers.

It is clear from the review of Education Polices, that the emphasis on elementary teacher education is gradually increasing. Keeping in view the recommendation s of

National Education Policy-2009(2009), the elementary colleges of education in Punjab have been placed under the umbrella of Education University Lahore.

B.Ed elementary has been initiated in line with suggested policy action of the National Education Policy 2009. There is, therefore, need for the future educational planners to take care of these variables when planning elementary teacher education in Punjab specially in the area of supply of elementary teacher.

2.16 DEMAND AND SUPPLY

According to Klein (1983) and Cuthbertson (1985) following are the four basic laws of demand and supply.

1. If demand increases and supply remains unchanged, then it leads to higher equilibrium price and quantity.
2. If demand decreases and supply remains unchanged, then it leads to lower equilibrium price and quantity.
3. If supply increases and demand remains unchanged, then it leads to lower equilibrium price and higher quantity.
4. If supply decreases and demand remains unchanged, then it leads to higher price and lower quantity.

Economics is the social science that deals with the production, distribution, and consumption of goods and services.

SUPPLY refers to the varying amounts of a good that producers will supply at different prices; in general, a higher price yields a greater supply. Demand refers to the quantity of a good that is demand by consumers at any given price.

According to website www.questia.com (2012) theories of supply and demand had their roots in the early 20th century theories of Alfred Marshall, which recognized the role of consumers in determining prices, rather than taking the classical approach of focusing exclusively on the cost for the producer as a determinant. Marshall's work brought together classical supply theory with more recent developments concentrating on the utility of a commodity to the consumer. More recent theories, such as indifference-curve analysis and revealed preference, offer more flexibility to the supply and demand theories created by proponents of marginal utility.

The method of planning wherein demand and supply are matched is used on determining the future needs of demand or future requirements of manpower. Hence it is usually named as Manpower Requirement Approach (MRA) to educational planning.

According to John Mace (2001), this method is about the forecasting of future demand for educated manpower. 'Demand in this case is used in different sense from the way economists use it. Demand for manpower refers to the number of workers to be employed. Following methods have been given by John Mace (2001) for forecasting manpower requirements for the future.

The Employers'-Openion Method

This method simply consists of asking employers how many workers and of what kind they plan to employ in the next few years.

The Incremental Labour-output Ratio Trend Method

The term 'labour' in this method refers to a particular labour category, and 'output' to industrial or national output. The trend in the ratio of labour to output is used to estimate future manpower 'needs'.

The Density-Ratio Method

This method consists 'firstly' of estimating stable fractions of the qualified manpower in the labour force of an economic sector...and, secondly, of applying this fraction to demographic forecasts of the total labour force as distributed among the various sectors'. Alternatively, the technique can be applied to given ratios between two types of manpower, for example, engineers to technicians. Adjustments can be made for 'improving' ratios, such as the teacher-pupil ratio in case of educational planning.

The International Comparison Method

This method presumes that there exist 'world manpower growth paths'. All a country needs in order to achieve a given level of output is to examine the manpower distribution of a country that has that output, and plan to achieve a similar manpower structure.

The Mediterranean Regional Project Method (MRP)

This method combines aspects of the other approaches and proceeds through the following six stages.

1. It begins with the initial 'target' GNP in some future year.
2. This target GNP is broken down by major sectors, e.g. agriculture, manufacture, transport.
3. An average labour-output coefficient is applied to the sectoral or GNP targets, and this yields a forecast of labour requirements by sector or industry.
4. The labour force is then distributed among a number of mutually exclusive occupational categories.
5. The occupational structure of the labour force is converted into an education structure by estimating the formal education required to perform each occupation successfully.
6. The figures compiled are adjusted to allow for deaths, retirements, and emigration, and this replacement figure is added to the additional manpower required to meet the target GNP. After these calculations have been made. The planner forecasts demand for educated people, conditional on the achievement of the GNP target.

The above mentioned methods are commonly used in calculating the educational requirements and demands for different sectors of economy. Having determined the manpower requirements, the planners compare this demand with the anticipated supply of workers available on the basis of current out flow of education system. The difference between the supply and demand indicates the desired increase of enrolments in order to meet the set targets. In this way the planner calculate required increases in the enrolments of educational institutions and increases in the requirements

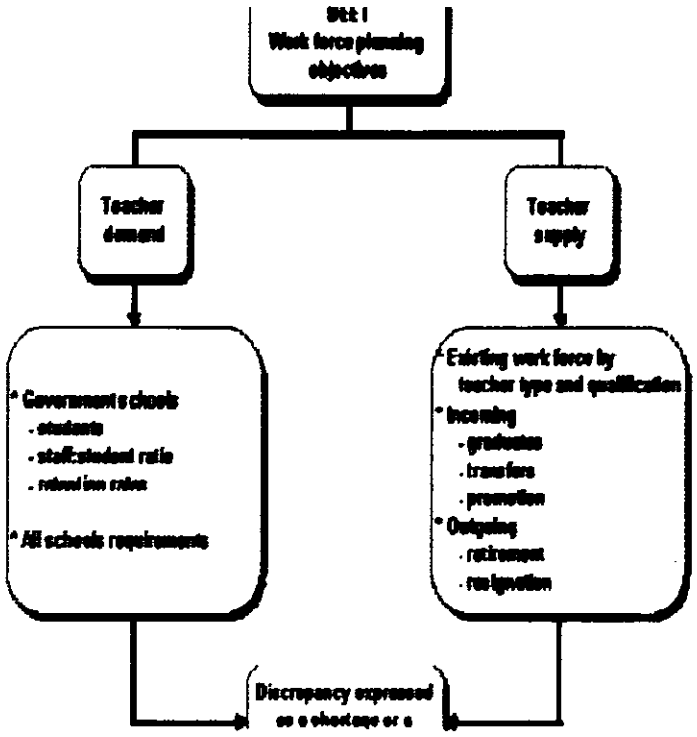
of teachers, building and equipment. Further the costs for the supply of these requirements are also calculated for the plan period.

According to john Mace (2001), the merit of this demand approach (MRA) in educational planning is twofold; it enables long-term educational planning and it yields exact numbers of manpower required. Given these two advantages of the manpower-requirements approach (MRA), it is hardly surprising that the approach has made such appeal to educational planners and has, become 'the leading method throughout the world for integrating educational and economic planning'.

Techniques Used to Assess the Supply and Demand of Teachers

According to website www.mceetya.edu.au (2012), various types of techniques are used to assess the supply and demand of teachers. These techniques often require data from education institutions, government agencies and education bodies to provide insights into the supply of teachers. According to this website, models and projections on teacher supply and demand do not attempt to make exact predictions of teacher shortages or surpluses but attempt to provide some understanding of the expected teaching environment in the future. This information then informs governments and education institutions in order to anticipate any potential education issues that may be combated with supply and demand policies.

In the coming pages two models have been presented. One model has been presented by Galbraith (1999) and the second model is an effort of U.K. Department for Education and Employment (1998).



Galbraith (1999) in his paper "Forecasting Teacher Supply and Demand" states that while the search for exact solutions is sometimes futile, this does not mean that results of value cannot be achieved. Furthermore, he states that the management of the supply and demand problem can be improved through better insights into the complex relationships that exist between variables. He also believes that while all studies refer to supply and demand, technical modeling projections have focused on demand issues, with supply being treated as if universities could produce the necessary number of graduates on call if only these numbers were predicted

Preston (2000) writes that her model is comprehensive in that all the relevant factors are fully taken into account on both the supply side and demand side including:

• fully incorporating the non-government as well as government sectors in student enrolment projections, teacher numbers and other factors; estimating actual teacher numbers, not full-time equivalents;

• in estimating net separation rates, taking account of non-availability after a period of casual or limited term employment,

• accounting realistically for graduates from previous years who had been unable to gain teaching positions;

• ensuring that the supply and demand figures are provided on a comparable basis,

• providing shortfalls or surpluses

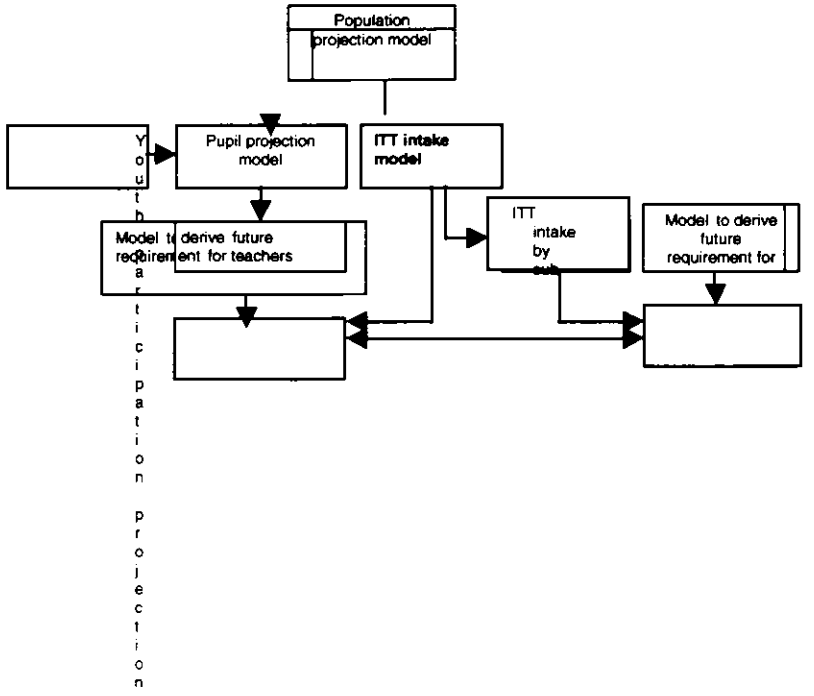
The UK Department for Education and Employment (1998) (now the Department for Education and Skills) based their teacher supply and demand projections on three main models described below.

• The Teacher Supply Model (TSM) (see figure 2). This model takes into account the movements of teachers into and out of nursery, primary and secondary schools.

• The Initial Teacher Training (ITT) Intake Model. This model estimates required ITT intake from the numbers of completers that TSM indicates to maintain supply.

• The Secondary Teacher Supply Model (STSM) breaks down the Teacher Supply Model for secondary teacher numbers.

UK Department for Education and Employment



Source: UK Department for Education and Employment (1998)

In brief different models are devised by different countries keeping in view their own circumstances. The Government of Pakistan in 1986 adopted a model to determine the demand of elementary teachers in Punjab for the years upto 1990. The same model as mentioned in chapter 3 has been used to project the requirements of elementary teachers in Punjab for the years 2006-2015.

2.17 RELATED RESEARCH STUDIES

UNESCO projects global enrolments by level of education and age at different points of time. According to UNESCO (1989), the total enrolments of world at primary, secondary and tertiary levels were projected to be around 1505 million in 2025 i.e. 21 percent increase between 2000 and 2025 and the enrolment rises in the developing countries were projected as under:

a) For Africa, the enrolments were projected to be on increase during 2000 to 2025 in absolute numbers compared to the enrolments registered in previous years.

b) For Latin Africa and Caribbean, the expansion of enrolment was projected to be smaller during 2000 to 2025 due to expected smaller increase in the school age population during this plan period.

c) For Asia and Pacific, in general, a reduction in the expansion of enrolment was projected between 2000 and 2025. This trend was to be heavily influenced by the projected decline in the school age population for China.

d) For both the least developed countries and the Arab States, the enrolment increases were projected to continue at slower pace upto 2025.

Hussar W.J and Tabitha M. Bailay (2011) conducted projections of Education Statistics for U.S.A upto the year 2020. According to this report, total public and private elementary and secondary school enrolment was 55 million in USA in fall 2008. The procedure of calculating the projected enrolments includes the factors like dropout rate, deaths, non-promotion, and transfer to and from public and at the state level migration rates.

According to this report:-

1. Enrolments in elementary and secondary schools in USA:
   a) have shown an actual increase of eight percent between the years1995 to 2008 and
   b) were projected to increase five percent in 2020 over the enrolment of 2008 at all the three levels of education.
2. The enrolments in pre-kindergarten to grade 8:
   a) have shown an actual increase of four percent between the period 1995 to 2008 and
   b) show a projected increase of additional eight percent between the plan period w.e.f 2008 to 2020.
3. Enrolments in grade 9 to 12:
   a) Increased 19 percent between 1995 and 2008 and
   b) projected to decrease less than one percent between the plan period 2008 to 2020.
4. Enrolments in public elementary and secondary schools
   a) increased 10 percent between 1995 and 2008 and
   b) were projected to increase an additional seven percent between 2008 and 2020
5. Enrolments in private elementary and secondary school
   a) decreased four percent between 1995 and 2008 and
   b) were projected to decrease eight percent between 2008 and 2020
6. Between 2008 and 2020, enrolments in public elementary and secondary schools were projected to
   a) decrease 1 percent for students who are white

b) increase 1 percent for students who are black

c) increase 25 percent for students who are Hispanic

d) increase 36 percent for students who are Asian/Pacific Islander and

e) increase 17 percent for students who are American Indian/Alaska Natives

7. The expected 7 percent national increase in public school enrolment between 2008 and 2020 plays out differently among the states.

   a) increases are projected for 36 states and the District of Columbia, with

      increases of more than 15 percent projected for 8 states

      increases between 5 and 15 percent projected for 17 states and the District of Columbia, and

      increases of less than 5 percent projected for 11 states

   b) Decreases are projected for 14 states , with

      decreases of 5 percent or more for 3 states; and

      decreases of less than 5 percent for 11 states

8. Between 2008 and 2020, public elementary and secondary enrolment were projected to

   a) decrease 3 percent in the Northeast

   b) increase 1 percent in the Midwest

   c) increase 10 percent in the South and

   d) increase 13 percent in the West

9. The total number of elementary and secondary teachers

      increased 23 percent between 1995 and 2008; and

      is projected to increase 7 percent between 2008 and 2020.

10. The number of teachers in public elementary and secondary schools
    increased 24 percent between 1995 and 2008; and
    is projected to increase 9 percent between 2008 and 2020.
11. The number of teachers in private elementary and secondary schools
    increased 19 percent between 1995 and 2008; and
    is projected to decrease 4 percent between 2008 and 2020.
12. The pupil/teacher ratio in elementary and secondary schools
    decreased from 17.1 to 15.0 between 1995 and 2008; and
    is projected to decrease to 14.7 by 2020.
13. The pupil/teacher ratio in public elementary and secondary schools
    decreased from 17.3 to 15.3 between 1995 and 2008; and
    is projected to decrease to 15.0 by 2020.
14. The pupil/teacher ratio in private elementary and secondary schools
    decreased from 15.7 to 12.8 between 1995 and 2008; and
    is projected to decrease to 12.3 by 2020.

Alam (1970) conducted a study entitled "Cost Projections for Bachelor of Education, Master of Education and Master of Arts in Education Degree Programmes in West Pakistan for the years 1969 to 1988" . In his study, he analyzed the cost factors involved in the cost projections for these teacher training Programmes. In making projections the methodology involved in an Asian Model of educational Development-Perspective was used. According to this model the cost for teachers' training institutions could be calculated from the enrolment projections for teachers' training institutions which in turn could be determined from the school enrolments. The researcher therefore,

made these projections with the use of the modified formulas of the model. In calculating the total teacher requirement a pupil teacher ratio of 17:1 was used and an attrition rate of one percent was used to calculate the additional teacher requirement. An annual inflation rate of 2.5 percent was used in projecting cost for the teacher training institutions for the period 1969 to1988. The main findings of the study were as under:

1. The enrolment of teachers' training institutions was observed to increase nine times over the projection period if the past trend of school enrolments continued.
2. The enrolments of teachers' training institutions were projected to be 18 times more than the base line data in case the target of universal education set by the educational policy were to be achieved by the years 1984 and 1989.

The study recommended the establishment of new institutions of teachers' training in case the targets set by the education policies were to be achieved. Provision of funds for capital expenditure was also recommended and it was proposed to carry out such projection studies after frequent intervals of time. It was also suggested to find out alternate measures to meet the requirements of future in the area of teacher education and also proposed the shift of the target of universal education for some handsome period of time.

Government of Pakistan (1986) conducted a research study entitled "Demand and Supply of Primary and Middle Schools Female Teachers in Pakistan for the period 1981-1990" under the sponsorship of the World Bank. The study aimed at analyzing the data of primary and middle school female teachers in Pakistan and making projections for the demand of these female teachers in Pakistan for the period 1981to 1990. The study was a part of research component of the Third Education Project, Ministry of Education,

Government of Pakistan. The main objectives of the study were to project the year wise demand of primary and middle school female teachers in Pakistan for years 1981 to 1990 and to determine the situation for the supply of these teachers during projection period. The purpose was to use these projections in the Third Education Project.

This study projected teacher requirement year-wise and for each province of Pakistan, the discussion was divided into (a) demographic projections for the projection period, (b) enrolment projections for the primary and middle schools for girls during the years 1981 to 1990, and (c) teacher requirement in primary and middle schools for girls during the projection period. The main findings of the study were as under:

1. In Punjab, primary school enrolments for girls were projected to increase to 2984 thousands in 1990-91 if the target of 75 percent participation rate was to be achieved by the end of 1990-91. Similarly, three time increase in the primary school female teachers was projected during the projection period at the maximum pupil teacher ratio of 40:1 in the primary schools up to 1990-91.
2. In Punjab, middle school enrolments for girls in classes VI, VII, and VIII were projected to be 2,291,000 in 1990-91 as compared to 1768 thousand girl students in these classes in 1981-82. Similarly, more than three times increase was projected in the demand of additional middle school female teachers in 1990-91 as compared to this demand in 1981-82 , in case pupil- teacher ratio of 25:1was to be achieved by the end of the projection period.
3. Similar projections were made for the provinces of NWFP, Sindh, and Baluchistan with the result that

a) In NWFP and in Sindh, the study projected five times increase of additional female teachers for classes I to VIII over nine years of the projection period (1981-82 to 1990-91).

b) In Baluchistan, the projected demand of female teachers for classes I to VIII increased thirteen times in 1990-91 over such demand in 1981-82.

The study projected year wise and province wise requirements of female teachers for classes I to VIII during the decade of projection and matched the supply of teachers to be trained through the colleges of education in order to calculate the year wise imbalances of demand and supply of teachers in the primary and middle schools for girls during the projection period.

It was recommended to establish additional colleges of education for women in each province in order to meet the growing teacher requirement in the school system. It was also proposed to the authorities of the Third Education Project to avail the teacher training facilities of Allama Iqbal Open University, Islamabad in order to plan and regulate the supply of teachers well in time.

In education policies targets were set based on some type of research studies. The Education Policy 1972-80(1972) ensured free education for classes I to VIII and envisaged education to be universal for boys by 1979 and for girls by 1984. Accordingly, the enrolment of classes I to V was projected to increase from 46 lakh in 1972 to 96 lakh in 1980, thus raising the participation rate of primary school children in Pakistan from 48 percent in 1972 to 85 percent in 1980.

In classes VI to VIII, the enrolment was projected to increase from 10 lakh in 1972 to 33 lakh in 1980 in Pakistan; thus raising the participation of middle class students

from 20 percent in 1972 to 55 percent in 1980. This universalization of elementary education in 1972 was expected to require 2.25 lakh additional teachers. In order to meet this demand, 75000 teachers were expected to be prepared through the regular colleges of education; 75000 through general stream of education by offering a new optional subject of teacher education and remaining 75000 teachers were planned to be prepared through the establishment of a National Literacy Corps drawn from unemployed persons, retired civil servants, ex-service men and university/ college students.

National Education Policy 1979(1979) shifted the targets of universalization of education and all the boys of class I age to be enrolled by 1982-83 and targeted boys of class I to V to be enrolled by 1986-87. In case of girls the universalization up to class V was planned to be achieved by 1992.

In classes I to V the enrolment of children of relevant age groups in Baluchistan was 30 percent, in NWFP 50 percent, in Sindh 42 percent and Punjab 48 percent in 1967-68, according to this policy (1979) In order to achieve the targets of universalization of primary education, the policy visualized the establishment of Mosque schools, Mohallah Schools and Village Workshop schools and allocated funds for developmental and recurring expenditures for primary education for each year during the five year plan period 1977-78 to 1982-83.

National Education Policy-1992(1992) also projected the enrolment and worked out the teacher demand of primary education and secondary education levels and these are mentioned as under

Table 1: Targets of National Education Policy 1992

Policy Targets	1992	2002
1. Primary Schools	1,24,000	2,30,957
Enrolment (I to V)	11,500,000	21,800,000
Teachers	329,000	594,000
Participation Rate (%)	66.3	99.1
2. Secondary Schools	19,000	48,487
Enrolment (VI to X)	4,750,000	9,150,000
Teachers	130,000	338,586
Participation Rate (%)	32.64	49.87

Source: National Education Policy-1992(1992)

Funds were also planned to be allocated for the achievement of the targets mentioned in Table 1

Year wise projected future estimates of the funds were mentioned in this policy in the form of development and recurring expenditures.

National Education Policy 1998-2010(1998) was more specific in projecting the enrolments and estimating the teacher demand for primary and secondary schools for the period 1997-98 to 2001-02. Following Table 2 shows these projected figures.

Table 2: Projected Targets for Elementary Education 1997-98 to 2001-02

Primary (5 -9)Years	1997-98	2001-02	Targets	
			2002-03	2010
Enrolments I to V (000)	15050	19170	20200	25800
Participation Rate	75.39	87.27	90.00	105.00
No. of Teacher (000)	346.30	374.80	382.20	527.00
Middle (10-12) Years				
Enrolment (000) classes VI to X	4790.00	7046.00	7610.00	11700.00
Participation Rate	49.24	62.25	65.00	85.00
No. of Teachers (000)	100.80	160.80	175.80	325.80

Source: National Education Policy-1998-2010 (1998)

It is clear from the data of Table 2 that projections in education were prepared for the period 1998-2010 for plan implementation during 1998-2010.

The projection of this study for the period 2006-2015 are therefore natural outgrowth of the previous work in this area and need of the time for planning elementary teacher education in Punjab.

CHAPTER 3

METHODOLOGY OF THE STUDY

The methodology of the study consisted of document analysis and projection calculations and these steps have been discussed as under:

3.1 DOCUMENT ANALYSIS

Relevant documents were analyzed to get basic information for the purpose of data collection. Basic information required for the projection of teacher demands was the actual enrolment data for the years 1995-2005 and the documents of the Bureau of Education Punjab, Bureau of Statistics Islamabad and Academy of Educational Planning and Management (AEPAM), Islamabad provided the required information. The documents of AEPAM also provided the data on the number of teachers in Punjab during the years 1995-2006. These data were reliable as Bureau of Education Punjab collected these data on scientific basis and supplied it to Academy of Educational Planning and Management for its annual publications. At this time, this is the only source to collect the historical statistics of education in Punjab.

There was a need to have demographic data specially the population data regarding the age-groups 0-4, 5-9, 10-14, and 15-19, in the form of projections for the years 2006 to 2015. National Institute of Population Studies Islamabad was helpful in providing population projections for the projection period 2006 to 2015.

In order to make projections in the area of demand for elementary teacher in Punjab, the methodology was to be devised. Basically, the formulas for projections were taken from the study on the "Supply and Demand of Primary and Middle School Female Teachers in Pakistan for the period 1981-90" conducted by the Ministry of Education, government of Pakistan in collaboration with the World Bank.

The use of these formulas by the government of Pakistan (1985-86) was authentic as these were devised from the Asian Model for Educational Projections upto 1985.

The methods used for the calculations of this work were as under:

3.2 PROJECTIONS

3.2.1 Population Projections

a) Year wise population projections for the age groups of years 05, 06, 07, 08, and 09 was the basic requirement of the study. For this purpose the projected population groups of 0-4, 5-9, 10-14, and 15-19 for Punjab were obtained from the National Institute of Population Studies for the years 2006 to 2015.

As these population groups were available in the groups of 5 years, the researcher had to split the group of 5-9 years into year wise groups. For this purpose Sprague Multipliers (appendix–A) were used, (1985-86) In this way separate age groups for each of the years 05,06,07,08, and 09 were obtained and these age groups were assumed to be the likely enrolments for classes I to V of the schools respectively.

The method of splitting the 5-9 age groups into year wise groups with the use of Sprague Multipliers has been shown in the following example. The population projections, for the year 2006 were given like this in the following groups

0-4 Age group	=10001 thousand
5-9 Age group	= 10210 thousand
10-14 Age group	=10631 thousand
15-19 Age group	= 9986 thousand

In order to split the 5-9 age groups the multipliers shown in table of appendix A were used. The number 5- years old for example corresponds with the line Fa in the second table. Hence 05 year age group is equal to;

= (0.0336 F-1) + (0.2272 Fo) - (0.0752 F+1) + (0.0144 F+2)

= (0.0336 x 1001) + (0.2272 x 10210) – (0.0752 x 10631) + (0.0144 x 9986)

= 2000.08 Thousand.

b) Year wise population projections for the age groups of years 10, 11, and 12 were required for the projection of elementary for classes VI, VII and VIII. For this purpose projected groups for the age groups of 0-4, 5-9, 10-14, 15-19, and 19-24 were required. Moreover the Sprague Multipliers given in Appendix A were used to split the age group 10-14 into year wise groups in order to obtain the groups of Y10, Y11, and Y12. The following example illustrates the split of 10-14 age groups into year wise population groups.

Demographic data of 2006

Age Group	Projected Population (000)
0-4	10001
5-9	10210
10-14	10631
15-19	9968

20-24 9085

In order to split 10-14 age groups into year wise groups, the multipliers were used to obtain Y10 group.

Y10 group = -(10001xF-2)+(10210xF-1)+(10631xF0)-(9968xF+1)+(9085xF+2)

= -(10001x.0128)+(10210x.0848)+(10631x.1504)-(9968x.0240)+9085x.0016)

= -12.81+865.81+1598.90-239.23+14.54

= 2227.21

3.2.2 Enrolment Projections

Year wise enrolments for the projection period 2006 to 2015 were calculated by using the enrolments of 2005 as the base line data. This is to clarify that the data on school enrolment and teachers for the base line year 2005 included public and private schools. However the data on madrassah system has not been included. A linear increase in the enrolment ratio was assumed from 2006 to 2015 with the targets set for the year 2015. The following formula was used for the calculation of future enrolments.

$$E_t = e_t \quad P_t$$

Where

E_t refers to enrolment in a year

e_t refers to enrolment ratio

P_t refers to school-age population in a year

3.2.3. Total Teacher Requirements:

Following formula was used for estimating the number of teachers required for teaching in classes I to V for the projections period.

$$T_t = \frac{E_t}{PT}$$

Tt refers to total number of teachers in a year

Et refers to enrolment in a year

PT refers to pupil-teacher ratio

3.2.4 Additional Teachers Requirements:

The following formula was used for calculating additional teacher requirement in Punjab for the years in projection period.

$$NT_t = T_{t-(1-a)} \quad T_{t-1}$$

NTt refers to additional teacher requirements

Tt refers to total number of teachers in a year

a refers of total number of teachers leaving the profession for all reasons

Tt-1 refers to total teacher requirement in previous year

Total teacher requirements and additional teacher requirements / demands were calculated separately for the classes I to V and for classes VI to VIII. At the end, aggregate of the additional teacher demand for primary and middle class was presented so that the supply of the required number of teachers is determined year wise for the years 2006-2015.

CHPATER 4

PRESENTATION AND ANALYSIS OF DATA

This chapter deals with presentation and analysis of data and the discussion has been divided into the following parts.

Part I: Population Projections for the Years 2006 to 2015:

In this part population projections of 05 to 09 year age groups in Punjab have been presented for the years 2006 to 2015. Moreover the age group of 05 to 09 years has been split into year-wise population projections with the use of Sprague Multipliers as discussed in Methodology part of Chapter 3. Thus this part presents the population age groups of years 05, 06, 07, 08 and 09 in Punjab during the projection period i.e. 2006 to 2015. In this way objective No1 of the study was achieved.

Part II: Enrolment Projections for the Years 2006 to 2015:

In this part actual enrolment in classes I to V in Punjab have been given for the years 1995 – 96 to 2004 – 2005 and the trends of enrolments during these years have been observed. In this way, flow chart of actual enrolments during the years 1995 – 96 to 2004 – 05 has been drawn. This helps in calculating the past trend of enrolments for the years 1995 – 96 to 2004 – 05 with the resultant decision about the baseline to be used for future planning in teacher education and for the achievement of objective No 1.

The second phase of part II deals with the enrolment projections of classes I to V in Punjab for the years 2006 to 2015 as visualized in the objective No 2 of the study.

These enrolment projections have been so made as to achieve the targets of bringing 100 percent of 05 year age group children in class I by the year 2015.

Part III: Teacher Projections:

This part of the study presents teacher requirement in two phases in line with objective No 3 of the study. Phase I has been allocated for the total teacher requirements for teaching of the students to be enrolled in different years of the plan period, whereas phase II deals with additional teacher requirements each year.

Part IV: Projections for classes VI, VII, VIII:

This part deals with a similar exercise for:

a) Year wise enrolment of classes VI, VII, and VIII in Punjab for the projection period and

b) year wise teacher requirement for the projection period in the shapes of both

   i) total teacher requirements and

   ii) additional teacher requirements

Part V: Aggregate Teacher Requirement for Classes I to VIII:

This part deals with the overall teacher requirements for classes I to VIII for each year in the plan period and in this way the demand side of the study is covered so that the teacher supply is accordingly arranged for planning elementary teacher education during the years 2006 to 2015.

PART – I POPULATION PROJECTIONS FOR THE YEARS 2006-2015:

Population projections become the base for the purpose of educational planning. The researcher had to collect relevant data from the National Institute of Population Studies Islamabad. Table 3 shows population projections of 05 – 09 years age groups in Punjab for the period 2006 to 2015. The figures given in the table are in thousands.

As the population groups of 05 – 09 age group were required to be split into year-wise age groups, Sprague Multipliers were designed to be used. For this purpose there was also need to have 0 – 4, 10 – 14 and 15 – 19 age groups. Table 4 shows the projected figures of population of following age groups.

0 - 04
05 - 09
10 - 14
15 – 19

With the use of Sprague Multipliers (Appendix A), the figures of 05 – 09 age groups for the years 2006 to 2015 were split into the year-wise figures and these have been presented in Tables 5 to 14. These tables have been so set as to show the multipliers in relevant columns and show the figures of projected population in the upper column

One point is to be clarified that the projected population age groups shown in tables 3 and 4 seem to be slightly decreasing with the passage of time. The authorities of National Institute of Population Studies (NIPS) used demographic formulas to project these population age groups and the population in these age groups was expected to decrease with the use of measures of population control during the plan period.

Table 3: Population Projections of 05 – 09 years Age Groups in Punjab for the year 2006 – 2015

Years	Population
2006	10210
2007	9999
2008	9839
2009	9821
2010	9839
2011	9825
2012	9788
2013	9725
2014	9638
2015	**9550**

Source: Government of Pakistan (2006), National Institute of Population Studies; Population Projections 1998 to 2015, Islamabad.

Table 4: Population Projections of 0 – 4, 5 – 9, 10 – 14, 15 – 19 years Age Groups in Punjab for the years 2006 to 2015

Years	0 – 4	5 – 9	10 – 14	15 – 19
2006	10001	10210	10631	9986
2007	9954	9999	10402	10121
2008	9882	9839	10725	10255
2009	9785	9821	10592	10377
2010	9089	9839	10387	10492
2011	9648	9825	10168	10590
2012	9629	9788	9960	10664
2013	9624	9725	9801	10688
2014	9643	9638	9785	10556
2015	9689	9550	9804	10355

Source: Government of Pakistan (2006), National Institute of Population Studies; Population Projections 1998 to 2015, Islamabad.

Table 5: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2006

Population in Thousands

Age Groups	0 - 4		5 – 9		10 - 14		15 – 19	Total
[redacted]	[redacted]		[redacted]		[redacted]		[redacted]	
[redacted]	x .0336 = 336.03	+	x.2272 = 2319.71	-	x.0752 = 799.45	+	x.0144 = 143.79	[redacted]
[redacted]	[redacted]	+	[redacted]	-	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	x .008 = 80.00	-	x.216 = 2205.36	-	x.008 = 85.04	+	x.000 = 0000	[redacted]
[redacted]	[redacted]	+	[redacted]	+	[redacted]	-	[redacted]	[redacted]
[redacted]	[redacted]	+	x.1408 = 1437.56	+	[redacted]	-	x.0144 = 143.79	[redacted]

Grand Total **10210**

Table 6: Split of Projected Population of 05 -09 age group into year wise Age Groups during the year 2007

Population in Thousands

Age Groups	0 - 4		5 – 9		10 - 14		15 – 19	Total
[redacted]	[redacted]							
[redacted]	x .0336 = [redacted]	+	x.2272 = 2271.77	-	x.0752 = [redacted]	+	x.0144 = 145.74	[redacted]
[redacted]	[redacted]	+	[redacted]	-	[redacted]	+	[redacted]	
[redacted]	[redacted]	-	x.216 = 2159.78	-	[redacted]	+	x.000 = 0000	
[redacted]	x .016 = [redacted]	+	x.184 = [redacted]	+	x.04 = [redacted]		[redacted]	
[redacted]	x.0176 = 175.19	+	x.1408 = 1407.85	+	x.0912 = 976.02	-	x.0144 = 145.74	[redacted]
							Grand Total	**9999**

Table 7: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2008

Population in Thousands

Age Groups	0 - 4		5 – 9		10 - 14		15 – 19	Total
[redacted]	9882		9839		10725		[redacted]	
[redacted]	x .0385 = 332.04	+	x.2272 = 2235.42	-	x.0752 = 806.32	+	x.0144 = 147.67	[redacted]
[redacted]	x .008 = 79.06	+	x.233 = [redacted]	-	x.048 = 514.80		[redacted]	
[redacted]	x .008 = 79.06	-	x.216 = 2125.22	-	x.008 = 85.80	+	x.000 = 0000	
[redacted]	x .016 = 158.11	+	x.184 = 1810.37	+	x.04 = 429.00	-	[redacted]	
[redacted]	x.0175 = 173.92	+	x.1408 = 1385.33	+	X093 = 978.12	-	x.0144 = 147.67	

Grand Total **9839**

Table 8: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2009

Population in Thousands

Age Groups	0 - 4		5 – 9		10 - 14		15 – 19	Total
[redacted]	9785		9821		10592		[redacted]	
[redacted]	x .0336 = 328.67	+	x.2272 = 2231.33	-	x.0752 = 796.51	+	x.0144 = 149.42	[redacted]
[redacted]	x .008 = [redacted]	+	x.292 = 2226.47	-	x.068 = [redacted]		[redacted]	
[redacted]	x .008 = 5408	-	x.216 = 2121.33	-	x.008 = 84.73	+	x.000 = 0000	
[redacted]	x .016 = 156.56	+	x.184 = 18.7.06	+	x.04 = 423.68	-	[redacted] 83.01	
[redacted]	[redacted] 1922.1	+	x.1408 = 1382.79	+	[redacted] 963.99	-	x.0144 = 149.42	[redacted]

Grand Total **9821**

Table 9: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2010

Population in Thousands

Age Groups	0 - 4		5 – 9		10 - 14		15 - 19	Total
[redacted]	[redacted]		[redacted]		[redacted]		[redacted]	
[redacted]	x.0336 = 325.55	+	x.2272 = 2235.42	-	x.0752 = 781.10	+	x.0144 = 151.08	[redacted]
[redacted]	x .008 = 77.51	+	x.232 = 2282.64	-	x.048 = 498.57	+	[redacted]	
[redacted]	x .008 = 77.51	-	x.216 = 2125.22	-	x.008 = 83.09	+	x.000 = 0000	[redacted]
[redacted]	x .016 = [redacted]	+	x.184 = 1810.37	+	x.04 = 415.48	+	[redacted]	
[redacted]	x.0176 = 170.52	+	x.1408 = 1385.33	+	x.0912 = 947.29	-	x.0144 = 151.08	[redacted]

Grand Total **9839**

Table 10: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2011

Population in Thousands

Age Groups	0 - 4	5 – 9	10 - 14	15 - 19	Total
[redacted]	9648	9825	10168	[illegible]	
[redacted]	x .0336 = + 324.17	x.2272 = + 2232.24	x.0752 = - 764.63	x.0144 = + 152.49	[redacted]
[redacted]	x .008 = + 77.18	x.232 = + 2279.4	x.048 = - 488.06	x.008 = + [illegible]	[redacted]
[redacted]	x .008 = - 77.18	x.216 = - 2122.2	x.008 = - 81.34	x.000 = + 0000	[redacted]
[redacted]	x .016 = - 154.36	x.184 = + 1807.8	x.04 = + 406.72	[illegible]	[redacted]
[redacted]	x.0176 = - 169.80	x.1408 = + 1383.36	X0912 = + 927.32	x.0144 = - 152.496	[redacted]
				Grand Total	**9825**

Table 11: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2012

Population in Thousands

Age Groups	0 - 4	5 – 9	10 - 14	15 - 19	Total
[redacted]	9624	9725	9801	[redacted]	
[redacted]	x.0336 = + 323.36	x.2272 = + 2209.52	x.0752 = - 737.03	x.0144 = + 153.90	[redacted]
[redacted]	x .008 = + 76.99	x.232 = + 2256.2	x.048 = - 470.44	x.008 = + 85.50	[redacted]
[redacted]	x.008 = 76.99	x.216 = - 2100.6	x.008 = - 78.40	x.000 = + 0000	[redacted]
[redacted]	x .016 = - 153.98	x.184 = + 1789.4	x.08 = + 392.04	[redacted]	[redacted]
[redacted]	x.0176 = 169.38	x.1408 = + 1369.28	X0912 = + 893.85	x.0144 = - 153.90	[redacted]

Grand Total **9725**

Table 12: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2013

Population in Thousands

Age Groups	0 – 4	5 – 9	10 - 14	15 - 19	Total
[redacted]	9624	9725	9801	[redacted]	
[redacted]	x .0336 = + 323.36	x.2272 = + 2209.52	x.0752 = - 737.03	x.0144 = + 153.90	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	x .008 = - 76.99	x.216 = - 2100.6	x.008 = - 78.40	x.000 = + 0000	[redacted]
[redacted]	x .016 = - 153.98	x.184 = + 1789.4	x.04 = + 392.04	[redacted]	[redacted]
[redacted]	[redacted]	x.1408 = + 1369.28	[redacted]	x.0144 = - 153.90	[redacted]

Grand Total **9725**

Table 13: Split of Projected Population of 05 -09 Age Group into year wise age groups during the year 2014

Population in Thousands

Age Groups	0 – 4	5 – 9	10 - 14	15 - 19	Total
[redacted]	9643	9638	9785	[redacted]	
[redacted]	x .0336 = + 324.00	x.2272 = + 2189.75	x.0752 = - 735.83	x.0144 = + 152.00	[redacted]
[redacted]	x .008 = + 77.14	x.232 = + 2236.01	x.048 = - 469.68	[redacted]	
	x .008 = + 77.14	x.216 = - 2081.80	x.008 = - 78.28	x.000 = + 0000	
	x.016 = + 154.28	x.184 = + 1773.39	x.04 = + 391.4	[redacted]	
	[redacted]	x.1408 = + 1357.03	[redacted] + 892.39	x.0144 = - 152.00	

Grand Total **9638**

Table 14: Split of Projected Population of 05 -09 Age Group into year wise Age Groups during the year 2015

Population in Thousands

Age Groups	0 - 4	5 – 9	10 - 14	15 - 19	Total
[redacted]	9689	9550	9804	[redacted]	
[redacted]	x .0336 = + 325.55	x.2272 = + 21.69.76	x.0752 = - 737.20	x.0144 = + 149.11	[redacted]
[redacted]	x .008 = + 77.51	x.232 = + 2215.6	x.048 = - 470.59	[redacted]	
[redacted]	[redacted]	x.216 = - 2062.8	[redacted]	x.000 = + 0000	
[redacted]	x .016 = [redacted]	x.184 = + 1757.3	x.0[redacted] = +4392.[redacted]	[redacted]	
[redacted]	x.0176 = - 170.52	x.1408 = + 1344.64	X0912 = + 894.....	x.0144 = - 148.11	[redacted]

Grand Total **9550**

A summary table showing the projected figures of the number of children in the age groups 05, 06, 07, 08, 09, during the years 2006 to 2015 is given in Table 15. This information has been used in making enrolment projections shown in the coming Tables.

Table 15: Year-wise Projected Population of the Children in the years 05 to 09 in Punjab for the Period 2006 to 2015

Classes / Years	I (5 years)	II (6 years)	III (7 years)	IV (8 years)	V (9 years)	Total
2006	2000.08	2018.32	2040.32	2063.99	2007.3	10210
2007	1947.17	1966.67	1994.54	2027.68	2062.94	9999
2008	1908.60	1928.94	1960.38	1999.22	2041.86	9839
2009	1913.01	1907.35	1982.32	1991.17	2027.15	9821
2010	1930.95	1945.51	1964.62	1986.9	2011.02	9839
2011	1944.27	1953.24	1963.68	1975.44	1988.39	9825
2012	1951.87	1954.89	1957.52	1960.21	1963.51	9788
2013	1949.75	1948.25	1945.21	1941.96	1939.85	9725
2014	1929.92	1927.92	1926.38	1926.07	1927.71	9638
2015	1907.06	1905.36	1906.86	1911.5	1919.13	9550

II. ENROLMENT PROJECTIONS

In order to observe the past trend of enrolments in classes I to V in Punjab for the years 1995-96 to 2005-06, the enrolments of these years are placed in Table 16

Table 16 Enrolments in Classes I to V in Punjab for the years 1995 – 96 to 2005 – 06 (000)

Class ⇨ / Year ⇩	I	II	III	IV	V	Total
1995-96	162.149	1053.552	941.444	857.526	755.236	5233.907
1996-97	1633.093	1051.907	956.204	868.154	762.483	5271.841
1997-98	1172.305	995.857	919.709	849.487	740.709	4678.067
1998-99	1243.533	817.292	684.687	590.413	480.840	3816.765
1999-2000	1453.770	999.480	864.550	794.498	681.759	4794.057
2000-2001	1451.136	1072.135	863.388	763.385	663.805	4813.849
2001-2002	1371.545	1136.096	958.217	808.405	677.391	4951.654
2002-2003	13890956	1151.347	971.072	819.238	686.465	5018.078
2003-2004	1194.424	1048.809	1003.653	916.654	804.901	4968.441
2004-2005	1342.622	1120.968	1020.924	997.372	832.758	5314.644
2005-2006	1394.379	1279.460	1154.908	1038.863	856.304	5223.914

Source: Government of Pakistan, (2006). Division Federal Bureau of Statistics, Islamabad, 2006: Pakistan Statistical Year Book 2006.

It was calculated from the data of table 16 that enrolments in classes I to V in Punjab show a slow trend of increase over the years 1995-96 to 2004-05; the enrolments in these classes being 5,233,907 in 1995-96 and being 5,314,644 in 2004-05, showing an increase of only 1.5 percent over a period of nine years from 1994-95 to 2004-05.

It is also evident that the total enrolment of classes I to V in Punjab was 5,723,914 in the year 2005-06 whereas the relevant school going age group for the years 05-09 in 2006 was projected to be 10210 thousand as given in table 15. This shows that in 2006 only 56 percent of the 05-09 age groups did enter the school system.

Similarly, the enrolment of class I in 2006 was 1394379 as shown in table 16 against the projected population of 2000,080 of 05 year age group in 2006 as shown in table 15. Thus 69.71 percent of 05 year age group populations were in class I in 2006.

The same enrolments have been shown in the form of flow in table 17 so that the enrolment of one year in one class may be seen as flow of the enrolment of the previous class in last year.

Table 17: Flow Table of Enrolments in Punjab for Classes I to V for the Years 1995-96 to 2005-06 **(000)**

Years ⇨	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Total	5233.907	5271.841	4678.067	3816.765		4813.848	4951.654	5018.078	4968.441		
Class V	155.236	762.483	740.709		681.759	663.805	677.391	686.465			
Class IV	857.526	868.154		590.413	794.498	767.385	808.405				1038.863
Class III	941.444		919.709	684.687	864.550	863.388				1020.924	1154.908
Class II		1051.907	995.857	817.292	999.480				1048.809	1120.968	1279.460
Class I	1626.149	1633.093	1172.305	1243.533				1389.956	1194.424	1342.622	1394.379

Table 18: Flow Table of Percentages of Retention of Students of Class II to V in Punjab during the Period 1995-96 to 2005 -2006

Years	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
Class V								55			
Class IV							65			73	
Class III						69			73		
Class II					80			84			
Class I				100			100				

It is evident from the data presented in table 17 and 18 that the retention rates of enrolments up to class V during the years 1999-2000 to 2005-06 ranged between 41 percent and 62 percent. It is also clear from the data of table 18 that the enrolment of class V in 2003-04 was 55 percent of its relevant enrolment in class I in 1999-2000, whereas similar retentions are 57 percent and 62 percent in class V in the years 2004-05 and 2005-06; thus showing an improving trend over the past three to four years, a shown in Table 19.

Table 19: Increase of Retention Rates of Enrolments in Class V during the Years 2002-03 to 2005-2006 in Punjab.

Years	Retention Rate
2005-06	62
2004-05	57
2003-04	55
2002-03	55

This growing trend of retention rates of the enrolments during the past four years (2002-03 to 2005-06) provides base for the use of growing trend of retention rate during the projection period.

Another inference which is drawn on the basis of the data of 2006 is as under

Total projected population of Punjab in all the age groups of 05-09 in 2006. = 10210

Total population of 05 year age group (assumed probable Enrolment of class I in 2006 in Punjab) = 2000.08

Actual enrolment of class I in Punjab in 2006 = $\frac{1394.374 \times 100}{2000.08}$

Participation rate= 69.71 %

In case 69.71 percent participation rate is taken an the base line data in the year 2006 and the target of 100 percent participation rate in class I in 2015 is taken for the projection period, the participation rates during the projected period have been shown in column III of Table 20 and the projected enrolments are likely to be as shown in column IV of Table 20.

Table 20: Projected Enrolments of Class I in 2006 to 2015

Year	5 Year old Children	Percentage of relevant age group for admission to class I	Projected Enrolment
2006		69.7	1394.37 (actual)
2007	1947.17	72.56	1412.87
2008	1908.60	75.53	1441.57
2009	1913.01	78.63	1504.20
2010	1930.95	81.85	1580.48
2011	1944.27	85.21	1656.71
2012	1951.87	88.70	1731.31
2013	1949.75	92.34	1800.40
2014	1929.92	96.12	1855.04
2015	1907.16	100.00	1907.16

Having calculated the projected enrolments of class I during the projection period as shown in column IV of Table 20, the main job was to find out the base line retention

rates in classes II to V as percentages of the relevant enrolments of classes I to IV in the previous years. For this purpose enrolments of the years 2003-04 and 2004-05 were used as shown in table 21.

Table 21: Enrolment of Class I to V in Punjab during the Years 2003-04 to 2004-05 and Class Wise Retention Rates

Class	Enrolment in 2003-04	Enrolment in 2004-05	Retention Rate *
V	804.901		
IV			
III			
II			
I		1342.622	-

*Enrolment of one class as percentage of the enrolment in previous class last year

Similarly Table 22 shows the enrolments of classes I to V in Punjab during the years 2004-2005 to 2005 – 2006 and class wise retention rates.

Table 22: Enrolments of 2004-05 and 2005-06 in Punjab for Classes I to V

Class	Enrolments of 2004.2005	Enrolments of 2005-2006	Retention rates
V	832.758	856.304	85.86
IV	997.372	1038.863	101.76
III	1020.924	1154.908	103
II	1120.968	1279.460	95.30
I	1342.622	1394.372	----

It is clear from the data of table 21 and 22 that:

a. Enrolment of class II in 2005-06 as compared to the enrolment of class I in 2004-05 was 95.30 percent, hence this retention rate has been taken as base line rate to be used for future projections up to 2015

b. Enrolment of class V in 2005-06 as compared to the enrolment of class IV in 2004-05 was 85.86 percent, hence this retention rate has been taken as base line retention to be used for future projection up to 2015

c. Enrolments of classes III and IV in 2005-06 as compared to the enrolments in classes II and III in the previous year (2004-05) have reached to the maximum, hence 100 percent retention rate have been assumed as the base line retention rates to be used for future projections from 2006 to 2015

In brief following fractions have been planned to be used as base line data for the year 2005-06 for classes I to V in Punjab.

a) Class II enrolment of 2005-06 as percentage of
class I enrolment of 2004-05 = 95.30

b) Class III enrolment of 2005-06 as percentage of
class II enrolment of 2004-05 = 100.0

c) Class IV enrolment of 2005-06 as percentage of
class III enrolment of 2004-05 = 100.0

d) Class V enrolment of 2005-06 as percentage of
class IV enrolment of 2004-05 = 85.86

Taking these percentages as base line data for 2005-06, the year wise retention rates were inflated @ .5 percent and 1.5 percent per annum at annual compound rate in

case of class II and class V during the projection period and these retention rates have been shown in table 23.

Table 23: Projected Retention Rates of Enrolments in One Class Compared to Enrolments in the Previous Class Last Year

Year	Class II enrolment as percentage of class I enrolment in the previous year	Class V enrolment as the percentage of class IV enrolment in the previous year
2006	95.30	85.86
2007	95.78	87.15
2008	96.26	88.46
2009	96.74	89.78
2010	97.22	91.13
2011	97.71	92.50
2012	98.19	93.88
2013	98.68	95.29
2014	99.18	96.78
2015	99.68	98.17

It is, with the use of the retention rates mentioned in table 23, that class wise enrolments were projected for the years 2007 to 2015 with the use of relevant formulas discussed in chapter III and these projected enrolments have been presented in table 24.

These projected enrolments have been presented in the form of a flow table in table 25 and indicate the flow of projected enrolments in classes I to V in Punjab over the projection period. Similarly, Table 26 gives this flow in the form of percentages with class I enrolment taken as a base.

Table 24: Class Wise Projected Enrolments of Classes I to V for the Years 2007-15 in Punjab

Class ⇨ / Years ⇩	I	II	III	IV	V	Total I to V	Percentage of the relevant age groups
2006	1394.379	1279.460	1154.908	1038.867	856.304	-	-
2007	1412.87	1335.54	1279.46	1154.91	905.37	6088.15 / 9999.000	60.88
2008	1441.57	1360.03	1335.54	1279.46	1021.63	6438.23 / 9839.000	65.44
2009	1504.20	1394.57	1360.03	1335.54	1148.70	6743.04 / 9821	68.66
2010	1580.48	1462.38	1394.57	1360.03	1217.08	7014.51 / 9838	71.29
2011	1656.71	1544.29	1462.38	1394.57	1258.03	7315.98 / 9825	74.46
2012	1731.31	1629.72	1544.29	1462.38	1309.22	7673.92 / 9788	78.40
2013	1800.40	1708.46	1626.72	1544.29	1393.50	8073.37 / 9725	83.02
2014	1855.04	1785.64	1708.46	1626.72	1493.68	8469.31 / 9638	87.79
2015	1907.16	1849.10	1855.64	1708.46	1596.95	8847.31 / 9550	92.65

Table 25: Flow of Projected Enrolments of Classes I to V in Punjab for the Years 2006 – 2015

Years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Class V	-	-	-	-						
Class IV	-	-	-							1708.46
Class III	-	-								1785.64
Class II	-								1785.64	
Class I							1731.31	1800.40		

Table 26: Flow of Projected percentages of Enrolments of Classes I to V in Punjab for the Years 2006 – 2015

Years	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Class V	-	-	-	-		89	91		95	
Class IV	-	-	-			97				
Class III	-	-			97		98			
Class II	-			97		98				
Class I			100			100			100	

III. Teacher Projections

This part of the chapter deals with the projected figures of the year-wise teacher demand for Punjab in Classes I-V in two phases during the projection period 2006-2015.

a) Total Teacher Requirement

For this purpose, the teacher-pupil ratio for the year 2005 was calculated. The enrolment in classes I to V in Punjab was 5314644 and the number of teachers working in the primary schools for classes I to V was 137400. Hence, the pupil teacher ratio of 39: 1 was calculated for the base line year 2005. This pupil teacher ratio is according to the data of public schools under study. It was, therefore, decided to use 40:1as the pupil teacher ratio during the projection period 2006-2015. This pupil teacher ratio of 40:1 has also been recommended and used in different education plans in Pakistan. With the use of this pupil teacher ratio the total teacher requirements for the years 2006 to 2015 were calculated and these are presented in table 27.

Table 27: Total Teacher Requirements for Classes I to V in Punjab during 2006-2015

Year	Projected Enrolment of Classes I to V	Total Teacher Requirement @ 40:1
2006	5723918	143098
2007	6088150	152204
2008	6438230	160956
2009	6743040	168576
2010	7014540	175364
2011	7315980	182900
2012	7673920	191848
2013	8073370	201834
2014	8469540	211739
2015	8847310	221183

It is clear from the data of table 27 that the total teacher requirement in the year 2015 is likely to be 221183 for classes I to V in Punjab in case of the projected enrolment of 8847310 which is 92.65 percent of the relevant age group (table 24), is brought to the school system.

b) Additional Teacher Requirement

In order to calculate the additional teacher requirement in Punjab for year 2006-2015 the following data were required;

a) Teacher requirement which was projected for the years 2006 to 2015 and is placed in column III of table 27 and

b) Attrition rate, which shows the total wastage of teachers due to all reasons like retirement, death, health problems etc. This attrition rate was calculated in a sample district of Rawalpindi and it was found to be four percent.

For the purpose of this study it was decided to assume four percent as the attrition rate during the projection period. By using the method discussed in the chapter on "Methodology of the Study", additional requirements of the teachers were calculated and placed in table 28.

Table 28: Projected Additional Teacher requirements for Teachers in Classes I to V for the year 2006-2015

Year	Existing Teachers A	Attrition Rate, B	Existing Teachers after Attrition, C = (A-B)	Teachers' Requirements	
				Total Teachers' Requirement D	Additional Teacher Requirements E= D-C
2005	137400 (actual)	-	-	-	-
2006	137400	5496	131904	143098	11194
2007	143098	5724	137374	152204	14830
2008	152204	6088	146116	160956	14840
2009	160956	6438	154518	168576	14058
2010	168576	6743	161833	175364	13531
2011	175364	7015	168349	182900	14551
2012	182900	7316	175584	191848	16264
2013	191848	7674	184174	201834	17660
2014	201834	8073	193761	211739	17978
2015	211739	8470	203269	221183	17914

It is clear from the data of table 28 that additional teacher requirement during the years 2009 to 2015 ranges 14000 to 18000 per annum. The last column of table 28 shows year-wise additional requirements of teachers for classes I to V and these figures show

the year-wise demand of school teachers for classes I to V in Punjab during the years 2006 to 2015.

IV. Projections for Classes VI, VII, and VIII

This part of the study deals with the projections for classes VI, VII, and VIII and the discussion has been divided into the followings.

a) Population projections of the age groups of Y10, Y11, and Y12 assumed to be the probable enrolments for classes VI , VII and VIII in Punjab for the years 2006 to 2015

b) Enrolment projections of classes VI, VII, and VIII in Punjab for the years 2006 to 2015

c) Total teacher requirement for classes VI, VII and VIII in Punjab for the years 2006-2015.

d) Additional teacher requirement for classes VI, VII, and VIII during the years 2006 to 2015.

a) Population projections for classes VI, VII and VIII in Punjab for 2006 to 2015

The population projections obtained from the National Institute of Population Studies, Islamabad were in the shape of five year age groups and the relevant age groups were of 10-14 years age groups for the years 2006 to 2015. There was again a need to split these groups into year wise age groups and to pick Y10, Y11, and Y12 age groups as these groups coincided with classes VI, VII, and VIII. The relevant population projections for

following years were needed as per formula given in Sprague Multipliers (Appendix A) and discussed in chapter 3.

0-4 age group

5-9 age group

10-14 age group

15-19 age group

20-24 age group

It was with the use of these age groups and the Sprague Multipliers given in Appendix A that 10-14 age groups was split into the year wise population groups of 10, 11, and 12 years of age and these have been given in tables 29 to 38. Table no 39 shows the summary of all these tables with the age groups of 10, 11, and 12 during the years 2006 to 2015 in Punjab.

Table 29: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the Year 2006

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population	10001	10210	10631	9968	9085	
Group Years						
Y_{10}	10001x0128	10210x.0848	10631x.1504	9968x.024	9085x.0016	
	-12.81	+865.81	+1598.90	-239.23	+14.54	=2227.21
Y_{11}						
Y_{12}	10001x.0064	10210x.0336	10631x.2544	9968x.0336	9085x.0064	
	+6.41	-343.06	+2704.53	-334.92	+58.14	= 2091.10

Table30: Split of Projected Population of 10 – 14 Age Group and Getting Y10, Y 11 and Y12 Age Groups for the Year 2007

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population	[illegible]	9999	10702	10121	[illegible]	
Group Years						
Y 10	9954x0128	9999x.0848	10702x.1504	10121x.024	9290x.0016	
	-127.41	+847.92	+1609.58	-.242.90	+14.86	=2102.05
Y 11	[illegible]	[illegible]	10702x.222	[illegible]	[illegible]	
	[illegible]	+143.99	+2380.12	+21[illegible]	[illegible]	
Y 12	9954x.0064	9999x.0336	10702x.2544	10121x.0336	9290x.0064	
	+63.71	-335.97	+2722.59	-340.07	+59.46	= 2169.71

Table 31: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the Year 2008

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population		9839	10725	10255		
Group Years						
Y 10	9882x0128	9839x.0848	10725x.1504	10255x.024	9477x.0016	
	-126.49	+834.35	+1613.04	-246.12	+15.16	=2089.94
Y 11						
Y 12	9882x.0064	9839x.0336	10725x.2544	10255x.0336	9477x.0064	
	+63.24	-330.59	+2728.44	-344.57	+60.65	= 2177.17

Table 32: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the Year 2009

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population	[illegible]	9821	10592	10377	[illegible]	
Group Years	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Y 10	9785x0128	9821x.0848	10592x.1504	10377x.024	9644x.0016	
	-125.25	+832.82	+1593.04	-.249.05	+15.43	=2066.99
Y 11	[illegible]	[illegible]	10592x.22[illegible]	[illegible]	[illegible]	
	[illegible]	+141.41	+2355.68	[illegible]	[illegible]	
Y 12	9785x.0064	9821x.0336	10592x.2544	10377x.0336	9644x.0064	
	+62.62	-329.99	+2694.60	-348.67	+61.72	= 2140.28

Table 33: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the year 2010

	0 -4	5 – 9	10 – 14	15 – 19	20 – 24	Total
Projected Population						
Group Years						
Y 10	9689x0128	9839x.0848	10387x.1504	10492x.024	9793x.0016	
	-124.02	+834.35	+1562.51	-.251.81	+15.67	=2036.70
Y 11						
Y 12	9689x.0064	9839x.0336	10387x.2544	10492x.0336	9793x.0064	
	+62.01	-330.59	+2642.45	-352.53	+62.68	= 2084.02

Table34: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the year 2011

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population		9825	10168			
Group Years						
Y 10	9648x0128	9825x.0848	10168x.1504	10590x.024	9933x.0016	
	-123.49	+833.16	+1529.27	-.254.16	+15.89	=2000.67
Y 11						
Y 12	9648x.0064	9825x.0336	10168x.2544	10590x.0336	9933x.0064	
	+61.75	-330.12	+2586.74	-355.82	+63.57	= 2026.12

Table 35: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the year 2012

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population	[illegible]	9788	9960	10664	[illegible]	
Group Years						
Y 10	9627x0128	9788x.0848	9960x.1504	10664x.024	10071x.0016	
	-123.23	+830.02	+1497.98	-.255.94	+16.11	=1964.94
Y 11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Y 12	9627x.0064	9788x.0336	9960x.2544	10664x.0336	10071x.0064	
	+61.61	-328.88	+2533.82	-358.31	+64.45	= 1972.69

Table 36: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the year 2013

	0 -4	5 – 9	10 – 14	15 – 19	20 – 24	Total
Projected Population	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Group Years						
Y_{10}	9624x0128	9725x.0848	9801x.1504	10688x.024	10206x.0016	
	-123.19	+824.68	+1474.07	-.256.51	+16.33	=1935.38
Y_{11}	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Y_{12}	9624x.0064	9725x.0336	9801x.2544	10688x.0336	10206x.0064	
	+61.59	-326.76	+2493.37	-359.12	+65.32	= 1934.40

Table 37: Split of Projected Population of 10 – 14 Age group and getting Y10, Y 11 and Y12 Age Groups for the year 2014

	0 -4	5 – 9	10 – 14	15 – 19	20 - 24	Total
Projected Population						
Group Years						
Y_{10}	9643x0128	9638x.0848	9785x.1504	10556x.024	10331x.0016	
	-123.43	+817.30	+1471.66	-.253.34	+16.53	=1928.72
Y_{11}						
Y_{12}	9643x.0064	9638x.0336	9785x.2544	10556x.0336	10331x.0064	
	+61.72	-323.83	+2489.30	-354.68	+66.19	= 1938.70

Table 38: Split of Projected Population of 10 – 14 Age Group and getting Y10, Y 11 and Y12 Age Groups for the year 2015

Projected Population Group Years	0 -4	5 – 9	10 – 14	15 – 19	20 – 24	Total
Y 10	9689x0128	9550x.0848	9804x.1504	10355x.024	10446x.0016	
	-124.02	+809.84	+1474.52	-.248.52	+16.71	=1928.53
Y 11	[illegible]					
	[illegible]					
Y 12	9689x.0064	9550x.0336	9804x.2544	10355x.0336	10446x.0064	
	+62.01	-320.88	+2494.14	-347.93	+66.85	= 1954.19

Table 39: Year Wise Projections of Population of Age Groups of 10,11 and 12 years in Punjab for the years 2006 to 2015.

	Y 10	Y11	Y12	Total 10-12
2006				
2007	2102.05	2146.61	2169.71	6418.37
2008				
2009	2066.99	2111.46	2140.28	6318.73
2010				
2011	2000.67	2010.43	2026.12	6037.22
2012				
2013	1935.38	1925.08	1934.40	5794.86
2014				
2015	1928.53	1938.51	1954.19	5821.23

b. Enrolment Projections

This part deals with the enrolment projections of classes VI to VIII in Punjab for the years 2006 to 2015. For this purpose the enrolment data of these classes for the years 1995-96 to 2005-06 have been presented in Table 40

Table 40: Year Wise Enrolments of Classes VI to VIII in Punjab for the years 1995-96 to 2005-2006

	VI	VII	VIII	Total
1995-96				
1996-97	688.196	534.134	446.532	1668.862
1997-98				
1998-99	675.575	544.446	447.658	1667.679
1999-2000				
2000-2001	574.692	516.386	459.530	1550.608
2001-2002				
2002-2003	609.549	530.230	492.491	1632.270
2003-2004				
2004-2005	705.152	585.124	519.630	1809.906
2005-2006				

Source: Government of Pakistan, (2006). Division Federal Bureau of Statistics Islamabad, 2006: Pakistan Statistical Year Book 2006.

It is clear from the data of table 40 that enrolments in classes VI to VIII during the years 1996-97 and 2005-06 show a slow increase; the enrolments in classes VI to VIII being 1,668,862 in 1996-97 and being 2,017,400 in 2005-06. In this way the total increase during these ten years being 20.88 percent, i.e., being about two percent increase per year. This shows a better increase rate as compared to the similar increase in

enrolments of classes I to V in Punjab during the last ten years. Tables 41 and 42 show the flow of these enrolments during the years 1995-96 to 2005-06.

Table 41: Flow Table of Enrolments in Punjab for Classes VI to VIII for the Years 1995-96 to 2005-06

→	1995-1996	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006
	489.714	446.532	438.880	447.658	489.608	459.530	485.984	492.491	510.550	519.630	618.043
	542.860	534.134	533.771	544.446	563.419	516.386	523.223	530.230	569.928	585.124	670.811
	673.352	688.196	662.330	675.575	663.117	574.692	601.498	609.549	643.951	705.152	728.546

Table42: Flow Table of Percentages of Retention of Students in Classes VI to VIII in Punjab during 1995-96 to 2005-06

Years ⇨	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Class VIII			45		74						
Class VII											
Class VI											

For the purpose of projecting enrolments of classes VI to VIII during the projection period, one basic requirement was the ratio between the enrolments of class V and class VI. In order to find out these ratios, the data of the enrolments of classes V and VI in the past few years was observed and these data have been given in Table 43.

Table 43: Class VI enrolments as Percentages of Class V Enrolments in Punjab during the Years 2000-2001 to 2005-2006

Year	Enrolment of Class V	Enrolment of Class VI	Class VI enrolment as % of class V enrolment
2000-2001	663805	574692	80
2001-2002	677391	601498	89
2002-2003	686465	609549	89
2003-2004	804901	643951	80
2004-2005	832758	705152	85
2005-2006	856304	728546	85

It is clear from the data shown in table 43 that average of six ratios was approximately 85. It means that 85 percent of the students in Class V enrolled in Class VI during the years 2000-2001 to 2005-2006. Hence 85 percent can be used as a base line data of the year 2006 for estimating the enrolments of Class VI during the project period.

On the other side the enrolment of class VI in 2005-2006 as compared to its relevant population age group was as given in table 44.

Table 44: Enrolments in Class VI along with its relevant Population Age Group in Punjab during the years 2005-2006

Year	Enrolment of Class VI	(Y_{10}) Relevant Population age groups	Enrolment as percentage of the relevant age groups
2005-2006	728.546	2227.21	32.7

It is evident from the data of table 44 that 32.7 percent of the relevant population age group (Y_{10}) was in Class VI during the year 2005-2006. It was taken as the base-line data and it was decided to improve the enrolments of classes VI by using the ratios shown in Table 45.

Table 45: Enrolment of Class VI as percentage of the relevant Age Group in Punjab during the Projection Period

Year	Enrolment as percentage of the relevant age-group
2006	32.70 (Actual)
2007	34.34
2008	36.05
2009	37.85
2010	39.75
2011	41.73
2012	73.82
2013	46.01
2014	48.31
2015	50.72

By multiplying the rations mentioned in table 45 with the relevant population age-groups the projected enrolments of Class VI were obtained and these data are presented in Table 46.

Table 46: Projected Enrolment Data of Class VI in Punjab during the year 2007 to 2015

Year	Population age group (Y_{10})	Participation ratio	Projected enrolment of Class VI
2006	2227.21	32.70 (actual)	728.54 (actual)
2007	2102.05	34.34	721.84
2008	2089.94	36.05	753.42
2009	2066.99	37.85	728.36
2010	2036.70	39.75	809.59
2011	2000.67	41.73	834.88
2012	1964.94	73.82	861.04
2013	1935.38	46.01	890.47
2014	1928.72	48.31	931.76
2015	1928.53	50.72	978.15

In order to calculate the enrolments of classes VII and VIII during the projection period, the figures of column IV of table 46 were taken as basic data as projected enrolments of Class VI. The following data of table 47 provided the flow rates of the enrolments for classes VII and VIII.

Table 47: Flow Rates of Enrolments to Classes VII & VIII during the years 2000-01 to 2004-05 in Punjab

Years	2000-01	2001-02	2002-03	2003-04	2004-05
Class VIII			86		85
Class VII		91		94	
Class VI	100		100		

The average of the promotion rates of class VI enrolments to class VII in the three years comes to 91 whereas the average of the percentages of promotion rates from Class VII to Class VIII comes to 85 percent. Hence these promotion rates were assumed as the base line data for the year 2006 and inflated to the promotion rates given in table 48.

Table 48: Promotion Rates used for Calculating the Projected Enrolments of Class VII & VIII in Punjab during the Year 2006 to 2015

Year	Class VII enrolments as % of relevant class VI enrolments (@ .5%)	Class VIII enrolment as % of the relevant Class VI enrolments (@ .5%)
2006	91	85
2007	91.46	85.43
2008	91.91	85.85
2009	92.37	86.28
2010	92.83	86.71
2011	93.30	87.15
2012	93.76	87.58
2013	94.23	88.02
2014	94.70	88.46
2015	95.17	88.90

With the use of promotion rates given in Table 48, the projected enrolments for classes VII and VIII were calculated and these are presented in Table 49.

Table 49: Projected Enrolments of Class VI to VIII in Punjab for 2006 to 2015

Year	Class VI	Class VII	Class VIII	Total
2006	728.541 (Actual)	670.81 (Actual)	618.04 (Actual)	2017.39
2007	721.84	666.32	602.41	1990.57
2008	753.42	663.44	625.45	2042.31
2009	728.36	695.93	622.80	2047.09
2010	809.59	676.14	653.29	2139.02
2011	834.88	755.35	634.77	2225.00
2012	861.04	782.78	709.04	2352.86
2013	890.47	811.36	736.53	2438.36
2014	931.76	843.28	761.68	2536.72
2015	978.15	886.76	791.63	2626.54

It is clear from the data of table 49 that the projected enrolments in classes VI to VIII in Punjab are 1990.57 thousands in 2007 but these are estimated to be 2626.54 thousands in 2015. These data are the base for calculating demand for teachers in classes VI to VIII during the projection period.

c. Total Teacher Requirement for Class VI to VIII in Punjab for 2007 to 2015

This part of the study deals with the projected demand of teachers for Classes VI to VIII in Punjab during the years 2006 to 2015. For this purpose pupil teacher ratios for the years 2004-05 and 2005-06 were calculated and it was decided to use 25:1 as the pupil teacher ratio for the period 2006 to 2015. Table 50 shows the total teacher requirements for the classes VI to VIII in Punjab for the projection period.

Table 50: Total Teacher Requirement for Class VI to VIII in Punjab for the Years 2006 to 2015

Year	Projected enrolment for Class VI to VIII	Total Teachers requirement @ 25:1
2006	2017390	80696
2007	1990570	79623
2008	2042310	81692
2009	2047090	81884
2010	2139020	85561
2011	2225000	89000
2012	2352860	94114
2013	2438360	97534
2014	2536720	101469
2015	2626540	105062

On the basis of the enrolment data of classes VI to VIII in 2005 and teacher data for the same year in classes VI to VIII, it was calculated that a pupil teacher ratio of 25:1 may be used for projecting the total teacher requirement for classes VI to VIII for the projection period. With the use of this pupil teacher ratio, it was found that, the teacher demand for cases VI to VIII will increase from 80696 teachers in 2006 to 105062 teachers in 2015; thus showing an increase of 30 percent in the demand for elementary teachers over the projection period.

d. Additional Teacher Requirement for classes VI to VIII

With the use of an attrition rate of 4 percent, as calculated for projection of primary school teacher demand in table 28, the middle school teacher demand was also projected in the form of additional teachers required for teaching classes VI to VIII in Punjab for each of the years 2006 to 2015 and these figures are presented in table 51.

Table 51: Projected Additional Teacher Requirements in Classes VI to VIII

Year	Existing Teachers A	Attrition @ 4 % B	Teachers after attrition C=A-B	Teachers' Requirement	
				Total Teacher Requirement D	Additional Teacher Requirement E= (D-C)
2005	Actual(68120)	-	-	-	-
2006	68120	2725	65395	80696	15301
2007	80696	3228	77468	79623	2155
2008	79623	3185	76438	81690	5254
2009	81690	3268	78424	81884	3460
2010	81884	3275	78609	85561	6952
2011	85561	3422	82139	89000	6861
2012	89000	3560	85440	94114	8674
2013	94114	3765	90349	97534	7185
2014	97534	3901	93633	101469	7836
2015	101469	4059	97410	105062	7652

It is clear from the data of table 51 that additional teacher demand for classes VI to VIII in the years 2006 to 2015 gradually increases; additional teacher demand in 2007

being 2155 and being 7652 in 2015. In this way the requirement of additional middle school teachers being 3.55 times more in 2015 than that of demand in 2007.

V. Aggregate Additional Teacher Requirement for classes I to VIII

Table 52 shows the aggregate of the additional teacher demand both for the primary schools and middle schools in Punjab for the years 2006 to 2015.

Table 52: Additional Teacher Requirements in Classes I to VIII in Punjab for the Years 2006 to 2015

Year	Additional Teacher Requirement		
	In Classes I to V	In Classes VI to VIII	Total in Classes I to VIII
2006	11194	1530	26495
2007	14830	2155	16985
2008	14840	5254	20094
2009	14058	3460	17518
2010	13531	6952	20483
2011	14551	6861	21412
2012	16264	8674	24938
2013	17660	7185	24845
2014	17978	7836	25814
2015	17914	7652	25566

It is clear from the data of table 52 that the demand of additional teachers for classes I to VIII in the year 2009 is likely to be 17518 whereas 25814 additional teachers are projected to be required for teaching classes I to VIII in Punjab in 2014. In this way, the elementary teacher demand in 2014 will be 150 percent of the elementary teacher demand in 2009. It is also evident that the annual demand for elementary school teachers in Punjab ranges between 16985 in 2007 (minimum) and 25814 in 2014 (maximum).

Criticism on Data Collected From Documents

As the first part of the study is a document analysis, the statistical data for the last ten years (1995-96 to 2005-06) were collected from the published documents of Academy of Educational Planning and Management, which collects data from the provincial Bureaus of Education and verifies the data before publishing it. It is also to be noted that EAPAM is the main source of educational statistics at federal level hence these data are reliable for the purpose of future projections in education. In case there is slight error in the past data on educational statistic, the previous rates trends and ratios i.e. enrolment trend, participation rates, retention rates, and pupil teacher ratios remain approximately accurate and help educational planners in setting future targets desired for the purpose of making projections.

DISCUSSION

This research is a projection study in the field of educational planning and documents have been studied to get support in the process of making projections. The literature was reviewed with the intention of concept clearance in this area and getting help in the process of setting targets for the future estimates.

The first stage in this study was to obtain the demographic data. The population projections used in this research were obtained from the National Institute of Population Studies, Islamabad. The data available from the Institute was in the age groups of 0-4, 5-9, and 10-14. In the previous research studies it was observed that the researchers used 5-9 age group as a group for classes I to V and they used this total group as one lot for the purpose of projections. Almost the same practice was done in the offices of the Ministry of Education and by the Planning Commission in estimating future plans. Alam (1970) used total of 5-9 age group as one lot in projecting the enrolments of classes I to V. This type of study has certain limitations. It does not take into account class wise enrolment; it cannot accommodate the interclass wastage due to dropout, especially dropout from class I to II and from class IV to V as observed in the existing research study. The wastage due to dropout in this research has been observed to be 4.7 percent during the shift from class I to II and 14.14 percent dropout was observed during the shift from class IV to class V.

Overall wastage was found to range between 38 percent and 59 percent per annum during the years 1999-2000 to 2005-06. With this wastage the plan targets remained unachieved. The planners can control these wastages only if the research studies provide accurate findings to control such wastages. While reviewing the related

research studies, it was observed that Ministry of Education (1986) in its projections for the enrolments of classes I to V for Third Education Project had to split the population data of 5-9 age group into year wise population groups so as to calculate the class-wise enrolment projections of classes I to V.

The researcher therefore, planned to split the five year population age groups of National Institute of Population Studies to years wise age groups of the population so that dropout control mechanism may also be applied by the planners while using the result of this study.

A review of the education policies provided the targets for each plan period. It was observed that these targets were found to be shifted from one policy document to other policy document. The Education Policy 1972-80 envisaged education to be universal for boys by 1979 and for girls by 1984. Accordingly the enrolments in classes I to V were projected to increase from 46 lakh in 1972 to 96 lakh in 1980; thus raising the participation rate of primary school children in Pakistan from 48 percent in 1972 to 85 percent in 1980. National Education Policy 1979 shifted this target for the achievement of universalization of education and all the boys of five year age were targeted to be enrolled in class I by 1982-83 and all the boys of 5-9 age group was targeted to be brought in classes I to V by the year 1986-87.

National Education Policy 1992 shifted this target and fixed to achieve 99.1 percent participation rate in classes I to V by the year 2002 whereas National Education Policy 1998-2010 planned to achieve this target of universalization (105 percent) participation rate in classes I to V in 2010.

The Government of Pakistan has been shifting this target for the achievement of universalization of elementary education in every plan period simply because of the failure to achieve the set targets. On the basis of the review of these education policies therefore, the researcher decided to bring 100 percent of the five year age group in class I by 2015 and 92.65 percent of 5-9 population age group in classes I to V by 2015. According to National Education Policy 1992, the participation rate in classes VI to X which was 32.64 in 1992 was targeted to be 49.87 by 2002. It provided no separate projected targets for classes VI to VIII. However National Education Policy 1998-2010 mentioned 49.24 percent as participation rate of enrolments in classes VI to VIII in 1997-98 and projected for these classes a participation rate of 62.25 percent in 2001-02, 65 percent in 2002-03 and 85 percent in 2010. This target again seems to be unrealistic as the findings of this study (Table 44) show class VI enrolment in 2005-06 as 32.7 percent of the relevant age group. This study, therefore, planned to bring 50.72 percent of the relevant age group in class VI by the year 2015. Similarly an enrolment of 2626540 (Table 49) in classes VI to VIII in 2015 which is projected to be 45.12 percent of its relevant age group (5821.23 thousand) in 2015, was targeted to be in school system by 2015.

While calculating the total teacher requirement, the pupil teacher ratio of 40:1 was used by Ministry of Education, Government of Pakistan for primary schools in its Third Education Project (1986) and a pupil teacher ratio of 39:1 was observed (part III(a) of chapter 4) for classes I to V in 2005. With the coincidence of the findings of these few studies, it was decided to use 40:1 as pupil teacher ratio for projecting total teacher requirement for primary classes during the projection period. Similarly the findings of

this study showed a pupil teacher ratio of 25:1 (discussion of Table 49) in classes VI to VIII in 2004-05 and 2005-06 and this finding was also verified with the findings of the study by Government of Pakistan (1985-86). Hence it was decided to use the pupil teacher ratio of 25:1 while projecting the total teacher requirement for classes VI to VIII in the projection period.

CHAPTER 5

SUMMARY, FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

This study was designed to analyze the demographic data and enrolment data of elementary schools in Punjab for the purpose of planning elementary teacher education in Punjab for the years 2006 to 2015. The main objective of the study was to project elementary teacher requirement for the years 2006 to 2015 so that proper planning of teacher education is made effectively. In order to achieve this objective, the documents of relevant demographic data were analyzed and population projections made by the National Institute of Population Studies, Islamabad were observed. The population projections from 2006 to 2015 were available in five years age groups. The researcher had to split the 05-09 age group and 10-14 age group with the use of Sprague Multipliers in order to obtain year wise age groups of 05 to 12 years age groups which were assumed to be the relevant age groups for classes I to VIII. The second stage of the research methodology was to make the enrolment projections for the projection period. For this purpose, actual enrolments for classes I to VIII in Punjab for the years 1995-96 to 2004-05 were obtained from the relevant documents and offices and the past trends of increase in elementary school enrolments were observed. Moreover, education policies were studied in order to decide about the future targets of elementary teacher education. The next stage of the research methodology was to project elementary teacher requirement from 2006 to 2015 on yearly basis. This teacher requirement was projected in two steps;

(a) total teacher requirement for classes I to VIII; (b) additional teacher requirement for these classes. The main targets decided for future projections were as under:

1. To manage entry of 100% five years old children in class I by the year 2015;
2. To minimize the wastage by controlling the drop out in classes II to V and managing to achieve the targets of 92.65 percent of 05-09 age groups in classes I to V by the year 2015
3. To use pupil teacher ratio of 40:1 in projecting total teacher requirement for classes I to V during 2006 to 2015
4. To use pupil teacher ratio of 25:1 in classes VI to VIII during the projection period
5. To use the attrition rate of 4 percent in calculating the additional teacher requirements as also observed in the previous studies on the topic

Having projected the year wise demand of elementary teachers in Punjab for the years 2006 to 2015 at primary (I-V) level and middle (VI-VIII) level separately, the overall year wise requirement of elementary teachers (I-VIII) were calculated so that the planners of teacher education may manage quality supply of teachers while planning future teacher education.

5.2 FINDINGS

The main findings of this study were as follows:

1. Enrolments of classes I to V in Punjab showed a slow trend of increase over the years 1995-96 to 2004-05; the enrolment in these classes being 5,233,907

in 1995-96 and being 5,314,644 in 2004-05, showing an increase of only 1.5 percent over the period of nine years from 1994-95 to 2004-05.

2. Total enrolment of classes I to V in Punjab was 5,723,914 in the year 2005-06 whereas the relevant population age group of years 05-09 in 2006 was projected to be 10210 thousand. This shows that in 2006 only 56 percent of the 05-09 age groups did enter the school system.
3. Enrolment of class I in 2006 was 1394379 against the projected population of 2000,080 of 05 year population age group in 2006. Thus 69.71 percent of 05 year population age group was in class I in 2006.
4. Retention rates of enrolments up to class V during the years 1999-2000 to 2005-06 ranged between 41 percent and 62 percent; 62 percent being retention rate of class V enrolment in 2000-01 and 62 percent being retention rate of class V enrolment in 2005-06
5. Enrolment of class II in 2005-06 as compared to enrolment of class I in 2004-05 was found to be 95.3 percent and enrolment of class V in 2005-06 was found to be 85.86 percent of the enrolment of class IV in 2004-05. Hence these retention rates were found to be the base line rates for future projections.
6. Enrolments of classes III and IV in 2005-06 as compared to the enrolments of classes II and III of 2004-05 respectively were found to be at the maximum rate of retention; hence 100 percent retention rate was found to be taken as base line retention rates in 2006 for future projections of the enrolments in classes III and IV in the years 2006 to 2015

7. The total enrolments of classes I to V in year 2005 were 5314644 and the teachers teaching in classes I to V in 2005 were 137400; hence the pupil teacher ratio of 39:1 was calculated to exist in 2005.
8. Total teacher requirement for classes I to V ranges between minimum teachers of 143098 in the year 2006 and maximum teachers of 221183 in 2015.
9. Projected additional teacher requirement for classes I to V in the years 2007 to 2015 ranges between 14000 and 18000 per annum and this shows the projected annual additional teacher requirement in Punjab during the projection period.
10. Enrolments in classes VI to VIII during the years 1996-97 and 2005-06 show a slow increase; the enrolments in classes VI to VIII being 1,668,862 in 1996-97 and being 2,017,400 in 2005-06. In this way the total increase during these ten years being 20.88 percent, i.e., being about two percent increase per year. This shows a better increase rate as compared to the similar increase in enrolments of classes I to V in Punjab during the last ten years
11. It is clear from the enrolments of class V and class VI during the years 2000-01 and 2005-06 that 85 percent of the enrolments of class V entered class VI. This is the high ratio but at the same time, it is discouraging that the enrolment of class VI in 2005-06 (728,546) was observed to be 32.7 percent of its relevant population age group (i.e., 2227.21 thousand)

12. Projected enrolments in classes VI to VIII in Punjab are 1990.57 thousands in 2007 but these are estimated to be 2626.54 thousands in 2015. These data provide demand for the elementary teacher in Pubjab.
13. On the basis of the enrolment data of classes VI to VIII in 2005 and teacher data for the same year in classes VI to VIII, it was calculated that a pupil teacher ratio of 25:1 may be used for projecting the total teacher demand for classes VI to VIII during the projection period. With the use of this pupil teacher ratio, it was found that the teacher demand for classes VI to VIII will increase from 80696 in 2006 to 105062 teachers in 2015; thus showing an increase of 30 percent in the demand for elementary teachers over the projection period.
14. Additional teacher demand for classes VI to VIII in the years 2006 to 2015 gradually increases; additional teacher demand in 2007 being 2155 and being 7652 in 2015. In this way requirement of additional middle school teachers being 3.55 times more in 2015 than that of 2007.
15. Demand of additional teachers for classes I to VIII in the years 2009 is likely to be 17518 whereas 25814 additional teachers are projected to be required for teaching classes I to VIII in Punjab in 2014. In this way, the elementary teacher demand in 2014 will be 150 percent of the elementary teacher demand in 2009.

5.3 CONCLUSIONS

Following conclusions were drawn from findings of this study:

1. As the increase of the enrolments of classes I to V over the period 1995-96 to 2004-05 has been extremely slow; being only 1.5 percent over this period of nine years, it can be concluded that this trend of growth cannot be followed in projecting the future enrolments of classes I to V in Punjab. (Ref finding 1)
2. It is evident from findings 2 and 3 that the participation rate in class I in 2006 was 56 percent of the relevant age group and the participation rate in class I to V was 69.71 percent of the relevant age group in 2006. It was therefore, concluded to use 69.71percent participation rate of class I in 2006 as base line data for the enrolment projections during the projection period. (Ref findings 2 & 3)
3. As the retention rates of enrolments of class V in 2000-01 and 2005-06 ranged between 41 percent and 62 percent, it can be concluded that the wastage rates in the primary school enrolments were 38 percent to 59 percent during the years 2000-01 to 2005-06. It is evident that this heavy dropout rate leads to failure in achieving the planning targets with the result that the set targets are gradually shifted. (Ref finding 4)
4. As the retention rates of classes II and V in 2005-06 were found to be 93.5 percent and 85.86 respectively to be taken as base line data for 2006, it was concluded to inflate these rates @ .5 percent and @ 1.5 percent per annum respectively in order to achieve 99.68 percent and 98.17 percent retention

rates for classes II and V respectively and to decrease the student wastage. (Ref finding 3)

5. As the data of 2005 revealed a pupil teacher ratio of 39:1, it was concluded to use a pupil teacher ratio of 40:1 in projecting total teacher demand for classes I to V during the projection period. While drawing this conclusion of using pupil teacher ratio of 40:1, the government policy of using this ratio was also kept in view. (Ref finding 11,12 & 13)
6. As it was found that the participation rate of class VI enrolment in 2005-06 was only 32.7 percent; of the relevant age group, hence it was concluded to be very low and the decision to raise it gradually to 50 percent up to 2015 was taken. (Ref finding 11)

5.4 RECOMMENDATIONS

Following were the recommendations of the study:

1. On the basis of slow rate of increase in the enrolments of classes I to V observed over the period 1995-96 to 2004-05, it is recommended that proper monitoring of the implementation of future plan may be made on yearly basis and the failures, if any may be remedied within the plan implementation period. The establishment of a monitoring cell in the Ministry of Education or Ministry of Planning is, therefore, recommended.
2. Establishment of a research and evaluation cell in Ministry of Education is also recommended so that the causes of the failure in the achievement of plan targets are investigated well in time

3. As the dropout rates ranging between 38 percent and 59 percent have been observed in primary school enrolments during the years 2000-01 to 2005-06, it is recommended to the plan implementers to monitor this aspect of education in future and take in time measures to control the wastage. The supervisory staff of the elementary schools may be specially trained to control wastage of school enrolment and maintain targeted retention rates during the projection period.
4. Additional teacher requirement for classes I to V and for classes VI to VIII is likely to rise up to 14000-18000 and 8000 in 2014 respectively. It is, therefore, recommended to control the supply of the primary school teachers accordingly. It is also recommended to avoid the mismatches of supply and demand while planning future elementary teacher education in Punjab.
5. As the aggregate of additional teacher requirement for classes I to VIII rises to the maximum of 25814 in 2014, authorities of the colleges of elementary education in Punjab need to plan ahead of time and prepare only the required number of teachers through their colleges and apply their remaining potential to retrain the trained working teachers.
6. It is also recommended to the coming researcher to conduct such projection studies separately for boys and girls. Moreover such research studies may also be conducted district wise so as to plan the future education on more reliable basis.

7. It is high time to improve the quality of education. For this purpose it is recommended to bring down the pupil teacher to 30:1 and 20:1 for primary and middle classes respectively and project the teacher demand accordingly.
8. Participation rates targeted in this study are quite realistic. It is recommended to raise the participation rates and project the teacher demand accordingly so that the targets of universalization of elementary education are achieved by 2015.
9. It is also recommended that a unit may be established by the Ministry of Education Punjab in order to carry out teacher education plans on yearly basis. This is likely to help implement the plans objectively and get effective benefits by supplying the teachers according to the projected demands of teachers.

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APPENDIX A

SPRAGUE MULTIPLIERS

	F-2	F-1	F0	F+1	F+2	F+3
First Table						
Fa			+0.3616	-0.2778	+0.1488	-0.0336
Fb			+0.2640	-0.0960	+0.0400	-0.0080
Fc			+0.1840	+0.0400	-0.0320	+0.0080
Fd			+0.1200	+0.1360	-0.0720	+0.0160
Fe			+0.0704	+0.1408	+0.0912	+0.0176
Second Table						
Fa		+0.0336	+0.2272	-0.0752	+0.0144	
Fb		+0.0080	+0.2320	-0.0480	+0.0080	
Fc		-0.0080	+0.2160	-0.0080	+0.0000	
Fd		-0.0160	+0.1840	+0.1400	-0.0080	
Fe		-0.0176	+0.1408	+0.0912	-0.0144	
Intermediate Table						
Fa	-0.0128`	+0.0848	+0.1504	-0.0240	+0.0016	
Fb	-0.0016	+0.0144	+0.2224	-0.0416	+0.0064	
Fc	+0.0064	-0.0336	+0.2544	-0.0336	+0.0064	
Fd	+0.0064	-0.0416	+0.2224	+0.0144	-0.0016	
Fe	+0.0016	-0.0240	+0.1504	+0.0848	-0.0128