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A large, light blue circular graphic containing a dark blue silhouette of a world map, centered on the Atlantic Ocean.

National Education Sector Development Plan: *A result-based planning handbook*

Education Policies and Strategies 13

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**National Education Sector
Development Plan:**

**A result-based
planning handbook**

**Section for Education Support Strategies
Division for Education Strategies and Capacity Building**

U N E S C O

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Preface

This is the thirteenth volume in the series *Education Policies and Strategies* launched in 2001 by UNESCO's former Division of Educational Policies and Strategies. Deliberately eschewing an excessive concern with theory, it seeks above all to be a collection of good practices. Through the choice of themes addressed, UNESCO aims to share its experience not only with education planners, but more broadly with all those interested in the elaboration and implementation of education policies and strategies.

Devoted to the subject of result-based planning in education, this issue is addressed to management specialists in national administrations, policy-makers and education ministry officials concerned with improving their knowledge of the methods and tools used in educational planning and management.

This handbook illustrates the way educational planning can be improved by means of the Logical Framework Approach. It describes the different stages of strategic planning in education (such as: system analysis, policy design, action planning, monitoring and evaluation), as well as the way the logical links can be assured across these stages in an effort to promote a result-based education planning and management. A few other planning methods and techniques, such as simulation modelling, resource projections, etc. are also related in this document.

This paper is the first attempt to applying the Logical Framework Approach to education in a sector-wide planning context. It is hoped that this handbook will assist Member States in strengthening their capacity in result-based education planning, using their resources more effectively and voicing their strategic priorities for educational development. It is also hoped that programme officers at various entities of UNESCO and other development agencies will find useful help in improving their planning skills and techniques in support of national education planning and management.

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Introduction

Planning is a process whereby a direction is set forth and then the ways and means for following that direction are specified. There are many forms of planning with several types of activities involved in this process.

A plan is the product of the planning process and can be defined as a set of decisions about what to do, why, and how to do it. A plan of action is a **living reference framework for action**. This implies that:

- ▶ As a **reference of action**, the plan is the result of consensus building process, to be agreed upon by all those working in the fields covered as well as the other stakeholders contributing to its implementation;
- ▶ As an indicative, **living framework**, it is designed in such a way as to allow for adjustments in light of new developments during implementation;
- ▶ As a **working tool**, it includes not only policy and expenditure frameworks, but also the hierarchy of objectives, key actions and institutional arrangements for implementation, monitoring and evaluation.

More and more, education managers are compelled to think and plan strategically, due to some following reasons:

- ▶ First, one may wish to plan and carry out all the activities deemed needed, but without achieving the ultimate goals.
- ▶ Furthermore, more resources do not necessarily stand for the best results. The way one uses these resources can lead to a different level of benefits.
- ▶ Thirdly, it has become more and more difficult to plan everything one would wish to do. One ought to make choices, often tough ones, through a balanced decision-making, trade-offs across the system and consensus building process.

These lead to espouse **strategic planning**. A strategic plan in the education sector is the physical product of the strategic planning process and embodies the guiding orientations on how to run an education system within a larger national development perspective, which is evolving by nature and often involves constraints.

The term strategy¹ was first used in the military context. Generals had the tasks of having a wider view of all factors, for the longer term purpose of eventually ensuring the security of their country. In the early 1960s, this term was proposed to be used outside the military context, first in business and then in the social sectors as well. Education is no exception.

Like any other systems, education has **inputs, processes, outputs and outcomes**:

- ▶ Inputs to the education system include resources such as teachers, buildings, equipment, books, etc.
- ▶ These inputs go through a process (throughput) whereby they are mixed (input mix), combined and/or moved along to achieve results.
- ▶ Educational outputs are tangible results produced by processes in the system, such as enrolments, graduates and learning achievements.
- ▶ Another kind of result, which can be called outcome, is the benefits for the students, their families and/or the society as well.

As a way of **strategic management**, education systems should be analyzed and thought out in terms of relevance, efficiency, effectiveness, impact and sustainability: for example, one will wonder whether the inputs to the education system are relevant for addressing the needs, to what extent the processes (utilization of resources) are efficiently driven and how well the anticipated outputs are effectively produced. Outcomes should be weighed in terms of their impact and sustainability.

Long range v. operational v. strategic planning

In the past, planners usually referred to the term “long-range planning”. More recently, they use the term “strategic planning”. Although many still use these terms interchangeably, strategic planning and long-range planning differ. Long-range planning is generally considered to mean the development of a plan aimed at achieving a policy or set of policies over a period of several years, with the assumption that the projection of (or extrapolation from) the past and current situation is sufficient to ensure the implementation of the future activities. In other words, long-range planning assumes that the environment is stable, while strategic planning assumes that a system must be responsive to a dynamic and changing environment. The term “strategic planning” is meant to capture strategic (comprehensive, holistic, thoughtful or fundamental) nature of this type of planning.

¹ From Greek strategía “generalship,” from strategos “general,” from stratos “army” + agein “to lead.” According to Merriam-Webster Online Dictionary, 10th Edition, strategy means “the science and art of military command exercised to meet the enemy in combat under advantageous conditions”.

With regard to operational and strategic planning, a narrow definition would be that strategic planning is done with involvement of high levels of management, while operational planning is done at lower levels. However, this document proposes to give it a wider definition as shown in the following table.

	Operational planning	<i>Strategic planning</i>
Focus	Routine activities	Achieving goals
Purpose	Achieving the best use of available resources	Planning the best courses of action
Rewards	Efficiency, stability	Effectiveness, impact
Information	Present situation	Future opportunities
Organization	Bureaucratic, stable	Entrepreneurial, flexible
Problem solving	Relies on past experience	Finds new ways and alternatives
Risks	Low	High

This material illustrates the way the **Logical Framework Approach** can be used in strategic educational planning and in the design of specific project documents for the implementation of the national education development plans. It is meant to be a practical guide on result-based, strategic and action planning with two restrictions. First, it deals with the planning issues of education systems at the macro level (national, or state/provincial level, especially in the case of federal systems), rather than at the micro level (e.g. institutions). Second, it addresses planning and management issues at “upstream stages”, rather than at the actual implementation phase. The term “upstream” is meant to designate the stage of the development of national education policies, programmes and/or projects, because it comes before the implementation of the programmes, or “downstream” phase. Many management aspects are not the object of this guide insofar as they concern “downstream stages”.

The handbook presents first a synoptic view of the different stages of the strategic management cycle in the education sector (Chapter I). Subsequent chapters describe the different stages of strategic and action planning by means of the Logical Framework Approach: system analysis (Chapter II), policy design (Chapter III) and action programming (Chapter IV). Resource costing techniques, especially through simulation modelling, are also explained (Chapter V).

In sum, readers of this handbook are kindly reminded that:

- ▶ This document does not intend to be exhaustive and exclusive. It explains the main features of the analytical and planning techniques as proposed by the Logical Framework Approach, but does not give extensive details of this method.
- ▶ It focuses on the logical sequencing in the design of a national education sector development plan or a project, but gives little details on the actual aspects of data and policy analysis, which methodology can be found in the materials listed in the bibliographical references of this handbook;
- ▶ Depending on their level and interest, readers can go straight to the chapters or sections of their choice in this handbook.

Chapter I.

The strategic management cycle

1.1. An overview

There are a variety of terminologies used in strategic management and a variety of approaches to carry it out. One cannot say that there is a “single perfect way” to conduct strategic planning. Each institution has its own particular interpretation of the approaches and activities in strategic management. However, what is generic to strategic management are certain typical stages involving similar activities carried out in a similar sequence. Any management involves four basic stages: analysis, planning, implementation and evaluation.

Diagram 1: The strategic management cycle



In a more sophisticated way, we can say that strategic management is a continuum of successive stages such as: critical analysis of a system, policy formulation and appraisal, action planning, management and monitoring, review and evaluation. Experience and lessons learnt from implementation, monitoring and evaluation provide feedback for adjusting the current programme or for the next cycle of policy formulation and action planning.

Diagram 1 outlines this cyclical pattern of strategic management:

- ▶ Any management cycle begins with analysis, whereby the current situation of a system and the critical issues pertaining to its status and functioning are first **analysed**.
- ▶ Findings and remedial options are then formulated and **appraised**, thus providing policy orientations.
- ▶ When the system is analysed and the future directions are traced, one can proceed with **planning** the necessary actions to correct or improve the situation. A plan can be long range (6 to 10 years), medium term (3 to 5 years) or short term (1 to 2 years).
- ▶ **Operationalization** consists of taking the necessary reform and institutional measures that are conducive to the smooth implementation of plans or programmes and before the actual execution starts, including:
 - ▶ Designing specific development projects or programmes and/or mobilizing resources required to **implement** the planned actions and activities.
 - ▶ Planning and management are subject to **feedback**-providing operations, i.e. **monitoring, review and evaluation**.

In the education sector, the management operations related to “upstream”, planning work consist of: (i) system analysis; (ii) policy formulation; (iii) action planning.

Sector analysis: This diagnostic stage consists of conducting data collection on and critical analysis of the aspects relating to (and surrounding) the education sector. Planners carefully review how the system functions (internal dynamics) and examine various contextual, determining factors (the environment of which education is a part), e.g. macro-economic and socio-demographic situations and developments. They look into the above aspects from the perspective of the system’s strengths, weaknesses, opportunities and threats (better known as the SWOT analysis) regarding educational development. This will help to identify the critical issues, to identify the challenges and to construct remedial actions. Some call this phase of **education sector analysis** (ESA) the diagnostic work. Sector review, system analysis, etc. are also used.

Note: Policy dialogue with stakeholders should contribute to a common understanding of the problems and issues. Lack of reliable information and relevant analysis often lead to misunderstanding and confusion among stakeholders. A tool/mechanism should be set up in order to provide relevant data and information for discussions, which will allow people “to sing on the same sheet of music”. Tailoring data appropriately to the different requirements of different stakeholders is often ignored, to the peril of such important consultation.

Policy and strategy formulation: Careful (and critical) analysis of the educational system undertaken during the sector analysis leads to questions about what the education sector must do in order to address the major issues, challenges and opportunities. These questions include what overall results (strategic goals) the system should achieve and the overall methods (or strategies) to implement policies designed to bring about such objectives. This stage of strategic planning is called **policy formulation**.

Note: Participatory policy formulation requires not only the participation of stakeholders in the design of policies and strategies but also the availability of considerable information and a number of policy options/alternatives that can allow for evidence-based policy dialogue and consensus building.

Note: Goals and expected results can, for example, be worded to be specific, measurable, agreed upon, realistic, timely, extending the capabilities of those working to achieve the goals, and rewarding to them (SMART or SMARTER as acronym). Using the SMART tool can help adjust existing educational policies and strategies or update them in the light of new developments.

Action planning: Action planning is a process whereby one translates the policy statements (options and strategies) into executable, measurable and accountable actions (EMA). In a broader sense, action planning includes specifying objectives, outputs, strategies, responsibilities and timelines (what, what for, how, who and when). The output of this process is a **plan of action**. For the purpose of result-based planning, the Logical Framework Approach is also widely used when preparing development projects, programmes and plans, thus contributing to results-based programming, management and monitoring in the education sector.

Note: The plan of action is a sort of “business” plan² (sometimes called operational plan, implementation plan or operating plan), which describes the actions, inputs and resources required over the next years. It also includes methods and indicators for **monitoring and evaluating** the planned activities. In general, it comprises (i) the sector analysis; (2) the policy directions; and (iii) the action programme (See also Box 1). *The sector analysis* summarises the findings of the structural, functional, and pedagogical diagnoses of an education system as well as the design of policy options and areas for improvement. The part dealing with *policies and strategies* presents the policy framework concerning the mission, the policy objectives/orientations, as well as the strategies of institutional reform and effective implementation of the education policy. *The action programme*, medium-term in general, describes the actions and activities to be carried out, the resources (human, technical, physical, and financial) required, the responsibilities and the implementation timeframe. Often, ministries will develop short-term plans (1 to 2 years) for each sub-sector, department, etc., which are sometimes called **work plans**.

² In addition to the strategic plan or quite often as part of it, one will have to prepare an action plan of medium range. This rolling medium-term plan (in general, 3-5 years according to countries’ planning practices) will permit mid-term updates and necessary adjustments to long-term policies and strategies in place.

Usually, **projections of resource requirements** are included in strategic, operating or work plans. Resources can be human, technical, physical and financial. Information on financial resources include: the cost estimates required for the implementation of the plan, the budget likely to be available in the future and the funding gaps (additional funding) to fill in for each of the years included in the span of time, giving particular attention to the first years. The MTEF (Mid-Term Expenditure Framework) processes in place in some countries should contribute to fruitful negotiations and trade-offs between the “top-down” budget ceiling and “bottom-up” initiatives for resource envelope for the sector.³ Plans build on the MTEF and further detail how the funds will be spent (by recurrent budget, capital budget, project budgets, etc.)

Note: In the context of strategic planning, **policy simulation modelling** is widely used when preparing education sector development plans or programmes, as a tool for scenario planning and resource projections. Since there are too many actors, interests and the interrelations between these in the education sector, it is necessary to have not only a reliable information system, but also an objective forecasting tool to facilitate policy consultations regarding policy feasibility, financial constraints and their consequences on education and national development.

1.2. The basic structure of plan or programme documents

A plan or programme document usually follows with a variety of variants the logic structure of which is presented in Box 1.

The following chapters present some aspects that are subject to analysis throughout the process of sector development planning, viz. diagnosis, policy formulation and action planning. Furthermore, they describe how the Logical Framework Approach can be used in the context of the design of an education sector development plan or programme.

³ See Public Expenditure Management Handbook. 1998. World Bank for a conceptual and practical overview of the MTEF procedures.

Box 1. The basic structure of plan documents

I. SECTOR ANALYSIS

I.1. General context

I.2. System description

I.3. Situation analysis (achievements, lessons, issues, challenges and opportunities)

I.5. Stakeholder analysis

II. POLICY AND STRATEGY

II.1. Development objective and overall goals

II.2. Specific objectives and strategy for achieving development objective

II.3. Beneficiaries

II.4. Institutional arrangements

II.5. Major sub-programmes (or Sub-sectors)

III. PROGRAMMES OF ACTION

III.1. Sub-programme 1

III.1.1. Programme objective (Statement and description of the programme)

III.1.2. Components (Results-> Actions ->Inputs/Resources)

III.2. Sub-programme 2

III.X. Sub-programme X

IV. MANAGEMENT, MONITORING AND EVALUATION

IV.1. Governance and management

IV.2. Development coordination (government, donors, NGOs, private sector, etc.)

IV.2. Risk assessment and assumptions

IV.3 Monitoring and evaluation

V. COSTS

VI. ANNEXES

Chapter II.

Sector analysis

Sector analysis is the first stage of sector development planning. Sector review, situation analysis, diagnosis, etc. are sometimes used interchangeably. Basically, sector analysis consists in conducting data collection on and critical analysis of the aspects relating to (and surrounding) the education sector. Planners and managers carefully examine both internal and external aspects of the education system. In other words, they:

- ▶ review how the system functions (internal dynamics) to meet people's needs and economic demand;
- ▶ examine various driving forces behind the education system and external conditions (the environment of which education is a part), e.g. macro-economic and socio-demographic situations and developments.

Planners and managers can look at the above aspects from the perspective of the system's strengths, weaknesses, lessons and opportunities regarding educational development. They also examine the relevance, efficiency and effectiveness of the inputs, processes and outputs of the system in its current setting. This helps to identify critical issues, challenges and construct remedial actions and policy provisions.

2.1. Diagnostic aspects to be analyzed

The main categories of aspects to be considered when conducting an **Education Sector Analysis (ESA)** and/or when describing the diagnostic part of an education sector development plan are: (i) macro-economic and socio-demographic frameworks; (ii) access to and participation in education; (iii) quality of education; (iv) external efficiency; (v) costs and financing of education; and (vi) managerial and institutional aspects. The aspects (ii), (iii), (iv), (v) and (vi) can be documented by sub-sector (pre-school, primary and secondary education, technical and vocational education, higher education, non formal education, etc.)

The following paragraphs describe, by category, the major aspects to be analysed in terms of **achievements, lessons, issues, challenges and/or opportunities**. Annex 1 presents in more detail the various aspects that can be considered for a diagnosis of the education sector, including the data and indicators to be provided.⁴

Macro-economic and socio-demographic frameworks: This is about analyzing the main aspects and features of the socio-economic context of the country in so far as they

⁴ For those who are interested in having more detailed information on these diagnostic aspects, please refer to Annex 1.

can have impact on education development. The general characteristics of a country can be studied mainly by carrying out, but not limited to, analyses of demographic (general and school-related) data, the macro-economic and budgetary context, the socio-cultural environment and the political and institutional structures and frameworks.

a) Demography and manpower

This involves analyzing the demographic aspects of at least the last two years (preferably 5 to 10 years) and the probable changes in the coming years (notably the period of programming of the plan), not only in the total population of the country, but especially in the school-age population.

b) Macro-economic and budgetary framework

This is about analyzing the past trends and the possible developments of national productivity, domestic revenues, and the prospective share of education in total public expenditure. On the basis of macro-economic data and information provided by agencies dealing with central planning and finance, education ministries will analyse some of the following macro-economic and budgetary indicators:

- ▶ Public expenditure on education as percentage of gross national product
- ▶ Public expenditure on education as percentage of total government expenditure
- ▶ Percentage distribution of public current expenditure on education by level
- ▶ Public current expenditure per pupil (student) as % of GNP per capita
- ▶ Public current expenditure on education as percentage of total public expenditure on education
- ▶ Private (or community) funding, if any
- ▶ External funding, if any

c) Socio-cultural analysis

This section concerns in particular: the demographic composition, the socio-cultural and sometimes religious structure, the country's cultural traditions which can have an impact on the social demand for education, the schooling and the school performance of minorities, and of girls/boys, etc.

d) Politico-institutional analysis

The aspects of institutional, political and territorial organization are likely to have an impact on the education services of a country. It involves the

analysis of the functioning mode of the State and local/public authorities (centralized or decentralized systems, etc.), but also the reforms in view and their likely consequences for the education system. The role and responsibilities of the different planning and management authorities should be analyzed in order to show their strengths and weaknesses and identify the paths to follow to remedy possible management problems in the education sector.

Access to and participation in education: This part mainly concerns analysing the access and participation at each level of education; the internal efficiency, and the disparities in education.

a) Access and participation

This section of the education sector diagnosis analyses education coverage by level and type of education according to the structure of the education system (at all levels and across all types of education), including the provision of education by public, semi-public, private or community schools, etc. Analysis is carried out of present trends building on an examination of past tendencies. Some main indicators that are used to measure access to and participation in education are:

Access to education can be defined as the extent to which the “school-age” population is able to access the first grade of a particular level or cycle of education. The most commonly used indicators to measure this aspect of the education sector are:

- ▶ the apparent intake rate;
- ▶ the net intake rate;
- ▶ the transition rate; and
- ▶ the registration rate.

Participation in education can be defined as the coverage of the “school-age” population in education services, ideally to the completion of the level concerned. The most commonly used indicators to measure this aspect of the education sector are:

- ▶ gross enrolment ratio;
- ▶ net enrolment ratio;
- ▶ age-specific enrolment ratio.

b) Internal efficiency

The internal efficiency of an education system basically measures the number of years it takes a child to complete a particular cycle or level of education, e.g. primary, secondary, etc. The basic indicators required to measure the internal efficiency of an education system are calculated on the basis of the flow rates:

- ▶ promotion rate;
- ▶ repetition rate; and
- ▶ dropout rate.

The indicators of the survival, retention, completion rates, etc. are calculated building on these flow rates. Cohort analysis using flow diagrams is useful to calculate these indicators of internal efficiency. A school cohort is a group of pupils who join the first grade of a given cycle or level of education in the same year and subsequently experience the events of promotion, repetition or dropout. Cohort analysis traces the flow of a group of pupils who enter the first grade in the same year and progress through an entire cycle or level of education. In particular, it can help calculate wastages due to dropout or repetition, survival rates and the coefficient of efficiency. For more details, please refer to Annex 4. Examples of indicators are:

- ▶ Years-input per graduate
- ▶ Average duration of studies per graduate
- ▶ Average duration of studies per dropout
- ▶ Average duration of studies for the cohort
- ▶ Proportion of total wastage spent on dropout
- ▶ Proportion of total wastage spent on repetition
- ▶ Survival rates by grade
- ▶ Coefficient of efficiency

c) Disparities. This means analyzing the educational coverage and services by gender (girls/boys), by administrative area (region, districts, etc.), by population density (urban/rural) or by socio-cultural groupings (social strata, ethnic or linguistic minority groups, etc.).

Quality of education: In principle, quality should deal not only with educational inputs, but also with outputs, outcomes (e.g. learning achievement, the acquisition of basic life skills, citizenship, etc.), and processes. However, because such educational outcomes are often difficult to measure, planners and managers have tended to rely on the quantity and the quality of educational inputs (resources) – and to a limited extent, processes, – to assess educational quality. Internal efficiency indicators (for example, promotion, repetition and dropout rates) are often used as proxies to measure the quality of education. Three broad categories of educational inputs are: (i) education personnel; (ii) instructional methods and materials; and (iii) educational facilities.

a) Education personnel

Teachers are the principal factor in educational provision. On the other hand, salaries represent the most important part of recurrent education

expenditure. This implies that teachers' attributes need to be analysed carefully. One ought to examine, for example, the number of teachers available, the requirement of teachers in the light of the national or sub-national norms and standards, pupils/teacher ratios, the level of teachers' qualification and their training needs, and the status of pedagogical and administrative supervision. Teacher salaries by category or by level of qualification need to be analysed in consultation with other ministries or institutions concerned. Some teacher-related indicators that can be analysed include:

- ▶ The number of teachers available in the system and new teachers to be recruited
- ▶ Pupil-teacher ratio
- ▶ Teachers' emoluments as a percentage of public current expenditure on education

b) Educational facilities

This is about school space and equipment. In countries that have reached high levels of education, physical construction can represent marginal investment. However, in countries that have significantly low enrolment ratios, this is one of the most important budgetary categories. This implies the need for a thorough and careful analysis of the costs and standards of construction, maintenance costs, the conditions of educational facilities (blackboards, desks, latrines, water, etc.), as well as the space-time use of classrooms according to levels and types of education. Some indicators that can help measure the space-time use of educational facilities are:

- ▶ Pupil-classroom ratio
- ▶ Classroom space utilisation rate
- ▶ Classroom time utilisation rate
- ▶ Classroom utilization rate
- ▶ Classroom requirements

c) Instructional methods, processes and outputs

This is about evaluating the status (or the availability) and the relevance of school programmes, pedagogical methods (as for example, the types of pupil groupings in multigrade classes, double shifts, etc., and also the class sizes), and of instructional material (textbooks, teacher's guides and equipment). Depending on the resources available to this end, specific research studies should be carried out in order to:

- ▶ Assess the actual learning achievement of students, taking into account their individual characteristics and the various educational inputs (lear-

ning environment, educational facilities, teachers' qualifications, pedagogical supervision, etc.) as well as non-school factors (geographical zone of schools, parents' social and economic backgrounds, distance to schools, etc.);

- ▶ Identify policy options to improve student performance in light of the nature and weight of the different factors influencing the teaching and learning by students.

Educational outcomes and external effectiveness: This is about the performance of graduates of a certain level of education in active social and economic life, meaning, the social and economic benefits that individuals and/or society can draw from the investments made in education. Depending on the contexts and the countries, the analysis of the characteristics of school-leavers (graduates of a given educational cycle), of their professional integration in the job market (tracer studies of school graduates) can prove essential in the definition of educational reforms.

Educational costs and finance: This part deals with questions on educational costs, financing and spending: How much education services cost at national or subnational levels, who pays for education, how resources are allocated and whether they are used efficiently and effectively.

a) Costs of education

This means expenditure by type, by function and by level of education as well as unit costs. Expenditure is in general analyzed in terms of recurrent or capital costs. Recurrent expenditure is subdivided into salaries (teaching personnel and non-teaching personnel) and other recurrent costs (textbooks, teacher guides, other educational materials). Sometimes, expenditure is made in cash or in kind. The analysis of unit costs, notably on salaries and school buildings, is important and necessary. On the basis of total expenditure and enrolments, one can calculate unit costs (costs per pupil) by school level, by type (general or technical education) or by status (public, semi-public or private).

Note: Increasingly, organizations analyze costs per pupil or salaries per teacher as multiples of GDP per capita to make comparisons not only between the levels and types of education in the country, but also to make regional and international comparisons. Considering the importance of salary expenditure, these are analyzed in a detailed way in relation to the salaries of other professions of similar qualifications in the country, and salaries of teachers in comparable countries. These unit costs are compared with the bulk of salaries in the light of class sizes and the student/teacher ratios (or the weekly teaching hours for teachers and the weekly learning hours for pupils, especially at post-primary levels). This analysis will make it possible for each country to adopt appropriate policies in increasing or maintaining salary levels by taking measures in quality improvement in education and in the status of

teachers. The analysis of the cost of school buildings is another important field, in particular in countries where enrolment ratios are low.

b) Educational finance

This involves the analysis of the financing of education by the State and local authorities (national education budget and other public budgets), of the financing by families (in kind or by cash) in public as well as in private education, of the financing by other national agents (industries, religious denominations, parents' associations, etc.) or by external agencies (which could be grants or loans at multilateral, bilateral, or NGO level), and for recurrent or capital costs.

At the national level, there exist several ministerial departments in charge of education and training. It happens that decentralized authorities receive non-allocated credits from the State. It is also necessary to define the budgets voted and the real expenditure.

Note: It is important to analyze the non-governmental spending, be it national (local groups, parent associations, enterprises, etc.) or foreign (multilateral, bilateral or non-governmental grants and/or loans). The non-governmental national budgetary data can be obtained during household surveys or from other providers of education and training. Experience also shows that it is not easy to obtain the budgetary data of external agencies, given the (i) multiplicity of concerned partners; (ii) the absence of accounts and the diversity of budgetary categories; (iii) the different programming and disbursement cycles of agencies.

c) Use of resources

This involves analyzing how resources are allocated and used within and across different sub-sectors or levels of education, as well as at the institution level. Some questions that can be raised include, but are not limited to:

- ▶ Is the allocation of financial resources at different levels appropriate (increased or reduced)?
- ▶ Are resources spent and used in an efficient, effective and transparent way?
- ▶ Could there be a possibility of trade-offs to increase the cost-efficiency and the cost-effectiveness within and across different levels and types of education?
- ▶ Is the financial management placed at a right level considering the existing institutional capacity (central, decentralized, school based, etc.)?

Managerial and institutional aspects: This is the question of relating the normative aspects of the system to the institutional and organizational management practices of the sector with a view to identifying strengths and weaknesses

in order to bring about improvements. The management aspects could be examined according to the traditional duality of the educational organization:

- ▶ the planning and administrative function which consists of programming and distributing resources (budgets, personnel, buildings, instructional materials, etc.) among the levels of education, regions and /or schools,
- ▶ the pedagogical function which contributes to the actual management and transformation of these resources into end-products (graduates, learning achievements, individual and social benefits).

2.2. Sector analysis through the LFA

2.2.1. Logical Framework Approach: An overview

The Logical Framework Approach (LFA) is an analytical technique which can help educational planners and managers to:

- ▶ structure the analysis of the current situation;
- ▶ establish a logical hierarchy of objectives;
- ▶ structure ways and means by which these objectives will be achieved;
- ▶ identify the potential risks to achieving the objectives and expected outcomes; and
- ▶ establish how outputs and outcomes might be monitored, reviewed and evaluated.

Note: A distinction needs to be made between the Logical Framework Approach (LFA) and the Logical Framework Matrix (LFM). In a large sense, the LFA involves the whole process of problem analysis, stakeholder analysis, designing a hierarchy of objectives and proposing implementation strategies. The end product of this analytical approach in summary form is the matrix (or Logframe), which outlines what the programme/project intends to do and how, what the assumptions (external factors) are, and how outputs and outcomes will be monitored, reviewed and evaluated. In a narrow sense, LFA means a process by which one constructs an LFM.

Once developed, the product of the LFA can be used as a monitoring and management tool for monitoring and reviewing the implementation of a plan, a programme or a development project.

The matrix structure is shown in Figure 1, together with a list of the questions that the matrix contains.

This matrix shows amongst others how to start framing the objectives hierarchy in the first column of the Logframe matrix. Objectives at the top of the column should help frame goal and purpose statements, while further down the column, output and activity statements can be identified. This exercise of filling in the first column (hierarchy of objectives) of the Logframe can be facilitated by an iterative process of building a problem tree and turning it into an objective tree as can be seen in Figures 3 and 7. In other words, this consists of establishing and checking the causes-effects and means-ends relationships and logics in the form of trees and then transposing them on the first column of the Logframe.

Figure 1. Logframe matrix structure: principal questions

Narrative Summary	Objectively Verifiable Indicators (OVI)	Means of Verification (MOV)	Risks and Assumptions
Goal Indicate the broad objective to which the plan or project has to contribute	What are the quantitative or qualitative measurements to assess whether the goals are being achieved?	What sources of information exists to verify the course of the plan or project?	What external factors are necessary for achieving these broad objectives?
Purpose Indicate the end-of-programme/project status	What are the quantitative measurements or qualitative evidence by which the achievement of these specific objectives can be judged (estimated time)	What sources of information exists to verify the achievement of the specific objectives?	(Purpose to Goal): What conditions external to the plan/project are necessary if achievement of the purpose is to contribute to reaching the goal?
Outputs Indicate each of the outputs that are to be produced in order to achieve the purpose	What kind and quantity of outputs, and by when will they be produced? (quantity, quality, time)	What sources of information can be to verify that outputs are produced?	(Output of Purpose): What are the conditions external to the plan/project which, if not met, are liable to restrict progress from outputs to achievement of the purpose?

Narrative Summary	Objectively Verifiable Indicators (OVI)	Means of Verification (MOV)	Risks and Assumptions
Actions/ Activities Indicate each of the actions/activities that are to be undertaken in order to produce each of the outputs.	The verifiable indicators at this level consist of resources required to undertake the activities (institutions, persons, time schedule, etc.).	MOVs at this level are usually the costs required to implement the activities	(Activity to Output): 1) What external factors must exist to obtain expected outputs on time? 2) What kind of conditions outside the control of the plan or project is necessary for its inception (preconditions)?

Depending on the specific needs and practices of an organization, this Logframe can be developed further to include additional levels of analysis and programming (e.g. outcome).

In this material, different steps of building the Logframe are examined according to the groupings of three stages of planning, i.e. situation analysis, policy formulation and action planning as shown in Figure 2.

Figure 2. Three principal stages of Logframe

Situation analysis	Policy and strategy formulation	Action programmes
<ul style="list-style-type: none"> • Problem analysis • Stakeholder analysis 	<ul style="list-style-type: none"> • Analysis of objectives • Analysis of strategies 	<ul style="list-style-type: none"> • Logframe Matrix • Nesting of Logframes • Performance indicators • Means of verification • Risk assessment and assumptions • Inputs/resources

Prior to designing a Logframe matrix, it is necessary to undertake a structured analysis of the current situation (Sections 2.2.2 and 2.2.3). The above analytical stages should be approached as an iterative process, not as a linear set of prescribed steps. For example, while stakeholder analysis is presented as coming after problem analysis, in practice, some preliminary stakeholder analysis is required prior to problem analysis in order to clarify who should be involved in the analysis of problems. The other elements of LFA relating to policy formulation and action planning are examined in Chapters 3 and 4.

The following paragraphs explain how one can carry out a structured situation analysis (problem analysis and stakeholder analysis) by means of the Logical Framework Approach and in light of the findings of the sector analysis. SWOT analysis, another technique that can help structure a diagnostic analysis of a problem or a system, is briefly presented as well.

2.2.2. Situation analysis

The two techniques, examined in this handbook, can be alternatively or in a combined way used in describing the current situation: (i) problem analysis by means of the Logical Framework Approach; (ii) SWOT analysis.

Problem analysis

One can apply the Logical Framework, especially its techniques of problem analysis, in order to identify and structure the hierarchy of problems that the education system faces. Different aspects to be considered for a diagnosis of the education sector are explained in Section 2.1.

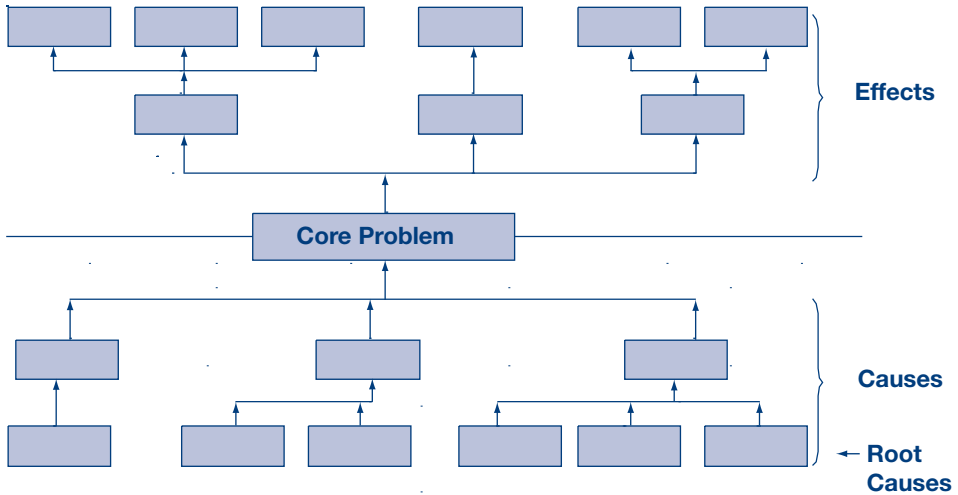
In general, development plans, programmes and projects are designed in order to overcome the current problems and improve the existing unsatisfactory situation. As said earlier in this handbook, a diagnostic analysis in education consists in describing the major educational aspects in terms of **achievements, problems, lessons, issues, challenges and opportunities**.

Problem analysis can help in this analytical work of situation analysis by identifying what the problems are and establishing the cause and effect relationships between these problems. The key purpose of this analysis is to identify the “root causes” and, not just the effects and symptoms of the problem(s).

*“A useful medical analogy can be used to emphasise this point: If you go to the doctor with a bad headache, and the doctor prescribes a pain killer without any further detailed diagnosis, the doctor is treating the **effect** and not the **cause** of your problem. Without finding out what is causing the headache in the first place, it is likely that pain will persist as soon as the medication wears off. Projects which only address the effects of problems, and not underlying causes, are therefore unlikely to bring about sustainable benefits.”⁵*

⁵ “AusGUIDELines: 1. The Logical Framework Approach”, Last Updated 2003, AusAID, Australian Government.

Figure 3a: Problem tree structure



In principle, the problem analysis should follow an in-depth investigatory, technical work (data collection and analysis): the diagnostic data, presented in Section 2.1, have to be collected and analyzed first; these data, once analyzed and compiled, will be made available, in a synthetic form, before constructing a problem analysis and for review by stakeholders (please refer to Section 2.2.3 on Stakeholder analysis).

A principal tool used in problem analysis is the “problem tree”, that is to be constructed by a group of people concerned with education development problems. This is about identifying all existing problems and placing them according to their level – causes and effects – around a core problem (See Figure 3a).

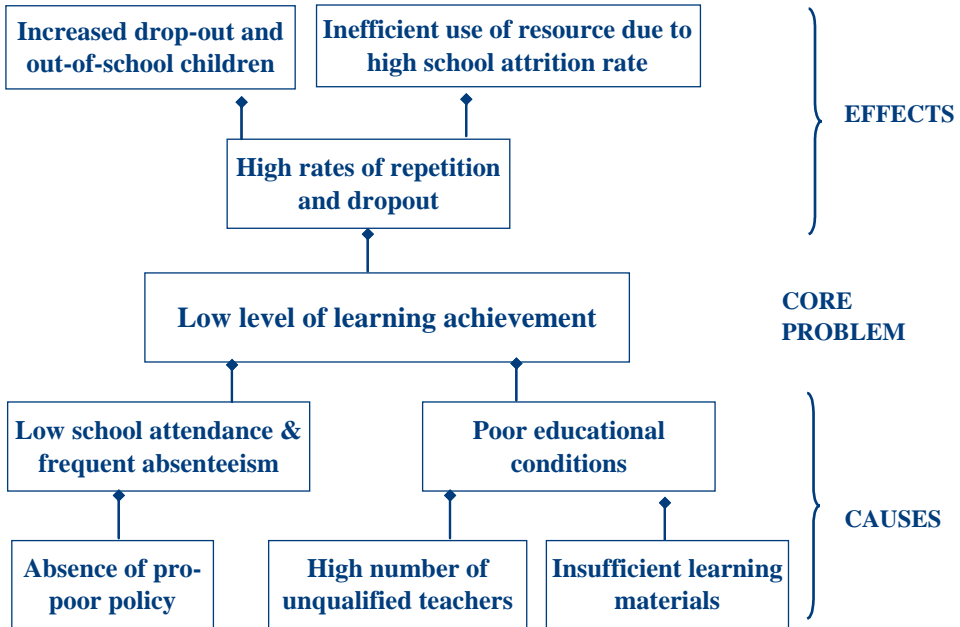
Note: The problem tree can be technically constructed by an individual. However, it is strongly recommended that this problem tree and the subsequent analysis are carried out collectively by a group of people, i.e. the stakeholders sharing interest in development and also those affected by such a change. Section 2.2.3 and Annex 2 describe the professional and other interest groups that can constitute stakeholders in the education system.

Some tips for constructing a problem tree are:

1. Bring together major stakeholders for constructing a problem tree on the basis of the data and the findings provided.
2. List, on paper or flipchart, all the problems that come to mind. Problems need to be carefully identified: they should be existing problems, not possible, hypothetical, imagined or future ones.
3. Identify a core problem (this may involve considerable trial and error before deciding on one).
4. Determine which problems are “Causes” and which are “Effects” of the core problem.
5. Arrange in hierarchy both Causes and Effects, and identify how the causes relate to each other in order to find out what are the root causes of the core problem.

A simplified example of the problem tree is shown in Figure 3*b*. Around the core problem of low learning achievement, we can see different layers of causes and effects that are stratified by means of structuring techniques. The problems identified as causes are placed under the core problem, while those identified as effects are put above. The root causes are those placed at the very bottom of this tree: one will have to act on these root causes in order to improve them and therefore they will be subject to activities to carry out as we will see later when explaining the analysis of objectives.

Figure 3b: An example of the problem tree



SWOT Analysis

The so-called SWOT analysis can be usefully and flexibly used in order to complement this stage of situation analysis. SWOT analysis is a tool for analysing a system and its functioning in an environment. In the first stage of planning, it can help planners and managers to focus on key issues. **SWOT** stands for **strengths, weaknesses, opportunities, and threats**. Strengths and weaknesses are **internal** factors, while opportunities and threats are **external** to the system.

SWOT analysis provides information that is helpful in matching the system's resources and capacities to the competitive (interconnected) and dynamic (evolving) environment in which it operates. As such, it is instrumental in problem identification and strategy formulation.

Note: SWOT is an analytical tool and does not provide data to work on. Thus, one must collect and process the data to be analyzed and use research and studies on the education sector (existing or additional, to be carried out) when applying SWOT analysis. Another caution is that SWOT analysis can be very subjective; two people rarely come up with the same final version of SWOT. Therefore, a collegial work can help reduce this subjectivity.

The figure 4 provides an example of a SWOT Analysis used to assess both internal and external conditions and factors of an education system in light of the data and studies that are examined in an education sector analysis. From this analysis:

- ▶ One will have a picture of the current situation as well as a road map that shows how to build on the strengths of the system and minimize (or eliminate) the weaknesses;
- ▶ One can then use this table to take advantage of opportunities and avoid (or lessen) threats, by utilizing the information gained to construct strategies;
- ▶ To take these further steps, a matrix of the factors (SWOT matrix, also known as TOWS matrix⁶) can be constructed as shown in Figure 5.

SWOT matrix can help structure policy options and strategies on the basis of the data analysed using a SWOT Analysis (Figure 4) such as is outlined below:

- ▶ S-O strategies pursue opportunities that are a good fit to the system's strengths.
- ▶ W-O strategies overcome weaknesses to pursue opportunities.
- ▶ S-T strategies identify ways that the managers of the system can use the strengths to reduce their vulnerability to external threats.
- ▶ W-T strategies establish a defensive plan to prevent the system's weaknesses from making it highly susceptible to external threats.⁷

⁶ TOWS analysis is similar to SWOT, but looks at the negative factors first in order to turn them into positive factors.

⁷ See *Simplified Strategic Planning: A No-Nonsense Guide for Busy People Who Want Results Fast!* 1999 by Robert W. Bradford et al., for an overview of the LFA techniques and stages.

Figure 4: An example of a SWOT analysis of an education system

I N T E R N A L	Strengths	Weaknesses
	<p>Internal positive aspects that are under control and upon which you may capitalize in planning:</p> <ul style="list-style-type: none"> • Policies and legislation on universal basic education • Decentralized planning and management structure • Diversified forms and types of education available • Relatively good network of educational establishments • A good number of motivated educational personnel 	<p>Internal negative aspects that are under your control and that you may plan to improve:</p> <ul style="list-style-type: none"> • Low management capacity, especially at decentralized level • Lack of reliable data and information to feed policy and decision making • Low level morale and professionalism of many education personnel • Insufficient number of educational establishments in some provinces • Low internal efficiency and flow rates (e.g., low promotion rates, high attrition rates, low learning achievement, etc.)
E X T E R N A L	Opportunities	Threats
	<p>Positive external conditions that you do not control but of which you can plan to take advantage:</p> <ul style="list-style-type: none"> • More financial resources likely to be available in the future • Positive perspectives for more jobs (e.g., growth, globalization, technological advances) • Nation-wide institutional reforms for greater devolution of power to provinces • High social demand for quality education • Increased donor support to education 	<p>Negative external conditions that you do not control but the effect of which you may be able to lessen:</p> <ul style="list-style-type: none"> • Low salaries of civil servants, including teachers • Weak governance: generalized corruption, lack of transparency in planning and management • Unfavourable climate for appropriate education provision (in some provinces) • Brain drain of qualified personnel, including teachers

Figure 5: SWOT Matrix

	Strengths	Weaknesses
Opportunities	S-O strategies	W-O strategies
Threats	S-T strategies	W-T strategies

2.2.3. Stakeholder analysis

Stakeholders can be described as individuals, groups and/or institutions having an interest in a project or a plan. They can:

- ▶ Be positively or negatively affected by the impact of the plan or the project; and/or
- ▶ Influence the success or the failure of the project or the plan.

Annex 2 presents *in extenso* the professional and other interest groups that can constitute stakeholders in the education sector.

Once the main problems and the causality relationships between them (causes and effects) are identified in the problem analysis by means of the problem tree, the next step is to carry out a **stakeholder analysis**. This is in order to identify on “who” these problems actually impact the most, and what the roles and interests of different stakeholders might be in addressing the problems and reaching solutions. In other words, stakeholder analysis consists in asking the following two questions: “Whose problem?” and, if a strategy is proposed: “Who will benefit?”

Note: It may be necessary to undertake a stakeholder analysis prior to the problem analysis (an initial stakeholder analysis) in order to clarify who should be involved in the analysis of problems.

Concretely, a stakeholder analysis aims:

- ▶ To identify the likely impacts of policies, plans/programmes, and projects;
- ▶ To assess the existing or potential conflicts of interest; and
- ▶ To take account of the impacts and various interests when designing policy options, implementation strategies and development actions.

The main steps in stakeholder analysis involve identifying:

- ▶ the main stakeholders (e.g. local, regional and/or national levels);
- ▶ winners and losers, those with interests, rights, resources and abilities to take part or influence the course of a programme;
- ▶ the extent of cooperation or conflict in the relationship between stakeholders.

A principal tool used in stakeholder analysis is the “Stakeholder Analysis Matrix”, as shown in Figure 6a and that is to be constructed and informed by a group of people. The first step is to identify all the individuals, groups, and institutions that will affect or be affected by a change, then to list them in the column under “Stakeholder” and to rate their interests, roles and appropriate strategies.

Figure 6a: Stakeholder Analysis Matrix

1. Stakeholder	2. Stakeholder interest(s)	3. Assessment of impact	4. Strategies for winning support or reducing obstacles

Steps for completing a stakeholder analysis matrix:

1. Once the list of all potential stakeholders is drawn in the column under “Stakeholder”, review the list.
2. Identify the specific interests these stakeholders have in a change. One can consider issues like: the benefit(s) of a change to the stakeholder; the effect that a change might have on the stakeholder (damage or conflict for the stakeholder). Explain briefly these under the column “Stakeholder interest(s)”.
3. Review again each stakeholder listed in column one. Ask the questions: how important are the stakeholder’s interests to the success of the proposed project? What is the role the stakeholder can play for a change to be successful, and how likely will the stakeholder play this role? What’s the likely impact of a stakeholder’s negative response to the change?
4. Assign, in the column “Assessment of Impact”, A for extremely important, B for fairly important, and C for not very important.
5. Lastly, consider the measures that you could take to get stakeholder support and reduce opposition. Ask the questions: What kind of information will they need? How important is it to involve the stakeholder in the planning or implementation process? Are there other groups or individuals that might influence the stakeholder to support your initiative? Describe your strategies for obtaining support or reducing obstacles in the last column in the matrix.

Then, one can also draw up a participation matrix to assign the type(s) of participation of stakeholders (e.g. will a stakeholder be the object of information, consultation, partnership and/or control?) according to their roles, interests and impacts and at each stage of planning and/or execution (Figure 6b). This together with the stakeholder analysis matrix will help design stakeholder participation strategies for a project or a plan.

Chapter III.

Policy objectives

Education sector policies represent the government’s public commitment to the future orientation of the sector. A clearly formulated policy can play an important “operational” role as a reference for action. It can help to guide decisions and future actions in educational development, including the interventions of international and bilateral cooperation agencies, in a coherent way. It is important that policy promote the coordination and success of programmes and projects. The formulation of a “good policy for education” is a necessary step in promoting the emergence and effective implementation of action plans, programmes and projects.

3.1. Education policy aspects

3.1.1. Policy dialogue

Policy dialogue refers to the consultations between stakeholders affected by and/or involved in the formulation and implementation of the sector policy: information sharing, consultations, negotiations with other line ministries and development partners. This takes on different formal and informal patterns: national conferences, consultative fora, ad hoc consultations, working groups meetings, seminars, round tables of donors for technical consultation or resource mobilization, etc.

Policy dialogue should be organized technically in order to allow the participants to “sing on the same sheet of music” and to facilitate building consensus or compromise based on the same information. This involves the actual implication of all the stakeholders not only for the implementation of the policies, but also at all stages of management: problem identification, policy formulation, action planning, monitoring and evaluation of the programme implementation.

The interests and perceptions of those who participate in the process of policy formulation and plan implementation differ. One has to analyse the professional and technical perspectives of the principal actors, the interest groups and the decision making process. This can be done by means of **stakeholder analysis**. Stakeholders are the people: (i) affected by the impact of an activity; and (ii) who can influence the impact.

Annex 2 presents the analysis of the different perspectives of professionals and interest groups that have stakes in educational development.

3.1.2. Policy aspects to be addressed

First of all, there is a need to clarify the difference between various levels of objectives and policy statements.

The **overall objective** (sometimes called “Goal” according to the Logical Framework Approach) is the aim toward which a plan or project is directed. Generally, a goal is not an objective that can be achieved by one plan or project alone, but is the end toward which a variety of plans (education, health, poverty reduction, etc.) and non-planned activities are aimed.

The **specific objective** (otherwise called the target or “Purpose” according to the Logical Framework Approach) is the objective which the plan or project is designed to achieve. The achievement of the purpose should contribute to the achievement of the overall objective – the goal.

A **policy** is a set of the goal and purposes (specific objectives). Often, education policies are defined along the following threefold dimension:

- ▶ access (access, participation, including gender and equity issues)
- ▶ quality (quality, internal efficiency, relevance and external effectiveness)
- ▶ management (governance, decentralization, resource management).

These dimensions are addressed (i) either as a whole, by programme component or by sub-sector, (ii) with target indicators by time-range (medium or long-term) and with a few quantitative indicators. One cannot say that there is a perfect way of writing policies or of listing different policy aspects. An indicative checklist is presented below as a way of providing specification of some of the fields requiring definition in an educational policy and the implementation strategies. This list is not exhaustive:

- ▶ access to and participation in education;
- ▶ equity and the reduction of disparities between boys and girls, regional disparities, rural/urban disparities and social disparities;
- ▶ quality and the relevance of education at different levels (basic education, general secondary education, technical and professional education, higher education, adult education, etc.);
- ▶ the place that the private sector and local groups occupy in the organization of education;
- ▶ regulation of student flows between (i) formal and non-formal education; (ii) public and private education; (iii) general secondary, technical, and professional education; (iv) short and longer higher education; (v) elementary and secondary, secondary and higher education, etc.;
- ▶ institutional aspects such as governance, management and planning, including the decentralization, de-concentration and centralization balance;

- ▶ partnership and communication between actors and partners, the level and form of participation and communication;
- ▶ cost control in recurrent and capital expenditure; and
- ▶ policies and strategies to mobilize resources in connection with decentralization, the development of the private sector and partnership development.

Particular emphasis should be placed on formulating quantified objectives such as enrolment, admission, and flow rates, pupils/teacher ratios, the supervision rate, the space utilization rate and the share of education in the national budget. For this purpose, simulation techniques and models have been used successfully to define policies that can then be quantified for consultation and the negotiation of trade-offs between stakeholders and development partners, on issues related to enrolment objectives, the organization of provision of different levels of education, and public, private, external financial contributions.

3.2. Formulation of policy objectives through the LFA

This section describes how one can use the techniques of the Logical Framework Approach (LFA) to analyze and formulate education policy objectives and alternative strategies.

3.2.1. Definitions and underlying principles of Logframe

Table 1 presents the Logical Framework summary. Objectives at the top of the first column frame goal (or overall objective) and purpose (or specific objective) statements and can be roughly equated with the policy, whilst outputs and actions indicate the way one wants to achieve this policy (implementation strategy and activities). In this table, the **hierarchy of objectives** is presented according to the following definitions:

- The **Goal** (often called overall objective) is a long-term objective. It is the aim toward which a plan or project is directed. Generally, several plans or projects contribute towards a goal and, conversely, a goal is rarely achievable by means of any one plan or project. The attribution of a plan or project toward the achievement of the “goal” is typically difficult – and also difficult to measure.
- The **Purpose** (often called policy target or specific objective) is the objective which the plan or project is designed to achieve. These are the benefits (or changes), which the plan or project seeks to bring about as a result of the outputs. The achievement of the purpose is directly linked to the achievement of the goal.

- The **Outputs** are the tangible products for achieving the purpose. They are the ‘deliverables’ for which specific institutions are responsible; outputs must be measurable and must be delivered on time. If there is more than one implementing institution, then separate outputs should be distinguished for each institution.
- The **Activities** (often called actions depending on the level of programming) are the necessary actions for achieving an output. There can be one or several activities in order to achieve each output.

Table 1. Logical framework summary

Column 1 Hierarchy of objectives	Column 2 Objectively verifiable indicators	Column 3 Means of verification	Column 4 Assumptions, hypotheses and risks
GOAL (or overall / general objective)	Long-term impact		Overall assumptions: Linking national development goals (MDGs, PRSPs, etc.) to sector-specific goals
PURPOSE (or specific objective)	End of plan or project status		Development hypothesis: Linking sector development objectives to specific objectives
OUTPUTS	Performance indicators		Implementation assumptions: Linking specific objectives to outputs
ACTIONS (or activities)	INPUTS	BUDGET	Management assumptions: Linking outputs to the activities

The **Assumptions** in Table 1 are the external factors which relate to the relationship between different levels of the cause and effect chain. Assumptions are not just comments or interesting facts. An assessment of the importance of each assumption and the probability (risk) of it being true is required. The more important and more risky the assumption, the greater the need to consider: (i) redesigning the project; (ii) seeking to reduce the risk by internalising the problem; and (iii) preparing a contingency plan in case the worst happens.

All **indicators** should be *measurable*. ‘Measurable’ means that there is an unambiguous definition (quality) and specific quantities and timings, in other words Quantity, Quality and Time (QQT). Ranking and prioritizing can also be a kind of measurement.

- ▶ **Activity-level indicators:** Activity level indicators (and means of verification) are usually the actual inputs and budgets required to implement these activities. Activities are usually broken down according

to who is responsible for implementation. Progress can be monitored against the associated budget and the schedule.

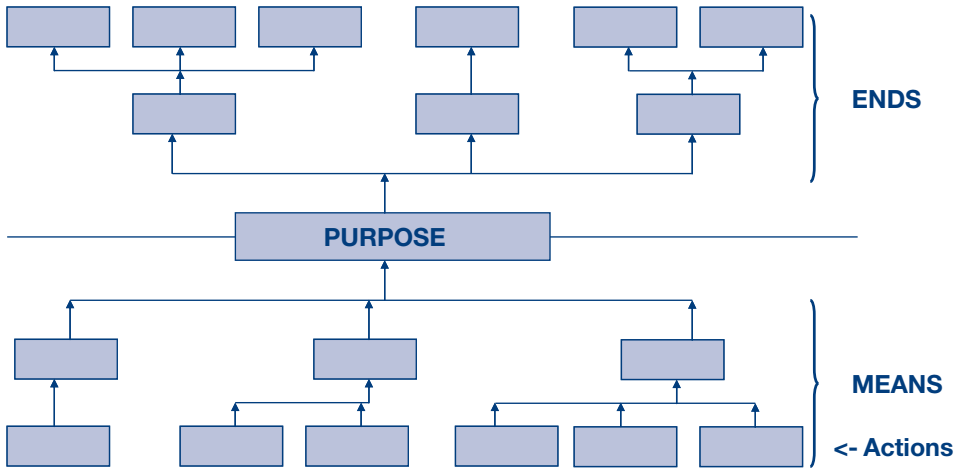
- ▶ **Output-level indicators:** Outputs are completed achievements. In the long run, outputs are indicative of the scope and scale of achievements required. In the short run, outputs become very specific targets (in terms of quantity, quality and time).
- ▶ **Purpose-level indicators:** These are the indicators of change/benefits (outcome) at the level of the target population. Often it is necessary to use proxy indicators since it is either difficult or impossible to measure the change directly. For example, an increase in promotion rates may be a proxy for increased quality of education.
- ▶ **Goal-level indicators:** These are rarely defined or collected by an individual plan or project. However, with the development of comprehensive, sector-wide planning, the need to specify impact indicators has been recognised. Specification can indicate whether the project or the plan will contribute to the achievement of the overall development goal or not.

Means of verification are the sources of information, e.g. statistics, reports, accounts, etc. that can help verify the achievement of each level of objective, except for the activity level, which consist of financial resources required.

3.2.2. Analysis of objectives

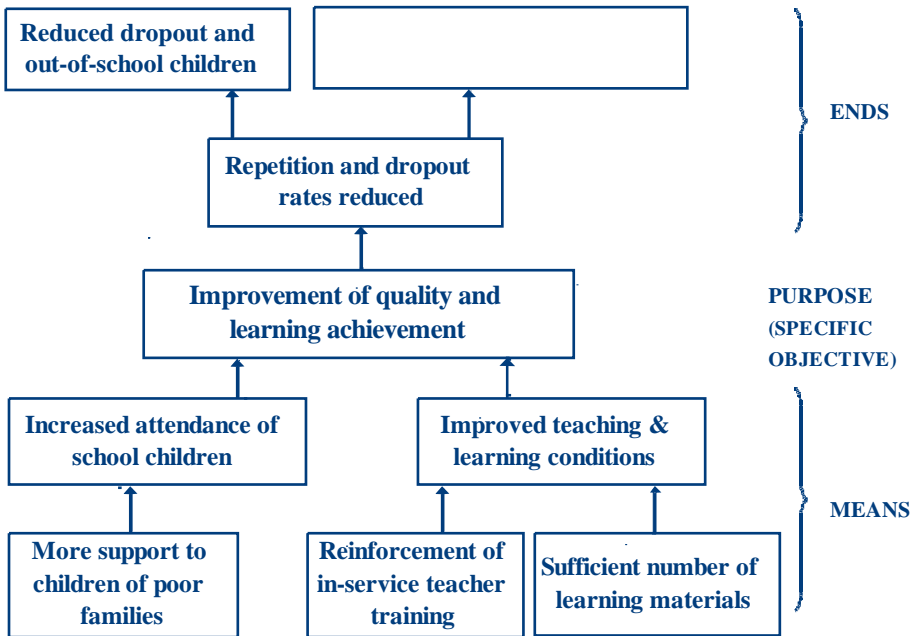
In the Logical Framework Approach, the analysis of objectives can be done by means of an objective tree (Figure 7a). Objective trees should be prepared after the problem tree has been completed and the stakeholder analysis has been undertaken. They use exactly the same structure as the problem trees (refer to Section 2.2.2), but with the problem statements (negatives) turned into objective statements (positives).

Figure 7a. Objective tree



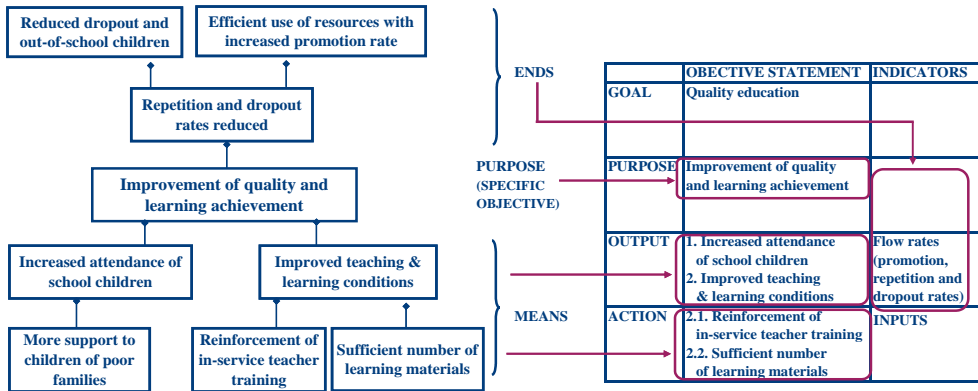
While the problem tree shows the cause and effect relationships between problems, the objective tree shows the “means – end” relationship between objectives in order to describe a satisfactory situation. An example of the objective tree is shown in Figure 7b.

Figure 7b. An example of the objective tree



This leads directly into developing the narrative description (first column) in the Logical Framework Matrix (LFM). An example is given in Figure 7c presenting the statements of objectives and their respective level at the LFM. In other words, the problems identified as causes in the problem tree and turned into positive statements will become means in the objective tree. The first layer of problems that was the root causes becomes the first layer of means in the objective tree. These means are the activities to be carried out in order to achieve the second layer of means (outputs).

Figure 7c. Example of the linkages between objective trees and Logframes



Note: According to the Logical Framework Approach, the definition of objectives is intrinsically imbedded into the problem analysis. The results of the stakeholder analysis may have helped to identify priority problems and not all of the original problem statements may therefore need to be translated into objective statements.

An activity at a certain level of decision making can be a goal or purpose (policy) at another level of programme management. This can be illustrated through the nesting of logframes, which is explained in Chapter 4, Section 4.3. In the hierarchy of objectives of the above figure, we find the goal and the purpose that are statements to be addressed and achieved by the plan or the project. The “Provision of quality education” is the general or long-term objective that a plan or a project is called to contribute to achieve, while the “Improved learning achievement” is the specific objective of a plan or project.

Section 3.1.2 presents a number of indicative policy-related aspects that are to be examined and addressed when formulating policy objectives and parameters.

3.2.3. Analysis of alternative strategies

During the process of establishing the problems and stakeholders, issues on the required actions, implied consequences and risks are likely discussed. In the same course, a set of **activities** is developed to deliver **outputs**, which, in turn, are intended to achieve the objectives (purpose and goal).

The type of questions that might need to be eventually asked (and answered) could include:

- ▶ Are all the identified problems addressed?
- ▶ What is the combination of actions that are most likely to bring about the desired outputs?
- ▶ What are the likely cost implications of different possible activities, and what can be realistically afforded?
- ▶ Which strategy will most effectively support institutional capacity building? and
- ▶ How can risks be best mitigated?

To assess alternative ways, it is useful to identify a number of criteria against which alternative actions can be ranked or scored. Criteria that may be used to help make a broad assessment of different options and alternatives include:

- ▶ benefits to target groups
- ▶ cost implications
- ▶ technical, financial and economic feasibility
- ▶ political feasibility
- ▶ contribution to institutional capacity building
- ▶ sustainability, and
- ▶ compatibility of the plan with other sector or development priorities.

In education sector development planning processes, policy simulation models can also help design policy options and alternative development scenarios, as well as provide useful information for evidence policy dialogue among stakeholders (See Footnote ⁸ and also Annex 3).

⁸ CHANG, G. C.; RADI, M. 2001. Educational planning through computer simulation.

Chapter IV.

Programme of action

A national policy should establish the framework for its implementation by giving the main goals and priorities, as well as the strategies to achieve them. It should be credible: that human and financial resources are available for carrying out the policy. Action planning (or programming) is the preparation for implementation. An action programme (which could also be called an action plan) aims to translate into operational terms the policy directions that education authorities intend to implement in a given time horizon. It is a tool for “clarifying” to some extent the goals and strategies in relation to the education policy, programming the activities required, establishing the timing, indicating the necessary resources, distributing institutional and administrative responsibilities, preparing the budgets, etc. It is important to consult and negotiate with the various development partners throughout the action planning stage if the country is to mobilise their support for plan implementation.

Note: It is necessary to differentiate between an action plan/programme and an investment programme which often deals with the infrastructures and equipments to carry out the action plan and the recurrent expenditure incurred by such investments. The duration of an action programme, in general, is five years. One of the criteria of an action plan – in order for a plan to be called action plan - is to go beyond mere policy statements and lists of activities to further define and prioritize the actions, activities, and required resources in a coherent manner. These actions and resource projections should be defined within a given macro-economic framework using appropriate technical tools such as a simulation model.

4.1. Action planning through the LFA

4.1.1. Preliminary remarks

In general the education policy framework document concerns the whole of the education sector. The action plan, which is linked to this policy framework, should also be sector-wide. Sometimes, a policy statement may concern either a particular sub-sector (secondary technical and professional education, for example) or a cross-cutting theme (improvement of the quality of education, for example), this within an overall, sector-wide development framework. Inasmuch as the subsectors represent fairly homogenous groups, an action programme can be developed first for each sub-sector, then these programmes are assembled into a sectoral plan of action, ensuring that a coherent whole is produced which faithfully reflects the policy framework.

An initial task for those in charge of developing an action plan is to draw up a typology of concepts to be used: objectives, results, actions, activities, measurements, resources,

etc. It is necessary to achieve consensus on the concepts and their logical arrangement. At this stage, however, there are two sources of variation.

- ▶ The numerous existing concepts: the terms vary across countries. The team in charge of developing the action plans must choose its concepts and definitions.
- ▶ The degree of detail with which one transcribes the policy framework in the action plan: Experience shows that concepts can be arranged logically into five levels.

An indicative typology would give the following levels: goal or general objective (level 1), purpose or specific objective (level 2), component (level 3); action (level 4) and activity (level 5). For each level, one will describe the expected results, how these will be measured (the verifiable indicators), who is to take responsibility and what are the (human, physical, and financial) resources required, as illustrated below:

Table 2. A typical action plan table

Level	Result statements	Indicator	Responsibility	Resources
1. Goal or general objective				
2. Specific objective				
3. Component				
4. Action				
5. Activity				

The foundation of an action plan consists of activities, grouped into actions. These latter, interacting with one another, are aimed to achieve a specific objective. Therefore, the main part of the work is the *determination of actions and activities* to achieve the policy objectives.

Different methodologies and techniques of action planning have been designed and used by different countries and agencies. Among them, this material has chosen to use two instruments that emerged as reference tools in developing action plans in the education sector: the Logical Framework Approach and simulation modelling. In reality, these two and other approaches are used, not in isolation but to complement each other, resulting in the preparation of a credible and coherent action plan for educational development.

4.1.2. Designing actions and their attributes with the Logframe Matrix

This section explains how the LFA can be used in preparing an action programme or a project implementation plan. Here we assume that we have come through the analytical and policy formulation stages such as problem analysis, stakeholder analysis, objective

analysis, institutional analysis, etc.⁹ In Table 3 of the logframe matrix, the policy objectives so far identified and analysed are formulated to fill in the corresponding boxes of goal and purpose of the first column. Further exercise is carried out in order to complete the other sections of the matrix: e.g. outputs, actions, performance indicators, etc.

Table 3. Logical framework summary

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Assumptions
Goal			
Purpose			
Outputs			
Actions/Activities			

Below, five indicative steps for establishing and completing a logframe matrix (re Table 3) are explained:

Step 1 (Column 1): Once the overall Goal (or commonly referred to as development objective) to which the plan contributes and the purpose(s) (otherwise called specific objective) to be achieved by the plan or project are specified, one can continue formulating the **statements** of the first column at output and activity levels by defining:

- ▶ the outputs (or commonly referred to as expected or immediate results) for achieving a purpose;
- ▶ the actions or activities for achieving an output:

Note: Section 4.2.3 explains, amongst others, the difference between different levels of results, e.g. output, outcome, etc.

Step 2 (Column 1): Since the statements in the previous steps are logically linked, one needs to confirm that the logic holds true, by verifying the vertical logic with an “**If/then Test**”, keeping in mind the following:

- ▶ the logical framework’s structure is based on the concept of cause and effect;
- ▶ in a well planned logical framework, one must be sure that if certain activities are carried out, one can expect certain outputs to result.

⁹ For more information on LFA, see: DFID. 2002. *Tools for Development: A handbook for those engaged in development activity*. London, Department for International Development.

There should be the same logical relationship between the outputs and purpose, as between the purpose and the goal.

Step 3 (Column 4): Since one is not able to control all of the factors related to any plan, one has to make some **assumptions**, defining them in relation to each level (activity, output, purpose and goal), keeping in mind the following:

- ▶ assumptions are external conditions over which the plan or project chooses not to exert or does not have control, but on which the accomplishment of objectives depends;
- ▶ in spite of the fact that managers are not responsible for the assumptions, they spend a great deal of time trying to influence the probability that the assumptions hold true;
- ▶ Figure 8a outlines the “**If/then Test**” involving both the first column and the assumptions column.

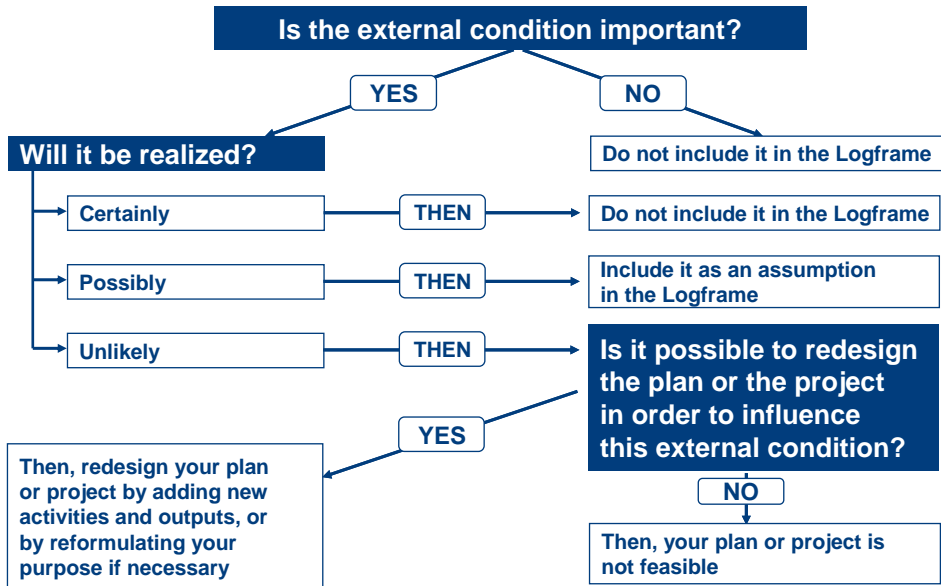
Figure 8a: If/then test between the columns of objectives and assumptions

Objectives	Assumptions	Indicators
GOAL (Overall Objective) Then	Risks and conditions	
PURPOSE (Specific Objective) Then	Risks and conditions and	
OUTPUT (Immediate Results) Then	Risks and conditions and	
ACTION (Activities to implement) If	Risks and conditions and	

- ▶ Figure 8b includes a number of questions one can ask step by step in order to assess whether an assumption – external condition – should be included or not in the logframe.
- ▶ The importance of each risk and assumption depends on (a) the probability that it will not happen, and (b) the importance to the project if it does not happen. If an assumption is more or less certain to happen and

not of great importance to the project's success, then the manager does not need to worry. If, on the other hand, the chances of the assumption actually happening are low and it is very important to project's success, the assumption is a 'killer assumption'. If the risks or assumptions are too great, one may need to redesign the actions and strategies.

Figure 8b: Assessment of assumptions



Step 4 (Column 2): The next step is to define the **objectively verifiable indicators** (OVIs) at the goal level, then purpose, then output, then activity level, keeping in mind the following:

- in principle, indicators should be stated in terms of quantity, quality and time (QQT) and sometimes place. Specifying numbers and dates is called targeting;
- a four-step example of constructing an indicator (or QQTeing an indicator) is: first, define a basic indicator (e.g. increased literacy rate); second, add quantity (e.g. literacy rate increased by 50%); third, add quality (e.g.. functional literacy rate increased by 50%); fourth, add time (e.g. functional literacy rate increased by 50% by 2015);
- activity level indicators must include means and resources involved to carry out this activity.

Step 5 (Column 3): Once OVIs are defined, the final task is to define the **means of verification** (MOV) at the goal level, then purpose, then output, then activity level, keeping in mind the following:

- the MOVs are the sources of information that will show that the targets have been achieved;
- the rule is that the indicators for measuring objectives must be verifiable by some means.
- activity level means of verification must include costs.

By applying the above steps, one can obtain the following example:

Table 4: Example of a logframe matrix

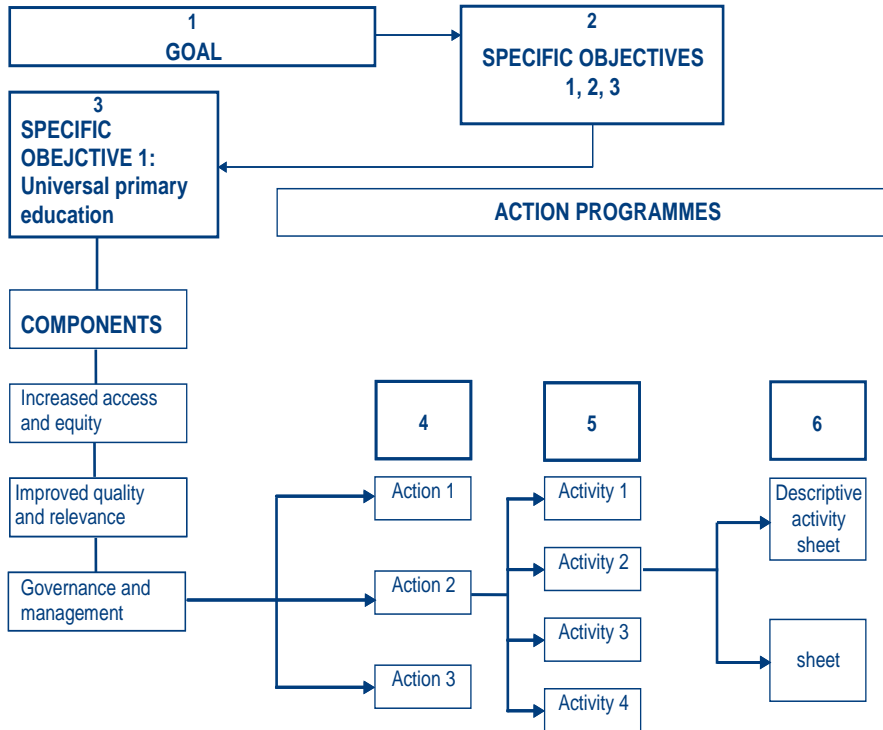
Narrative Summary	Objectively Verifiable Indicators	Means (Sources) of Verification	Risks & Assumptions
Goal: Development of the personality, intellectual independence, integration of individuals in their professional lives.			
Purpose: Education for All Goals achieved through provision of free, compulsory and high quality education.	By 2015	Statistics School census Surveys	Political and economical stability
Outputs: 1. <u>Universal access to free and quality basic education</u> 2. Increased coverage of early childhood programmes 3. ...	1. <u>Quality basic education by 2007 and free education by 2015</u> 2. 75% for age group 3-5, 100% for age group 6-7 by 2007 3. ...	Statistics School census	Continued political commitment
Actions/activities: 1. <u>Access to quality basic education, by ensuring that recognized and measurable outcomes are achieved by all</u> 2. Children in difficult circumstances have access to and are able to complete free and quality education by 2015 ...	1. <u>Teachers and non-teaching staff trained</u> 2. <u>Sufficient educational material</u> 3. <u>Provision of equipment</u> 4. <u>Infrastructure refurbished;</u> 5. <u>etc.</u>	Education expenditure Etc.	Budget for education sustained Pledges of donors respected

Risks are potential unwanted happenings. Every development activity involves risks. Risks that materialize can result in failure. Risks and assumptions must be evaluated and, if necessary, adjustments made in order to reduce the chance of failure. Some more explanations are given in the Section 4.2 with regard to the indicators at the level of purpose and outputs. Indicators at the level of activity which consist of resources are explained in Chapter V.

4.1.3. Developing an action plan through nesting of Logframes

Once the Logical Framework Matrix is designed through the Logical Framework Approach, the question is how in practice we can use it in actually designing and structuring a plan or a programme. Figure 9a traces a way of designing the structure of a plan from the upper level (Goal or development objective) down to the activity level through specific objectives and actions.

Figure 9a: Classical steps of action planning

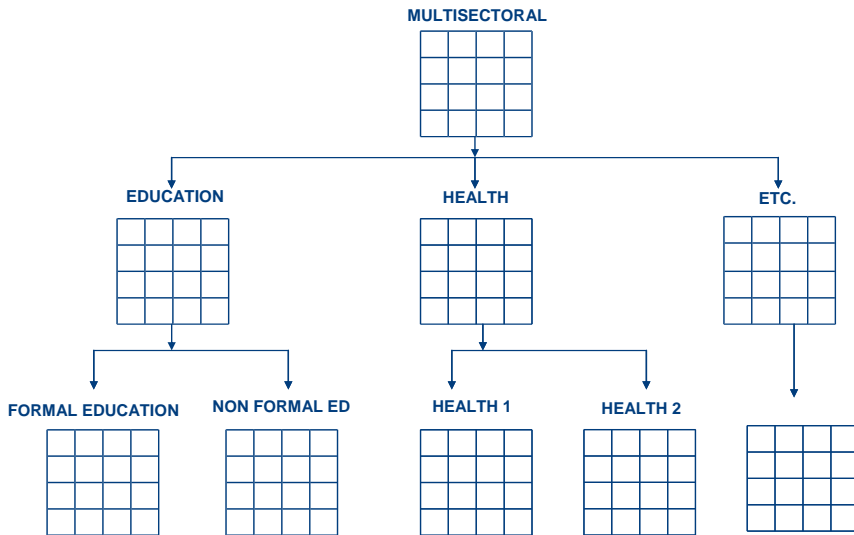


If we explain this planning structure in light of the Logical Framework Approach and its hierarchy of statements (Goal → Purpose → Output → Activity), the first level statement (Goal) is achieved by a combination of several specific objectives (purposes). The specific objective is the target which a programme or project is designed to achieve as a result of the outputs (or actions). The actions that can be worded in terms of outputs are aimed at achieving the purpose (upper level). Activities are the smallest programming units and can be grouped to form an action.

This classical process of action planning can be facilitated and indeed improved in quality by applying the LFA and its nesting techniques. Plans designed in such a way will be more logical and coherent.

Figure 9b shows the several levels of development planning in a country. Let's assume that there is a macro-plan in this country, e.g. a multi-sector development plan that we can call "poverty reduction and economic growth programme", which is prepared by the ministry of finance. Based on this multi-sector development plan, the ministry of education will be called to design the education sector development plan. The latter may be further breakdown with more details on implementation strategies into two separate plans of action for formal education and non formal education. This process of declining wider development objectives into specific objectives is called nesting of logframes.

Figure 9b: Nesting of Logframes 1



Each of the logframes used in this nesting is the results of individual Logical Framework matrices at different levels of planning and management. In other terms, with this nesting technique, decision-makers at different levels (of decentralization for example) can programme concrete actions and activities relevant to local contexts but all conducive to achieving a common goal.

As we can see in Figure 9c, the goal at the programme level (fourth column) was the action at the multi-sector plan, output at the sector plan and purpose at the sub-sector plan. The output of this programme will become the purpose of the project that the institution in charge will prepare at the implementation stage of its programme.

Figure 9c: Nesting of Logframes 2

MULTI SECTORAL				
Goal	SECTORAL			
Purpose	Goal	SUB- SECTORAL		
Output	Purpose	Goal	PROGRAMME	
Action	Output	Purpose	Goal	PROJECT
	Action	Output	Purpose	Goal
		Action	Output	Purpose
			Action	Output
				Action

In Table 5, another example of the nesting of logframes, the underlined texts in the Output boxes of the Sector level are nested down to a lower level of outputs (programme level) and later on to another lower level of outputs (component level). In practice, this nesting exercise should be done for the other actions as well, which are not underlined in this example.

In this example,

- the Goal “Quality education for all children of the age group of basic education” at Component level was “Output” at the Sector level and “Purpose” at Programme/sub-sector level;
- the Purpose “Quality education for all children leading to acquisition of recognized level of measurable achievements” at this Component was “Action 1” at the Sector level, “Output” at Programme/sub-sector level, but will be “Goal” at Action level;
- the Output “Harmonized, modern and flexible curricula developed and implemented” was “Action” at the Programme/sub-sector level, will be one of the purposes at Action level, etc. Table 5. Nesting of Logical Frameworks: an extract from an EFA Plan of Action

Table 5 transcribed into text will give Box 2, which constitutes an indicative structure of the part on the programme of action of an education sector development plan. This Box only presents the objective statements as defined by the LFA. One will have to define for each level of objective statement, verifiable indicators, resource requirements, responsibilities and a timeframe.

Box 2. Example of an indicative structure of an EFA plan

...

Goal (to which the plan contributes): Contribute to the development of the personality, intellectual independence, integration of the individuals in the professional life in the conditions of democracy.

Specific objective (to be achieved by the plan): Education for All Goals achieved through provision of free, compulsory and high quality education ...

Six (sub-sector/thematic) programmes (components of the plan): (a) ECCE; (b) Primary; (c) Secondary; (d) Higher; (e) Non-Formal; (f) Cross-cutting

Action programmes

A. ECCE Programme

B. Primary education programme

A.1. Programme Objective (Statement and description of the programme)

A.2. Main Lines of Actions

Component 1. Universal access to quality basic education by the year 2007 and completion of free education by 2015

Action 1: Unified, modern and flexible curricula developed and implemented

Output 1. New curricula designed and tested for primary education

- *Main Activity 1.* Department of Curriculum Department strengthened (if possible, *results, indicators, responsibilities, resources, timelines* for each activity)

- *Main Activity 2.* Curricula for Grades 1 & 2 redesigned

- *Main Activity 3.* In-service training of teachers on new curricula

- *Main Activity 4.* ...

Output 2. New textbooks printed and distributed

Output 3. ...

Action 2. Status of teaching staff improved

Action 3. ...

Component 2. Children in difficult circumstances ..., have access to and are able to complete free and quality education by 2015

Component 3. ...

C. Secondary education Programme

D. Higher education Programme

E. Non-formal education programme

F. Cross-cutting themes

...

4.2. Planning for monitoring, review and evaluation

This section describes the main aspects of monitoring and evaluation that should be clarified when designing education policies and development plans or projects. It does not deal with the detailed arrangements that need to be made in conducting monitoring and evaluation during the actual implementation of the policies, programmes or projects.

We are all accountable for the work we do. We are accountable for the use of the resources that we are given. We are accountable to a variety of people, but foremost to the people and communities we serve, though we are also accountable to those who provide resources.

We also need to learn lessons. We need a system that is reflective and analytical, examining performance both:

- ▶ On an on-going day-by-day, month-by-month basis so that we can change direction and improve what we are doing; and
- ▶ On an occasional basis, perhaps annually or every three years, when we can examine our effectiveness and the changes that have occurred so that we can build lessons from such experience into our future plans.

In response to these two needs for accountability and feedback, three main questions should be addressed when preparing education development plans or programmes:

- ▶ What can enable us to judge and measure whether an objective or an expected result is achieved and an activity implemented?
- ▶ How can we assess the achievement of an activity, an output or an objective?
- ▶ What level of result are we going to assess?

In general terms, monitoring and evaluation consists in measuring the status of an objective or activity against an “expected target” that allows judgement or comparison. This target is an **indicator**. This implies that one has to define at the stage of planning some indicators that can enable measurement whether and how an output or an activity is delivered in comparison with the initial targets.

The second question concerns how to assess the status of each level of the programme. Your boss might want you to produce results, no matter how you achieve them. However, you ought to care about the use of the means that you are given in order to attain the results expected by your boss. This can be done by regular **monitoring** of the achievement of your activities. On the other hand, you may need an external and objective point of view to assess the impact of your activities, which can be done by a more formal form of assessment, an **evaluation**.

It is very important to plan M&E from the outset: e.g. when doing a strategic plan or planning a programme or a project. A system is needed that will help answer the questions of:

- ▶ **Relevance:** does the organization or project address identified needs?

Box 2. Example of an indicative structure of an EFA plan

<i>Sector level</i>			
Goal: Development of human resources		Programme (sub-sector) level	
Purpose: Education for All (EFA) Goals achieved through provision of free, compulsory and high quality education.		Goal: EFA achieved both in quantitative terms and for actual attainment of knowledge, attitudes and skills.	
Outputs: 1. <u>Access to quality basic education by 2007 and free education by 2015;</u> 2. Early childhood programmes to 75% for 3-5, and to 100% for 6-7 by 2007; 3. ...		Purpose: Universal access to and effective participation in quality basic education.	
Actions Level 1: 1. <u>Access to quality basic education, with achievement of recognized and measurable outcomes by all;</u> 2. <u>Children in difficult circumstances ..., complete free and quality education by 2015;</u>		Goal: Quality education for all children of the age group of basic education	
Actions Level 0: 1. <u>Harmonized, modern and flexible curricula developed and implemented;</u> 2. <u>Status of teaching staff improved;</u> ... Actions Level -1: 1. <u>New curricula designed and tested for primary education</u> 2. <u>New textbooks printed and distributed</u> ...		Component level	
		Goal: Quality education for all children leading to acquisition of recognized level of measurable achievements	
		Purpose: Quality education for all children leading to acquisition of recognized level of measurable achievements	
		Goal: Quality education to ensure that recognized and measurable outcomes are effectively achieved by all children	
		Purpose: Unified, modern and flexible curricula designed, piloted and implemented	
		Outputs: 1. <u>Modern and flexible curricula developed and implemented;</u> 2. <u>Status of teaching staff improved;</u> 3. ...	
		Outputs: 1. <u>New curricula designed and tested for primary education</u> 2. ...	
		Action level	

- ▶ **Efficiency:** are we using the available resources wisely and well?
- ▶ **Effectiveness:** are the desired outputs being achieved? Is the organization or project delivering the results it set out to deliver?
- ▶ **Impact:** have the wider goals been achieved? What changes have occurred that have targeted individuals and/or communities?
- ▶ **Sustainability:** will the impact be sustainable? Will any structures and processes so established be sustained?

The following sections describe in more detail the above aspects that need to be thoroughly raised, discussed and formalized when preparing a plan, a programme or a project. However, one has to make clear from the outset that credible indicators cannot be constructed without a reliable information system. Without the production of reliable statistics, the quality of monitoring and evaluation will be questionable at the stage of the plan implementation. In other words, one must start by establishing a reliable information system in order to ensure the quality of the monitoring and evaluation.¹⁰

4.2.1. Performance indicators

An indicator is a number or ratio (a value on a scale of measurement) that can be obtained from a series of observed or calculated facts and that can reveal relative changes as a function of time. Indicators are used to measure performance; they play a crucial role in monitoring and evaluation:

- ▶ they specify **realistic targets** for measuring or judging if the objectives have been achieved
- ▶ they provide **the basis for monitoring, review and evaluation** so feeding back into the management of the organisation or project and into lesson learning and planning for other subsequent work
- ▶ the process of setting indicators contributes to **transparency, consensus and ownership** of the overall objectives and plan.

Indicators are called **Objectively Verifiable Indicators (OVIs)** according to the LFA in order to emphasise that they are not just subjective judgements; rather, they need to be constructed so that when different observers measure performance, they will come to the same conclusion. Indicators are more likely to be objective if they include elements of **quantity, quality and time (QQT)**.

The following briefly introduces the general types of performance indicators that can be used to assess progress towards the achievement of different types of expected results and to answer the question: How do we know whether we are achieving/ have achieved our goal?

Direct or indirect indicators

Direct indicators (often statistical). These indicators are used for objectives that relate to a directly observable change resulting from activities and outputs. A direct indicator is simply a more precise, comprehensive and operational restatement of the respective objective. If the expected result is to increase the number of professionals trained in an area over a period of time, one should ensure that quantified data are collected on a regular basis and made available for monitoring, review or evaluation. For example, if the expected result is to: “train over two years 250 inspectors in educational planning and management”, then the direct statistical indicator would be simply a count by semester or by year of the number of those actually trained in this field.

Indirect or proxy indicators may be used instead of, or in addition to direct indicators. They may be used if the achievement of objectives: (i) is not directly observable like the quality of life, organisational development or institutional capacity; (ii) is directly measurable only at high cost which is not justified; (iii) is measurable only after long periods of time beyond the life span of the project. However, there must to be a prima facie connection between the proxy and the expected result. The following example illustrates how a proxy indicator could be used to assess progress in what might seem to be an intangible situation. If the expected result is: “greater awareness among the general public and policy-makers about the major challenges of the HIV/AIDS in education”, a good proxy indicator might be to collect data on the number of times public figures spoke of these challenges and/or the number of times the mass media reported on these challenges. In this case, collecting data every six months would be satisfactory. In the longer term, programme evaluation should offer statistical data to ascertain more accurately the totality of the factors and variables at play.

Qualitative or quantitative indicators

The QQT maxim for constructing an indicator generally works well. But its rigid application can result in performance and change, that is difficult to quantify or to be given appropriate value. That a change may be difficult to quantify or that the analysis of qualitative data may not be straightforward, are not reasons to sweep them under the carpet. Special effort and attention needs to be given to devising qualitative indicators. A balance of indicators is needed, with some that focus on the quantitative and others on qualitative aspects.

Quantitative indicators may relate to:

- ▶ the frequency of meetings,
- ▶ the number of people involved
- ▶ growth rates
- ▶ the intakes of inputs; e.g. grants, buildings, teachers
- ▶ the adoption and implementation of the outputs, etc.

In many instances where the expected result may be qualitative (change of attitudes, capacity building, etc), a non-statistical approach may be the only way possible to develop an indication of “progress”. **Qualitative indicators** largely focus on the “process of change” - asking stakeholders what they did as a result of their participation in activities. This technique works especially well in instances where training seminars and workshops are the pursued outputs. However, when dealing with stakeholders, care needs to be taken to avoid a focus simply on “satisfaction”. Rather, the focus should be on what happened as a result of the participation. It should also be noted that narrative indicators can seldom be quantified easily over the short term. Qualitative indicators relate to:

- ▶ the level of participation of a stakeholder group
- ▶ stakeholder opinions and satisfaction
- ▶ aesthetic judgements; e.g. taste, texture, colour, size, shape, etc.
- ▶ decision-making ability
- ▶ the emergence of leadership
- ▶ the ability to self-monitor
- ▶ attitudinal and behavioural changes
- ▶ evidence of consensus.

Qualitative indicators are sometimes called **narrative indicators**. The following example illustrates how narrative indicators could be used. If the expected result is to “Enhance provincial capacities for organization and management of non-formal education”, then a valid narrative indicator might be through a follow-up questionnaire to be circulated among those individuals who participated in training activities to ask them what they did in their provinces as a result of the actions of the Ministry of Education. Such a questionnaire should not be a survey of client satisfaction. It should ask: “What did you do as a result of your participation in the training workshop?” It could be sent out to stakeholders several times – at least once a year - in order to develop a “baseline” and thus begin to assess the continuum of change. It may be that oral interviews could be used in lieu of a formal written response. Narrative indicators enable an organization to assess the interconnection of factors without recourse to extremely expensive statistical research. In this way, one could demonstrate “partial success” even if other factors may have prevented the overall “enhancement of national capacity”. This example also illustrates how a proxy indicator could be combined with a narrative indicator. In this case, a reliable proxy indicator might be the number of new non-formal education centres. The proxy has not measured “enhanced capacity”; rather it has shown the impact.

¹⁰ Carrizo et al. 2003. Information tools for the preparation and monitoring of education plans.

4.2.2. Three classifications of evaluation

Depending on the nature of a programme and the purpose of an evaluation, there are different classifications of evaluation.

The first classification can be made depending on who's conducting the evaluation:

- ▶ **internal** (when the evaluation concerns a programme implemented entirely within an institution, is carried out by the persons belonging to the same institution as those managing the programme, sometimes in cooperation with the assistance of external evaluators);
- ▶ **self-evaluation** (is a form of internal evaluation done by those who implement the programme); or
- ▶ **external** (when the evaluation concerns a programme whose implementation involves persons from outside the institution, often carried out by evaluators independent of the institution).

The second classification is made depending on the use of evaluation. An evaluation can be:

- ▶ **formative** (because its main goal is generally to correct the course taken by a programme and its results are usually intended for those implementing it. Sometimes called mid-term evaluation because it is carried while the programme is still being implemented);
- ▶ **summative** (because it leads to conclusions about the value of the programme so that lessons can be learnt for the future. It is called end-of-programme evaluation); or
- ▶ **ex-post** (because it is conducted some time after the completion of the programme in order to draw conclusions on the impact and sustainability of the programme. It is another form of summative evaluation.)

The following three types of evaluation form the third classification that is being widely used in programme evaluation. However, it is recommended that some flexibility is applied when conducting the types of evaluation described below in combination with those mentioned above. These three types are: monitoring, review and evaluation.

Monitoring: It is not an evaluation per se, but is a process whereby the progress of activities is regularly and continuously observed and analysed in order to ensure that the expected result is achieved. It is done by regular collection and analysis of information for checking the performance of the programme activities.

G				
P				
O				
A				

Monitoring is usually done internally by those who are responsible for the execution of activities (programme managers) in order to assess:

- whether and how inputs (resources) are being used;
- whether and how well planned activities are being carried out or completed; and
- whether outputs are being produced as planned.

Monitoring focuses on **efficiency**, that is the use of resources, especially at the activity (and sometimes at the output level).

Major data and information sources for monitoring are: financial accounts and also internal documents such as mission reports, monthly/quarterly reports, training records, minutes of meetings, etc.

Review, as for monitoring, is a task performed usually by those who are responsible for the activities, but it is a more substantial form of monitoring, carried out less frequently, e.g. annually or at the completion of a phase.

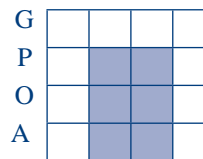
G				
P				
O				
A				

Often called mid-term review, its results are designed for those who are implementing the activities as well as the providers of funds. Reviews can be used to adjust, improve or correct the course of programme activities.

Review focuses, in particular, on **effectiveness** and **relevance**. It assesses whether the activities have delivered the expected outputs and the latter are producing the expected outcomes, in other words whether there is indication that the outputs are contributing to the purpose of the project or programme.

Key data and information sources for review are typically both internal and external documents, such as annual status reports, survey reports, national statistics (e.g. statistical yearbooks), consultants' reports, etc.

Evaluation in many organisations is a general term used to include review. Other organisations use it in the more restricted sense of a comprehensive examination of the outputs of a programme, how it contributes to the purposes and goals of the programme.



Evaluations are usually carried out both by insiders (those belonging to the same institution as the programme managers) and outsiders (external evaluators) in order to help decision makers and other stakeholders to learn lessons and apply them in future programmes. Evaluations focus, in particular, on **impact** and **sustainability**.

Evaluations may take place:

- at the end of a project phase or at the completion of a project (terminal or summative evaluations) to assess immediate impact; and/or
- beyond the end of the project (ex-post evaluations) to assess the longer-term impact of the project and its sustainability.

Key data and information sources for evaluation are both internal and external. They may include annual status reports, review reports, consultants' reports, national and international statistics, impact assessment reports, etc.

The following table describes in a comparative way the differences between these three types of evaluation.

Table 6: Comparison between monitoring, review and evaluation

	<i>Monitoring</i>	<i>Review</i>	<i>Evaluation</i>
When is it done?	Continuous throughout the life of a programme or project	Occasional mid-way or at the end of a phase of programme or project	Occasional at the end or beyond the end of a phase or programme
What is measured?	Checks mainly efficiency – inputs and processes to produce outputs	Checks the effectiveness and relevance of an objective or a programme	Checks the longer term impact and sustainability of the objectives and goals
Who is involved?	Generally only insiders involved	Involves insiders, with outsiders	Involves outsiders, with insiders
What sources of information are used?	Typically internal documents.	Both internal and external documents such as half-year or annual reports, status reports, internal statistics, etc.	Both internal and external, e.g. review reports, consultants reports, national and international statistics, etc.
Who uses the results?	Managers and staff are the main users of the information gathered	Many people use the information e.g. managers, staff, donors, beneficiaries	Many people use the information e.g. managers, staff, donors, beneficiaries, other organizations
How are the results used?	Decision-making results in minor corrective changes	Decision-making may result in changes in strategies and modalities	Decision-making may result in major changes in policies, strategies and future work

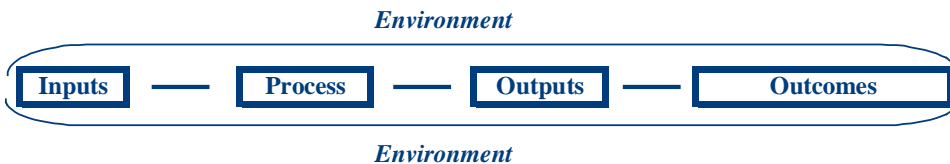
Source: Adapted from Centre for International Development and Training (CIDT), University of Wolverhampton

4.2.3. Objects of monitoring and evaluation

As described above, depending on the purpose and types of evaluation, the focus of evaluation can be different. This section explains the objects and focuses that are discussed and thought of on monitoring and evaluation during the phase of the preparation of a plan or a programme.

Like any other system, the education sector has inputs, processes, outputs and outcomes as show in the figure below. These are the main objects of monitoring and evaluation.

Figure 10: Education system and its environment



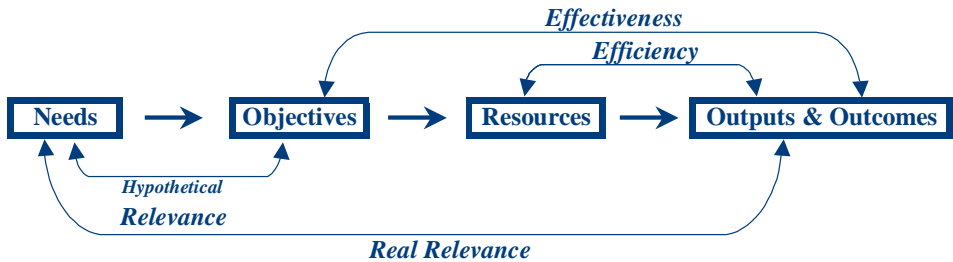
Inputs are human, financial and other resources necessary for producing outputs and achieving results. In the education system, they are teachers, equipment, buildings, textbooks, etc. These inputs go through a **process** (throughput) where they are mixed (input mix), combined and/or moved along to achieve results.

Outputs are the products and services that are generated as the tangible results in carrying out the planned activities. In an education system, they are, for example, the graduates and the knowledge acquired during their studies. Producing an output by itself can be meaningless. Such outputs are sought for the purpose of contributing to the achievement of an outcome.

Outcomes are the effects of utilizing the outputs. They are the overall changes in situations and/or benefits for the students, their families and/or the society as well, that can be qualitative and/or quantitative. For example, in the education sector, they are the gains that the graduates from an education level can actually obtain thanks to the knowledge they acquired at school.

Systems are often analyzed in terms of relevance, efficiency, effectiveness, impact and sustainability: for example, one can wonder whether the inputs to the education system are relevant for addressing identified needs, to what extent the processes – utilization of resources - are efficient, and how far the anticipated outputs are effectively produced. Outcomes and results will be analyzed in terms of their impact and sustainability. These are the focuses of monitoring and evaluation.

Figure 11: The relationship between relevance, efficiency, and effectiveness.



Relevance can be hypothetical or real:

- ▶ **Hypothetical** relevance is defined in relation to needs, e.g. whether a goal, an objective or an expected result of a programme or project reflects the actual needs of the beneficiaries or not. This is the focus of evaluation when appraising a programme before its approval, and sometimes during the programme review.
- ▶ **Real** relevance measures the extent to which the outputs produced and/or outcomes achieved respond to the needs of the population. This is the focus of evaluation when conducting a programme review, most often during a programme evaluation.

Efficiency describes the relation between the quantity of the outputs (products and services) produced and the quantity of resources used to produce them. Unit or average cost is often used to express the efficiency. This is the focus of evaluation during programme monitoring and review, and sometimes during programme evaluation.

Effectiveness describes the extent to which an objective has been achieved. In other words, it measures the level of achievement of an objective (or an expected result) of a programme or project pursued and of the effects (outputs and outcomes) achieved. This is the focus of evaluation during the programme review, and most often during the programme evaluation.

Impacts are the effects on the population and the environment by the pursuit and the achievement of an objective. The action involved in the pursuit of an objective can change a situation in both predictable and unpredictable ways. **Sustainability** is the extent to which the benefits delivered and changes brought about by a programme or a project continue after its completion. Programme evaluation, and project review in a lesser extent, focus on impact and sustainability.

Chapter V.

Estimation of costs

5.1. Costs/resources at the activity level

According to the Logical Framework Approach, activity level indicators and means of verification are usually the actual inputs and budgets required to implement these activities. As we can see in Figure 12, the indicators at the activity or action level are the inputs for carrying out the activities such as the number of people to be trained, the number of buildings to construct, the number of materials to produce and distribute, while the means of verification at this level are the actual costs incurred to mobilize these inputs or resources.

Activities are usually broken down according to who is responsible for implementation. There should be in principle as many activities as there are responsible units in order to increase their accountability in the execution of their activity. Different categories of inputs or resources needed to implement each activity should be specified. Progress can be monitored against the associated resources, budget and the schedule.

Figure 12. Indicators and means of verification at the activity level of Logframe

Objectives	Objectively verifiable indicators	Means of verification
GOAL	What will indicate objectively if: <ul style="list-style-type: none"> • the overall objective • the specific objective • the output is achieved?	How to verify the achievement of: <ul style="list-style-type: none"> • the overall objective • the specific objective • the output?
PURPOSE		
OUTPUT		
ACTION	This is about inputs (MEANS), for example: <ul style="list-style-type: none"> • number of people trained • number of experts recruited • number of buildings • etc. 	This is about financial resources (COSTS)

Usually the classification of financial resources should follow the accounting regulations and practices in place in the concerned countries or institutions. For example, across the United Nations System, there are harmonized budget items that are classified by nature of expenditure. This format, presented below, is used by UNESCO as well when preparing and implementing a development project. There are also established norms and standards in terms of unit costs that should be considered (or referred to) when

calculating the budgetary requirements.

Table 7. The budget table format used by UNESCO

BL	Description	Total		2003		2004	
		w/m	\$	w/m	\$	w/m	\$
10	PROJECT PERSONNEL						
11	International consultants						
13	Administrative support personnel						
15	Local travel						
16	Mission costs						
17	National professionals						
20	SUB-CONTRACTS						
21.01	Subcontract 1						
21.02	Subcontract 2						
21.0X	Subcontract X						
30	TRAINING						
31	Fellowships						
32	Study visits						
33	Local training and workshops						
40	EQUIPMENT						
45.01	Expendable						
45.02	Non-expendable						
50	MISCELLANEOUS						
51	Sundries						
52	Reporting costs						
53	Miscellaneous						
90	TOTAL						
99	Project total						
	Agency support costs (13%)						
999	TOTAL including support costs						

The budget items that are used by ministries of education are in general much more complex. They are often the combination of the different classifications by nature, by level of education and by function. The following is an indicative example of the budget table of broad categories of expenditure used by national educational administrations:

Table 8. An indicative budget table format in the education sector

1. Primary education	2. Secondary education	3. Higher education	X. Cross-cutting
Recurrent costs	Recurrent costs	Recurrent costs	Administration
Teachers (Wage, etc.)	Teachers (Wage, etc.)	Teachers (Wage, etc.)	
Category 1	Category 1	Category 1	
Category 2	Category 2	Category 2	
Category 3	Category 3	Category 3	
Category X	Category X	Category X	
Other Staff Costs	Other Staff Costs	Other Staff Costs	
Training	Training	Training	
Admin. & supervision	Admin. & supervision	Admin. & supervision	
Workers & others	Workers & others	Workers & others	
Educational material	Educational material	Educational material	
Textbooks	Textbooks	Textbooks	
Teaching guides	Teaching guides	Teaching guides	
Other running costs	Other running costs	Other running costs	
Maintenance	Maintenance	Maintenance	
Electricity, water and heating	Electricity, water and heating	Electricity, water and heating	
Miscellaneous	Miscellaneous	Miscellaneous	
S/Total	S/Total	S/Total	
Capital costs	Capital costs	Capital costs	
Constructions	Constructions	Constructions	
Equipment	Equipment	Equipment	
Other	Other	Other	
Total Primary	Total Secondary	Total Higher	

While the costing of the activities for a specific programme or project may be relatively easy if the budgeting elements and criteria are already in place, the budgeting of an education action plan can be much complex, especially when it involves making the projection of several years' expenditure. Different techniques, specific to each country's contexts, exist. Other techniques have recently emerged like the mid-term expenditure framework (MTEF) in some countries.

In any case, a credible multi-year projection of resources can be hardly estimated without a computerized simulation model. Section 5.2 and Annex 3 elaborate on the purpose and use of the simulation techniques for the design of policy options, the formulation of an education development plan and the evaluation of the required multi-year educational expenditure.

5.2. Budgeting through simulation techniques

As early as the plan's preparation phase, simulations can enable upstream forecasts of recurrent expenditure and investments for the education sector in accordance with educational policy orientations. The government, as a result, can have advance information on the annual costs for implementing its reform and development plan, foresee budgetary gaps in relation to the State financing in a given period, and identify the fields for which additional investments should be sought from the national private sector and/or from external partners.

Simulation modelling contributes to and benefits from the medium term expenditure frameworks (MTEFs). MTEF aims to ensure the consistency of the budgetary allocations with overall fiscal objectives and domestic resources and thus to improve the realism of sector budgets. Its significance is particularly important in many developing countries where a large gap between stated policies and actual domestic resources often leads to *ad hoc* budget cuts in plan implementation. Based on the MTEF budget ceiling for the sector, education simulation model forecasts the domestic resources likely to be available for the education sector, anticipates their use by budget category and order of priority and in turn contributes to fine-tuning the sector expenditure framework in consistency with overall macro-economic and fiscal perspectives.

Subsequent use is facilitation in setting up annual and multi-annual budgets, that is to say, the short-term technical and financial programming of administrative and financial actions. The formulation of short-term objectives – over one or two years – is carried out on the basis of the achievements and forecasts of the action plan. The simulation makes it possible to specify new anticipated achievements and their costs, which facilitates the programming of recurrent and capital expenditure.

Estimates of national annual expenditure are provided by level of education and by category of expenditure. According to the level of de-concentration and/or decentralisation, such expenditure can be disaggregated by region, by education level and by type and category of expenditure. National authorities, taking into account the objectives and the potential for development of each region, can take corrective measures necessary to balance budgetary programming.

At the time of short-term budgeting, it is necessary for the simulation model to take into account significant parameters which have an impact on the cost of education, such as inflation, salary increases and the cost of educational goods and services. However,

a simulation model is a tool which can help foresee the *probable* evolution of an education system in the more or less distant future by means of a more or less limited number of baseline data and hypotheses of development. The simulated results will be probable, but *not sure*, because the future of a system also depends on unforeseen hazards and uncertainties which have an impact on the evolution of phenomena. This explains the need to update the baseline data and parameters as the implementation of the development programme advances. The baseline data and the hypotheses retained for the development of the simulation model are inevitably limited in number and consequently can not take into account all the parameters, be they identified or not, which regulate the evolution of an educational system.

Bibliographical references

- AusAID. 2001. *AusGUIDELines: 1. The Logical Framework Approach*. Canberra. Last Updated 2003 by AusAID, Australian Government.
- BRADFORD, R. W., DUNCAN, J. P., TARCY, B. 1999. *Simplified Strategic Planning: A No-Nonsense Guide for Busy People Who Want Results Fast!*. Chandler House Press (ISBN: 1886284466).
- BRYSON, J. M. 1995. *Strategic Planning for Public and Nonprofit Organizations: A Guide to Strengthening and Sustaining Organizational Achievement, Revised Edition*. Minneapolis, USA.
- CARRIZO, L., SAUVAGEOT, C. BELLA, N. 2003. *Information tools for the preparation and monitoring of education plans*. Paris, UNESCO. (Education policies and strategies 5, ED-2003/WS/42).
- CHANG, G. C.; RADI, M. 2001. *Educational planning through computer simulation*. Paris, UNESCO. (Education policies and strategies 3, ED-2001/WS/36).
- CIDT. *Project Cycle Management: Indicators and Means of Verification*. Centre for International Development and Training (CIDT), University of Wolverhampton
- DFID. 2002. *Tools for Development: A handbook for those engaged in development activity*. London, Department for International Development.
- European Commission. 2001. *Manual Project Cycle Management*. Brussels, European Commission. (Evaluation Unit of the EuropeAid Co-operation Office).
- JALLADE, L.; RADI, M.; CUENIN, S. 2001. *National policies and programmes and international cooperation: What role for UNESCO?* Paris, UNESCO. (Education policies and strategies 1, ED-2001/WS/5.).
- LAVERGNE, R.; ALBA, A. 2003. *CIDA Primer on Program-Based Approaches*, Prepared by Analysis and Research Division, Policy Branch with contributions from other CIDA staff (Updated on Sept. 27, 2003), CIDA.
- UNESCO. 1997. *Guide méthodologique pour l'élaboration des plans d'action au PRODEC Mali*. Paris, UNESCO. (Training material).
- UNESCO ED/EPS/NED. 2005. *EPSSim 2.1: User's Guide*. Paris, UNESCO. (Education policies and strategies 3a, ED-2005/WS/17).
- THE WORLD BANK. 1998. *Public Expenditure Management Handbook*. Washington, D.C. The World Bank.

ANNEXES

Annex 1. Main aspects to be analyzed for a diagnosis of the education sector

In a sector analysis, the education system is analysed in different angles or aspects, which include, but are not limited to:

- Macro-economic and social frameworks of the country
- Status of student flows
- Quality of education
- External efficiency
- Costs and financing of education
- Managerial and institutional aspects.

The following paragraphs describe the main features of these aspects as well as the principal indicators commonly used to diagnose and “characterise” the education sector.

A. Macro-economic and social frameworks

The characteristics of a country can be studied mainly by carrying out, but not limited to, analyses of demographic (general and school-related) data, the macro-economic and budgetary context, the socio-cultural environment and the political and institutional structures and frameworks.

Demography

This involves analyzing the demographic aspects of at least the last two years and the probable changes in the coming years (notably the period of programming of the plan), not only in the total population of the country, but also in the school-age population. It is necessary to have the demographic data by specific age and by gender, in particular for the school-age population at pre-school, primary, and secondary levels. It is also necessary to analyze the characteristics which can affect the organization and the operation of the education system, as for example, the job and human resources market, rural exodus, migration, HIV/AIDS, etc.

Macro-economic and budgetary framework

This is about analyzing the past trends and the possible developments of national productivity (GDP, GNP), domestic revenues, and the share of education in total public expenditure. Countries dependent on external financing should examine the present situation and the probable evolution of external resources, such as debt and debt servicing, grants and loans for the education sector, as well as direct technical assistance. In practice, many of these countries carry out this analysis with help of

donor and lending agencies in the context of mid-term expenditure framework (MTEF) processes, sector investment programmes (SIPs), SWAps, or more recently Education for All Fast Track Initiative (FTI).

Here, it is important to do a careful and detailed analysis of the interventions of external bilateral and multilateral agencies which are carried out in the form of projects, direct financing of national budget or in the framework of programmes called HIPC's, PRSP, etc. On the basis of macro-economic data and information provided by agencies dealing with central planning and finance, education ministries will analyse some of the following macro-economic and budgetary indicators:

- Public expenditure on education as percentage of gross national product (%GNP): Total public expenditure on education (current and capital) expressed as a percentage of the Gross National Product (GNP) in a given financial year. It is calculated by dividing total public expenditure on education in a given financial year by the GNP of the country for the corresponding year. (Interpretation: In principle a high percentage of GNP devoted to public expenditure on education denotes a high level of attention given to investment in education by the government; and vice versa.)

Formula:

$$\%GNP_t = \frac{PXE_t}{GNP_t}$$

Where:

$\%GNP_t$ = Percentage public expenditure on education in financial year t .

PXE_t = Total Public expenditure on Education in financial year t .

GNP_t = Gross National Product in financial year t .

- Public expenditure on education as percentage of total government expenditure (%PXE): Total public expenditure on education (current and capital) expressed as a percentage of total government expenditure in a given financial year. It is calculated by dividing total public expenditure on education incurred by all government agencies/departments in a given financial year by the total government expenditure for the same financial year. (Interpretation: A higher percentage of government expenditure on education shows a high government policy priority for education relative to the perceived value of other public investments, including defence and security, health care, social security for unemployment and elderly, and other social or economic sectors.)

Formula:

$$\%PXE_t = \frac{PXE_t}{TPX_t}$$

Where:

$\%PXE_t$ = Public expenditure on education as a percentage of total government expenditure in financial year t .

PXE_t = Total public expenditure on education in financial year t .

TPX_t = Total government expenditure in financial year t .

● Percentage distribution of public current expenditure on education by level (%PCXE): Public current expenditure for each level of education, expressed as a percentage of total public current expenditure on education. It is calculated by dividing public current expenditure devoted to each level of education by the total public current expenditure on education. (Interpretation: Relatively high percentage of current expenditure devoted to a specific level of education denotes the priority given to that level in national educational policy and resource allocation. When interpreting this indicator, one may also take into account the corresponding distribution of enrolment by level and then assess the relative current expenditure per student.)

● Public current expenditure per pupil (student) as % of GNP per capita (%PCXE/ GNP per capita): Public current expenditure per pupil (or student) at each level of education, expressed as a percentage of GNP per capita in a given financial year. It is calculated by dividing per pupil public current expenditure on each level of education in a given year by the GNP per capita for the same year. (Interpretation: A high percentage figure for this indicator denotes a high share of per capita income being spent on each pupil/student in a specified level of education. It represents a measure of the financial cost per pupil/student in relation to average per capita income.)

Formula:

$$\% PCXE_h^t = \frac{PCXE_h^t}{\sum_{h=1}^n PCXE_h^t}$$

Where:

$\% PCXE_h^t$ = Percentage public current expenditures on level of education h in financial year t.

$PCXE_h^t$ = Total public current expenditures on level of education h in financial year t.

Formula:

$$\% PCXE_{h,GNPc}^t = \frac{PCXE_h^t}{E_h^t} / \frac{GNP^t}{P^t}$$

Where:

$\% PCXE_{h,GNPc}^t$ = Public current expenditure per pupil of education level h as percentage of GNP per capita in financial year t

$PCXE_h^t$ = Public current expenditure on education level h in financial year t

GNP^t = Gross National Product in financial year t

E_h^t = Total enrolment in education level h in school-year t

P^t = Total national population in year t.

● Public current expenditure on education as percentage of total public expenditure on education (%PCXE): Public current expenditure on education expressed as a percentage of total public expenditure on education (current and capital) in a given financial year. It is calculated by dividing public current expenditure on education in a given financial year by the total public expenditure on education for the same financial year. (Interpretation: A high percentage of public current expenditure on education reflects the need to devote a large share of public funding to maintain the education system operations, taking into account current and projected changes in enrolment, in the salary levels of educational personnel and in other operational costs. The difference between this percentage and 100 reflects the proportion of public expenditure on education devoted to capital expenditure.)

Socio-cultural analysis

This is the section which is often forgotten or sometimes avoided in a sector analysis. This concerns in particular: the demographic composition, the sociological and religious structure, the country's cultural traditions which can have an impact on the social demand for education, the schooling and the school performance of minorities, and of girls/boys, etc.

Box 2 presents an example of the socio-cultural aspects that were examined for the Education Sector Analysis in a country. This socio-cultural analysis shed light on the historical, social and political backgrounds of the country's education system that have affected the national education system in the past and that should be taken into account when designing policies and strategies for the future of the educational development in this country.

Formula:

$$\% PCXE_t = \frac{PCXE_t}{TPXE_t}$$

Where:

$\% PCXE_t$ = Percentage public current expenditure on education in financial year t.

$PCXE_t$ = Total public current expenditure on education in financial year t.

$TPXE_t$ = Total public expenditure in financial year t.

Box 2: Example of the aspects covered for a socio-cultural analysis

Part A: Socio-political context of education

1. Evolution of the Federal Republic (Pre-Colonization; Colonization; The National Question and Its Root; Beginning of Federalism; Conflicts and Crises; Military Coups, Military Rule and the Civil War)

2. The Three Fundamental Educational Traditions (Indigenous education; Islamic Education; Western Education)

[...]

Politico-institutional analysis

The aspects of institutional, political and territorial organization are likely to have an impact on the education services of a country. It involves the analysis of the functioning mode of the State and local/public authorities (centralized or decentralized systems, etc), but also the reforms in view and their likely consequences for the education system. The role and responsibilities of the different planning and management authorities should be analyzed in order to show their strengths and weaknesses and identify the paths to follow to remedy possible management problems in the education sector.

With regard to the institutional analysis of the education sector, Section F of this Annexe describes the managerial and institutional aspects that need to be examined in a sector analysis.

B. Status of student flows

- Access and participation at each level of education
- Internal efficiency
- Disparities in education

Access and participation

This section of the education sector analysis analyses education coverage by level and type of education according to the structure of the education system (at all levels and across all types of education), including the provision of education by public, semi-public, private or community schools, etc. Analysis is carried out of present trends building on an examination of past tendencies.

One can present the evolution of the numbers of students and intake rates, net and gross enrolment ratios by level, and analyze the distribution and evolution of school enrolments in different types of schools. The analysis of the transition to different levels of education (to general, technical and professional education at secondary and higher levels, for example) could be conducted from the perspective of the possible rationalization of the education system according to the job market and trends in economic development.

The analysis of access to and participation in education should be carried out in terms of supply and demand. This means finding out if access and schooling are more limited by incomplete supply, by deficient demand, or by these two factors at once. For example, children may not have access to education because there are no schools in their village or there is not enough space at school, or they may not wish to go to school for different reasons. This investigation will allow the forward identification of appropriate strategies to increase schooling, by enlarging the school supply, by stirring up social demand for education or by improving the school environment and the relevance of schooling to some sub-groups of population. To achieve this, it is necessary to organize household surveys and to use their findings fully, in order to identify the real causes and possible

corrective measures.

Below are presented some main indicators that are used to measure access to and participation in education.

Access to education can be defined as the extent to which the “school-age” population is able to access the first grade of a particular level or cycle of education. The most commonly used indicators to measure this aspect of the education sector are: (i) the apparent intake rate; (ii) the net intake rate; (iii) the transition rate; and (iv) the registration rate.

● **Apparent intake rate (AIR):** Total number of new entrants in the first grade of primary education, regardless of age, expressed as a percentage of the population at the official primary school-entrance age. It can be calculated by dividing the number of new entrants in grade 1, irrespective of age, by the population of official school-entrance age.

Formula:

$$AIR^t = \frac{N^t}{P_a^t}$$

Where:

AIR^t = Apparent Intake Rate in school-year t

N^t = Number of new entrants in the first grade of primary education, in school-year t

P_a^t = Population of official primary school entrance-age a , in school-year t .

● **Net intake rate (NIR):** New entrants in the first grade of primary education who are of the official primary school-entrance age, expressed as a percentage of the population of the same age. It can be calculated by dividing the number of children of official primary school-entrance age who enter the first grade of primary education by the population of the same age.

Formula:

$$NIR^t = \frac{N_a^t}{P_a^t}$$

Where:

NIR^t = Net Intake Rate in school-year t .

N_a^t = Number of children of official primary school-entrance age a who enter the first grade of primary education, in school-year t .

P_a^t = Population of official primary school-entrance age a , in school-year t .

● **Transition rate (TR):** The number of pupils (or students) admitted to the first grade of a higher level of education in a given year, expressed as a percentage of the number of pupils (or students) enrolled in the final grade of the lower level of education in the previous year. It can be calculated by dividing the number of new entrants in the first grade of the specified higher cycle or level of education by the number of pupils who were enrolled in the final grade of the preceding cycle or level of education in the previous school year.

Formula:

$$TR_{h,h+1}^t = \frac{E_{h+1,1}^{t+1} - R_{h+1,1}^{t+1}}{E_{h,n}^t}$$

Where:

$TR_{h,h+1}^t$ = Transition rate (from cycle or level of education h to h+1 in school year t)

$E_{h+1,1}^{t+1}$ = number of pupils enrolled in the first grade at level of education h+1 in school-year t+1

$R_{h+1,1}^{t+1}$ = number of pupils repeating the first grade at level of education h+1 in school-year t+1

$E_{h,n}^t$ = number of pupils enrolled in final grade n at level of education h in school year t.

Formula :

$$RR_{h,h+1}^t = \frac{I_{h+1,1}^t}{G_{h,n}^{t-1}}$$

Where:

$RR_{h,h+1}^t$ = Registration rate (from a cycle or level of education h to another h+1 at a school year t)

$I_{h+1,1}^t$ = Number of new entrants to Grade 1 of the cycle or level of education h+1 at a school year t

$G_{h,n}^{t-1}$ = Number of graduates from the last grade n of a cycle or level of education h at a school year t-1

● **Registration rate (RR):** The number of students admitted to the first grade of a cycle or level of education in a given year, expressed as a percentage of the number of students graduated from the final grade of the lower cycle or level of education in the previous year. It can be calculated by dividing the number of new entrants in the first grade of the specified cycle or level of education by the number of students who had graduated from the final grade of the preceding cycle or level of education in the previous school year. (N.B. This rate is different from the transition rate. It can be considered as an intake rate, but for other levels than the primary education level, in that it calculates the number of new entrants to the first grade of any non-primary education level as percentage of the theoretical eligible population, i.e., those who graduated from the preceding education level.)

Participation in education can be defined as the extent to which the “school-age” population is able to pursue its studies as far as possible, ideally to the completion of the level concerned. The most commonly used indicators to measure this aspect of the education sector are: (i) gross enrolment ratio; (ii) net enrolment ratio; (iii) age-specific enrolment ratio.

● Gross enrolment ratio (GER): Total enrolment in a specific level of education, regardless of age, expressed as a percentage of the eligible official school-age population corresponding to the same level of education in a given school-year. It is calculated by dividing the number of pupils (or students) enrolled in a given level of education regardless of age by the population of the age-group which officially corresponds to the given level of education. (Interpretation: A high GER generally indicates a high degree of participation, whether the pupils belong to the official age-group or not. A GER value of 100 percent indicates that a country is, in principle, able to accommodate all of its school-age population, but it does not indicate the proportion already enrolled. The achievement of a GER of 100 percent is therefore a necessary but not sufficient condition for enrolling all eligible children in school. When the GER exceeds 90 percent for a particular level of education, the aggregate number of places for pupils is approaching the number required for universal access of the official age-group. However, this is a meaningful interpretation only if one can expect the under-aged and over-aged enrolments to decline in the future in order to free places for pupils from the expected age-group.)

Formula:
$$GER_h^t = \frac{E_h^t}{P_{h,a}^t}$$

Where:

GER_h^t = Gross Enrolment Ratio at level of education h in school-year t

E_h^t = Enrolment at the level of education h in school-year t

$P_{h,a}^t$ = Population in age-group a which officially corresponds to the level of education h in school-year t

● Net enrolment ratio (NER): enrolment of the official age-group for a given level of education expressed as a percentage of the corresponding population. It is calculated by dividing the number of pupils enrolled who are of the official age-group for a given level of education by the population for the same age-group. (Interpretation: A high NER denotes a high degree of participation of the official school-age population. The theoretical maximum value is 100%. Increasing ratios can be considered as reflecting improving participation at the specified level of education. When the NER is compared with the GER the difference between the two ratios highlights the incidence of under-aged and over-aged enrolment. If the NER is below 100%, then this provides a measure of the proportion of children not enrolled at the specified level of education. However, since some of these children/youth could be enrolled at other levels of education, this difference should in no way be considered as indicating the percentage of students not enrolled. A more precise complementary indicator is the age-specific enrolment ratio (ASER) which shows the participation of the population of a particular age in education.)

Formula:

$$NER_h^t = \frac{E_{h,a}^t}{P_{h,a}^t}$$

Where:

NER_h^t = Net Enrolment Ratio at level of education h in school-year t

$E_{h,a}^t$ = Enrolment of the population of age-group a at level of education h in school-year t

$P_{h,a}^t$ = Population in age-group a , which officially corresponds to level of education h in school-year t

● **Age-specific enrolment ratio (ASER):** Percentage of the population of a specific age enrolled, irrespective of the level of education. It is calculated by dividing the number of pupils (or students) of a specific age enrolled in educational institutions at all levels of education by the population of the same age. (Interpretation: A high ASER denotes a high degree of educational participation of the population of the particular age. The theoretical maximum value is 100%. Increasing ratios can be considered as reflecting improving participation of the particular age. If the ASER is below 100%, then the difference provides a measure of the proportion of the population of the particular age who are not enrolled.)

Formula:
$$ASER_a^t = \frac{E_a^t}{P_a^t}$$

Where:

$ASER_a^t$ = Age Specific Enrolment Ratio of the population of age a in school-year t

E_a^t = Enrolment of the population of age a in school-year t .

P_a^t = Population of age a in school-year t

Internal efficiency

The internal efficiency of an education system basically measures the number of years it takes a child to complete a particular cycle or level of education, e.g. primary, secondary, etc.

The basic indicators required to measure the internal efficiency of an education system are calculated on the basis of the flow rates (promotion, repetition and drop-out). To obtain these indicators, one needs to have the enrolment statistics of at least the two most recent successive years or better, the past ten years. The repetition and drop-out rates will make it possible to measure the system's efficiency as well as the potential efficiency gains that free up resources. The indicators of the survival, retention and completion¹¹ rates are calculated on the basis of the flow rates.

It is important to analyze the reasons underlining these indicators. It sometimes happens, for example, that the high drop-out rate in a given grade results from the simple fact that many schools, being incomplete, do not provide teaching at this specific grade. The completion rate, which can also be an indicator of participation, makes it possible to measure the internal efficiency in countries where the rate of loss (linked to drop-outs and repetitions) is high.

The **flow indicators** are: (i) promotion rate; (ii) repetition rate; and (iii) dropout rate.

¹¹ The completion rate evaluates the percentage of pupils completing a study cycle in relation to the corresponding age population.

● Promotion rate (p): the proportion of pupils enrolled in a given grade in a given school-year who will at the beginning of the following school-year, be enrolled in the next higher grade. There are two possible ways of calculating this indicator, depending on the availability of data on the number of promotees by grade. If such data are available, “Formula 1” can be used, in which case, the number of promotees by grade in school-year t+1 is divided by the number of pupils enrolled in the corresponding grade in school-year t. Otherwise, “Formula 2” is used when data on the number of promotees by grade are not available; the number of repeaters by grade in school-year t+1 are subtracted from the number of pupils enrolled in the corresponding school-year and the difference is then divided by the number of pupils enrolled in the corresponding grade in school-year t.

● Repetition rate (r): the proportion of pupils from a cohort enrolled in a given grade in a given school-year who are studying in the same grade in the following school-year. It is calculated by dividing the number of repeaters in a given grade in school-year t+1 by the number of pupils from the same cohort enrolled in the same grade in the previous school-year t.

Formulas:

$$p_i^t = \frac{P_{i+1}^{t+1}}{E_i^t}$$

$$\text{or } p_i^t = \frac{E_{i+1}^{t+1} - R_{i+1}^{t+1}}{E_i^t}$$

Where:

p_i^t = Promotion Rate at grade i in school-year t

P_{i+1}^{t+1} = number of pupils promoted to grade i+1 in school-year t+1

E_{i+1}^{t+1} = number of pupils enrolled in grade i+1 in school-year t+1

R_{i+1}^{t+1} = number of pupils repeating grade i+1 in school-year t+1

E_i^t = number of pupils enrolled in grade i, in school-year t.

Formula:

$$r_i^t = \frac{R_i^{t+1}}{E_i^t}$$

Where:

r_i^t = Repetition Rate at grade i in school-year t

R_i^{t+1} = number of pupils repeating grade i, in school-year t+1

E_i^t = number of pupils enrolled in grade i, in school-year t.

● Dropout rate (d): it is the proportion of pupils leaving school without completing a given grade in a given school-year expressed as a percentage of those who were enrolled in the same grade at the beginning of that grade at the beginning of the same school-year. There are two possible ways of calculating this indicator, depending on the availability of data on the number of drop-outs by grade. If such data are available, “Formula 1” can be used, in which case, the number of drop-outs by grade in school-year t is divided by the number of pupils enrolled in the corresponding grade in school-year t. Otherwise, “Formula 2” is used when data on the number of dropouts are not available; the number of repeaters and promotees by grade in school-year t+1 are deducted from the number of pupils enrolled in the corresponding school-year and the difference is then divided by the number of pupils enrolled in the corresponding grade in school-year t.

Formulas:

$$d_i^t = \frac{D_i^t}{E_i^t} \text{ or}$$

$$d_i^t = \frac{E_i^t - (R_i^{t+1} + P_{i+1}^{t+1})}{E_i^t}$$

Where:

d_i^t = Dropout Rate at grade i in school-year t

D_i^t = Number of dropouts at grade i in school-year t

$E_i^t - (R_i^{t+1} + P_{i+1}^{t+1})$ = number of pupils dropping out from grade i in school-year t

Cohort analysis using flow diagrams is useful to calculate other indicators of internal efficiency. A school cohort is a group of pupils who join the first grade of a given cycle or level of education in the same year and subsequently experience the events of promotion, repetition or dropout. Cohort analysis traces the flow of a group of pupils who enter the first grade in the same year and progress through an entire cycle or level of education. In particular, it can help calculate wastages due to dropout or repetition, survival rates and the coefficient of efficiency. Annex 4 gives an example of the reconstructed cohort analysis method, whereby one can calculate average durations of studies, system wastages, coefficient of efficiency, etc.

● **Years-input per graduate (YIG):** The estimated average number of pupil-years spent by pupils (or students) from a given cohort who graduate from a given cycle or level of education, taking into account the pupil-years wasted due to drop-out and repetition (N.B. One school-year spent in a grade by a pupil is equal to one pupil-year.) It is calculated by dividing the total number of pupil-years spent by a pupil-cohort (graduates plus drop-outs) in the specified level of education by the sum of successive batches of graduates belonging to the same cohort.

$$\text{Formula: } YIG_g = \frac{\left\{ \sum_{j=n}^{n+k} G_{g,j} * j \right\} + \left\{ \sum_{j=1}^{n+k} D_{g,j} * j \right\}}{\sum_{j=n}^{n+k} G_{g,j}}$$

Where

YIG_g = Years input per graduate (for graduates belonging to cohort g)

$G_{g,j}$ = Graduates from cohort g after j years of study g,j

$D_{g,j}$ = drop-outs from cohort g after j years of study

k denotes the number of repetitions allowed; n the prescribed normal duration of study for a cycle or level of education; g the pupil-cohort; and j the number of years of study.

● **Average duration of studies per graduate (ADSG):** The estimated average number of years taken by graduates to graduate from a given school cohort in a cycle or level of education. It is calculated by dividing the sum of the products of the number of graduates by the number of n years spent in a given school cohort in a cycle or level of education by the number of graduates in the corresponding school cohort and cycle or level of education. The result is expressed in number of years. N.B. one year spent in a grade by a pupil is equal to one pupil-year.

$$\text{Formula: } ADSG = \frac{\sum_{i=n}^{n+k} G_i * i}{\sum_{i=n}^{n+k} G_i}$$

Where:

G_n = Graduates after n years of study

G_{n+1} = Graduates after n+1 years of study

G_{n+k} = Graduates after n+k years of study

$G = \sum_{i=n}^{n+k} G_i$ = Total number of graduates

● Average duration of studies per dropout (ADSD): The estimated average number of years that those, who dropout from a given school cohort in a particular level of education, stayed at school before dropping out. To calculate it, divide the total number of years (pupil-years) during which dropouts from a given school cohort and in a level or cycle of education stayed in a school before leaving, by the number of dropouts in the corresponding school cohort and level or cycle of education. The result is expressed in numbers of years. N.B. one year spent in a grade by a pupil is equal to one pupil-year.

Formula:

$$ADSD = \frac{\sum_{i=n}^{n+k} D_i * i}{\sum_{i=n}^{n+k} D_i}$$

Where:

D_i = Dropouts after i years of study

D_{n+k} = Dropouts after n+k years of study

$D = \sum_{i=n}^{n+k} D_i$ = Total number of dropouts

● Average duration of studies for the cohort (ADSC): The estimated average number of years required for a pupil/student to graduate from a given school cohort in a cycle or level of education. It is calculated by dividing the sum of the total number of pupil-years taken to graduate by pupils from a given school cohort and in a level or cycle of education and the total pupil-years during which dropouts stayed in school before leaving by the sum of the number of graduates and dropouts in the corresponding school cohort and level or cycle of education. The result is expressed in numbers of years. N.B. one year spent in a grade by a pupil is equal to one pupil-year.

Formula:

$$ADSC = \frac{ADSG * G + ADSD * D}{1000}$$

Where:

ADSG= Average duration of studies per graduate

ADSD= Average duration of studies per dropout

See above.

● Proportion of total wastage spent on dropout (PTWSD): the proportion of total number of pupil/years wasted due to drop out from school from a given cohort in a cycle or level of education. It is calculated by dividing the total number of pupil-years wasted by pupils who drop out from a given school cohort in a level or cycle by the sum of the total number of pupil-years wasted by both the former and the pupils who repeat grades in the corresponding school and level or cycle of education (i.e. the excess of pupil-years wasted on the repetition and drop-outs) and multiply the result by 100. N.B. one year spent in a grade by a pupil is equal to one pupil-year.

Formula:

$$PTWSD = \frac{\sum_{i=1}^n D_i * i}{PYEG} * 100\%$$

Where:

PYEG=PYC - OPYG pupils-years spent in excess

See above.

● Proportion of total wastage spent on repetition (PTWSR): The proportion of the total number of pupil/years wasted due to repetition within a given cohort in a level of education. It is calculated by deducting the PTWSD from 100. The result is expressed as a percentage. N.B. one year spent in a grade by a pupil is equal to one pupil-year.

Formula:

$$PTWSR = (100 - PTWSD)\%$$

Where:

$$PTWSR = \frac{\sum_{i=1}^n R_i * i}{PYEG} * 100\%$$

See above.

● **Survival rates by grade (SR):** percentage of a cohort of pupils (or students) enrolled in the first grade of a given level or cycle of education in a given school-year who are expected to reach successive grades. They are calculated by dividing the total number of pupils belonging to a school-cohort who reached each successive grade of the specified level of education by the number of pupils in the school-cohort, i.e. those originally enrolled in the first grade of primary education.

Formula:

$$SR_{g,i}^k = \frac{\sum_{t=1}^m P_{g,i}^t}{E_g^k}$$

Where:

$$P_{g,i}^t = E_{g,i+1}^{t+1} - R_{g,i+1}^{t+1}$$

i = grade (1, 2, 3, ..., n) t = year (1, 2, 3, ..., m) g = pupil-cohort.

$SR_{g,i}^k$ = Survival Rate of pupil-cohort g at grade i for a reference year k

E_g^k = Total number of pupils belonging to a cohort g at a reference year k

$P_{g,i}^t$ = Promotees from E_g^k who would join successive grades i throughout successive years t.

R_i^t = Number of pupils repeating grade i in school-year t.

● **Coefficient of efficiency:** The ideal (optimal) number of pupil-years required (i.e. in the absence of repetition and drop-out) to produce a number of graduates from a given school-cohort for a cycle or level of education, expressed as a percentage of the actual number of pupil-years spent to produce the same number of graduates. Input-output ratio, which is the reciprocal of the coefficient of efficiency, is often used as an alternative. (N.B. One school-year spent in a grade by a pupil is counted as one pupil-year.) It can be calculated by dividing the ideal number of pupil-years required to produce a number of graduates from a given school-cohort for the specified level of education, by the actual number of pupil-years spent to produce the same number of graduates.

Formula:

$$CE_g = \frac{\sum_{j=n}^{n+k} G_{g,j}^t * n}{\left\{ \sum_{j=n}^{n+k} G_{g,j}^t * j \right\} + \left\{ \sum_{j=1}^{n+k} D_{g,j}^t * j \right\}}$$

Where:

CE_g = Coefficient of Efficiency for a pupil-cohort g

$G_{g,n}$ = the number of pupils graduating from cohort g in final grade n after n years of study (without repetition)

$G_{g,j}$ = the number of pupils graduating from cohort g in final grade n after j years of study

$D_{g,j}$ = the number of pupils (of the cohort g) dropping out after j years of study

k denotes the number of repetitions allowed; n the prescribed normal duration of study for a cycle or level of education; g the pupil-cohort; and j the number of years of study.

Another indicator that can be used to assess the internal efficiency is the **completion rate**.

- **Gross completion rate:** the total number of students completing (or graduating from) the final year of primary or secondary education, regardless of age, expressed as a percentage of the population of the official primary or secondary graduation age. It is calculated by dividing the number of students completing (or graduating from) the final year of primary or secondary education by the population of the official graduation age.

Formula:

$$GCR_h^t = \frac{C_h^t}{P_{h,a}^t}$$

Where:
 GCR_h^t = Gross Completion Rate at level of education h in school-year t

C_h^t = number of students completing (or graduating from) the final year of primary or secondary education h in school-year t

$P_{h,a}^t$ = Population at the official graduation age a which officially corresponds to the level of primary or secondary education h in school-year t

In fact, in the absence of information on graduates, the completion rate is often proxied by the following formula (here applied to the primary case):

GCR (primary) =

No. of students in the last primary grade
 – repeating students

Population of the official age group for the last primary grade

Disparities

This means analyzing the educational coverage and services by gender (girls/boys), by administrative area (region, districts, etc.), by population density (urban/rural) or by socio-cultural groupings (social strata, ethnic or linguistic minority groups, etc.). In education as in other sectors, the trees may hide the forest: an enrolment rate of 70 per cent in the rural areas may accompany a figure of less than 30 per cent in a deserted region; a national average student/teacher ratio of 40 may, in reality, vary between 10 and 150 by region. This analysis of disparities is necessary not only for ethical reasons, but above all, to ensure the delivery of adapted and efficient education services for the effective schooling of different population groups. For example, it makes it possible to act on both the supply and demand sides depending on the contexts. It also enables differential resource mobilization as required by different population groups (e.g. to accommodate different opportunity costs for rural populations, the training of teachers in specific techniques, etc.). School statistics and household surveys can be used to carry out such analyses.

One can use the indicators described above in disaggregating by gender and other groupings in order to measure the magnitude of disparities.

C. Quality of education

The quality in education is difficult to assess not least because of the variety of definitions and understandings of educational quality by different stakeholders. In principle, quality should deal with educational outputs and outcomes (e.g. learning achievement, the acquisition of basic life skills, citizenship, etc.) rather than inputs. A commonly used indicator could be the results of the examination. However, because such educational outcomes are difficult to measure, planners and managers have tended to rely on the quantity and the quality of educational inputs (resources) to assess educational quality. Three broad categories of educational inputs are: (i) education personnel; (ii) instructional methods and materials; and (iii) educational facilities

Education personnel

Salaries represent the most important part of recurrent education expenditure. In many contexts, they represent as much as 95 per cent or more of the recurrent education budget. On the other hand, teachers are the principal factor in educational provision. This implies that teachers' attributes need to be analysed carefully. One ought to examine, for example, the number of teachers available, the requirement of teachers in the light of the national or subnational norms and standards, pupils/teacher ratios, the level of teachers' qualification and their training needs, and pedagogical and administrative supervision. Teacher salaries by category or by level of qualification need to be analysed in close coordination with other ministries or institutions concerned. Sometimes, the analysis of different categories of non-teaching personnel turns out to be crucial in improving the quality and the efficiency of education services.

Some teacher-related indicators that can be analysed at this stage include:

● Pupil-teacher ratio (PTR): Average number of pupils (students) per teacher at a specific level of education in a given school-year. For the purpose of examining system-wide pupil-teacher ratios, teachers are defined as persons whose professional activity involves the facilitation of learning and the acquisition of attitudes and skills that are stipulated in a formal curriculum by students enrolled in a formal educational institution. The PTR is calculated by dividing the total number of pupils enrolled at the specified level of education by the number of teachers at the same level. (Interpretation: A high teacher pupil-ratio suggests that each teacher has to be responsible for a large number of pupils. In other words, the higher the pupil/teacher ratio, the lower is the relative access of pupils to teachers. It is generally assumed that a low pupil-teacher ratio signifies smaller classes, which enables the teacher to pay more attention to individual students, which may in the long run result in better pupil performance.)

Formula:

$$PTR_h^t = \frac{E_h^t}{T_h^t}$$

Where:

PTR_h^t = Pupil-teacher ratio at level of education h in school-year t

E_h^t = Total number of pupils or (students) at level of education h in school-year t

T_h^t = Total number of teachers at level of education h in school-year t.

● The number of teachers available in the system and new teachers to be recruited: One ought to undertake a careful analysis of the availability and requirement of educational personnel, preferably by category. Very often, it starts with calculating (or counting) the number of teachers actually available (or working) in the system and extrapolating the number of students per teacher (pupils/teacher ratio) or the number of students per class (class sizes). These indicators could be compared with the national or subnational standards in terms of PTR or class size. There are two ways of calculating the full-time equivalent teacher requirements: the first is the ‘method based on the pupil-teacher ratio’ and the second is the ‘method based on the number of pupils by class and hours taught by teachers’. The first method is used when calculating the teacher requirements at the primary education level and the second is applied for calculating these requirements at the education levels of “subject teaching”, i.e. secondary education, higher learning, etc.

Method based on the pupil-teacher ratio:

$$PTR_h^t = \frac{E_h^t}{T_h^t}$$

$$R^t = R^0 + t * cr$$

Where:

TR^t = number required of full-time equivalent teachers required

E^t = total projected number of students

R^t = pupil-teacher ratio

R^0 = initial pupil-teacher ratio

cr = constant annual rate change of pupil-teacher ratio

Method based on the number of pupils by class and hours taught by teachers:

Formula:

$$TR^t = \frac{E^t * H^t}{C^t * L^t}$$

$$C^t = C^0 + t * c$$

Where:

TR^t and E^t are defined above.

H^t = average number of weekly hours per student

C^t = average number of students per class

L^t = average number of weekly hours per full-time teacher

cc = constant annual rate change of average number of students per class

● Teachers' emoluments as a percentage of public current expenditure on education (%TX): Public expenditure devoted to teachers' emoluments is expressed as a percentage of total public current expenditure on education. It is calculated by dividing public current expenditure devoted to teachers' emoluments in a given financial year by the total public current expenditure on education for the same financial year. (Interpretation: A higher percentage of public current expenditure devoted to teachers' emoluments denotes the preponderance of spending on teachers' compensation to the detriment spending on administration, teaching materials, scholarships, etc. The way in which educational spending is allocated between these different purposes i.e. teachers' salaries and the condition of education facilities (e.g. expenditure on teaching materials, etc) can affect the quality of education.)

Formula:

$$\%TX_t = \frac{TX_t}{PCXE_t}$$

Where:

$\%TX_t$ = Percentage of public current expenditure on education devoted to teachers' emoluments in financial year t.

TX_t = Total public current expenditure on teachers' emoluments in financial year t.

$PCXE_t$ = Total public current expenditure on education in financial year t.

Educational facilities

This is about school space and equipment. In countries that have reached high levels of education, this represents marginal investment. However, in countries that have significantly low enrolment ratios, this is one of the most important budgetary categories. Sometimes 80 per cent of external financial resources are spent on the construction of new buildings. This implies the need for a thorough and careful analysis of the costs and standards of construction, the conditions of educational facilities (blackboards, desks, latrines, water, etc.), as well as the space-time use of classrooms according to levels and types of education. Some indicators that can help measure the space-time use of educational facilities are:

● Pupil-classroom ratio (PCR): The ratio of the number of pupils (students) to the number of classrooms. It is calculated by dividing the number of pupils (students) at a level or cycle of education by the number of classrooms in the corresponding level or cycle of education. (Interpretation: Low PCR may be conducive to proper teaching/learning conditions but can be less cost-effective. High PCR generally indicates high classroom utilisation rate but not necessarily high learning outcomes. However all the other factors which affect the teaching/learning process should also be considered in the interpretation of this indicator. Although it is generally agreed that “overcrowded” classes are detrimental to pupil/ student achievement, the advantages of small classes are not necessarily obvious. Hence especially at lower levels of education, in order to increase both access and participation rates, given the scarcity of resources, more care should be taken when formulating educational policies solely on P/CR without due regard to the implications of cost-saving policies on the quality of education.)

Formula:
$$PCR_h^t = \frac{E_h^t}{C_h^t}$$

Where:
 PCR_h^t = Pupil-classroom ratio at level of education h in school-year t
 E_h^t = Total number of pupils or (students) at level of education h in school-year t
 C_h^t = Total number of classrooms at level of education h in school-year t.

● **Classroom space utilisation rate (CSUR):** Percentage of the area of standard floor space occupied by pupils/students in a classroom. It is calculated by dividing the area of floor space of a classroom actually used by pupils/students at a level or cycle of education by the standard floor space which is planned for utilisation by pupils/students in the corresponding level or cycle of education. (Interpretation: Ideally this indicator should approach as close as 100%. Indication on space utilisation of classrooms without any information on the time during which classrooms are occupied can be useless for cost effectiveness, educational decision-making purposes.)

Formula:

$$CSUR_h^t = \frac{A_h^t}{S_h^t}$$

Where:

$CSUR_h^t$ = Classroom space utilisation rate

A_h^t = Area of classroom's floor space actually used at h level or cycle of education

S_h^t = Area of the standard classroom's floor space that is planned for utilisation at h level or cycle of education

Data required: 1) Number of classrooms
 2) Standard and actual area of floor space classrooms are respectively utilized or planned to be utilized.

● **Classroom time utilisation rate (CTUR):** Proportion of hours classrooms are used or occupied for teaching/learning purposes within the total number of standard hours of utilisation. It is calculated by dividing the number of hours during which classrooms are actually utilised for teaching and learning at a level or cycle of education by the standard numbers of hours classrooms are planned to be used in the corresponding level or cycle of education. (Interpretation: Ideally this indicator should approach as close as 100%. Indication on time utilisation of classrooms without any information on the number of pupils involved can be useless for cost effectiveness and educational decision making. In addition the optimum time utilisation of classrooms can depend enormously on the ways classes are organised and especially at higher levels of education where the set-up time between classes can seriously affect classroom time utilisation rate.)

Formula:

$$CTUR_h^t = \frac{H_h^t}{S_h^t}$$

Where:

$CTUR_h^t$ = Classroom time utilisation rate

H_h^t = Number of actual hours classrooms used at h level or cycle of education

S_h^t = Number of standard hours of utilisation of classrooms at h level or cycle of education

Data required: 1) Number of classrooms
 2) Standard and actual number of hours classrooms are respectively utilised or planned to be utilised.

● Classroom utilization rate (CUR): The product of the classroom's space and time utilisation rates. It is calculated by multiplying the CTUR (Classroom Space Utilisation Rate) by the CSUR (Classroom Time Utilisation Rate). (Interpretation: Ideally this indicator should approach as close as 100%. When analysing this indicator for educational planning, proper care should be taken in isolating the relative weights of the respective influence of time and space on its magnitude. Since developing countries are faced with scarce resources, idle capacities usually occurs as result of lack of information on both classrooms' time and space utilisation. Hence the development of this indicator should be encouraged in line with a rationalised classroom utilisation management system in order to enhance the rates of access and participation, especially in developing countries.)

Formula:
$$CUR_h^t = CSUR_h^t \times CTUR_h^t$$

Where:

CUR_h^t = Classroom utilisation rate

Data required: 1) Number of classrooms
2) Standard and actual number of hours classrooms are respectively utilised or planned to be utilised. 3) Standard and actual area of floor space classrooms are respectively utilized or planned to be utilised.

● Classroom requirements (TCR): Based on the analyses of the projected enrolments and classroom utilization standards, it is possible to calculate future requirements for new constructions by level or cycle of education. This indicator is indispensable when preparing sector plans or programmes/projects related to classroom constructions. It is calculated, especially for primary education level, by dividing the total number of students by the average number of students per classroom. As for the secondary and higher levels of education, classroom requirements are calculated by taking into account the number of (weekly or monthly) learning hours and laboratory-usage hours as well.

Formula:
$$TCR_d^t = \frac{E_d^t}{ASC_d^t}$$

$$NC_d^t = \frac{[E_d^t - (1-a) * E_d^{t-1}]}{ASC_d^t}$$

$$ASC_d^t = ASC_d^o + t * c$$

where:

E_d^t = Total projected number of students, year t and level of education d

TCR_d^t = total classrooms required, year t and level of education d

ASC_d^t = Average number of students per classrooms year t, level of education d

NC_d^t = new classrooms required, year t, level of education d

a = replacement rate of buildings; cc = constant annual rate of change of average of students per classrooms; 0 = initial year

Instructional methods and educational outputs

This is about evaluating the status (or the availability) and the relevance of school programmes, pedagogical methods (as for example, the types of pupil groupings in multigrade classes, double shifts, etc., and also the size of classes), and of instructional material (textbooks, teacher's guides and other equipment). In certain countries, the change or the reform of pedagogical means and methods is considered as a major strategy for the improvement of pupil flow rates (increase in access to and participation in education).

Many of the above aspects of quality can be quantified, but do not tell much about students' achievements and knowledge. For instance, curricula might be poorly designed and textbooks irrelevant in their content; school inspectors may only be charged with administrative data collection; teaching methods might be inadequate, etc. Furthermore, there are also non-school factors (such as the socio-economic background of the pupils and their health and nutrition status) which are of critical importance and affect performance and attention in classes.

Depending on the resources available to this end, specific research studies should be carried out as has been done in some countries in order to:

- ▶ Assess the actual learning achievement of students, taking into account their individual characteristics and the various educational inputs (learning environment, educational facilities, teachers' qualifications, pedagogical supervision, etc.) as well as non-school factors (geographical zone of schools, parents' social and economic backgrounds, distance to schools, etc.);
- ▶ Identify policy options to improve student performance in light of the nature and weight of the different factors influencing the teaching and learning by students.

D. External effectiveness

This is about the performance of graduates of a certain level of education in active social and economic life, meaning, the social and economic benefits that individuals and/or society can draw from the investments made in education. Depending on the contexts and the countries, the analysis of the characteristics of school-leavers (graduates of a given educational cycle), of their professional integration in the job market (tracer studies of school graduates) can prove essential in the definition of educational reforms.

This means analyzing to what extent the education sector is organized in ensuring a basic education for all the citizens of the country as well as the general, technical and professional training at secondary and higher education levels, in tune with the changing demands of society and the economy. On the basis of the evaluation of the current distribution and regulation of student flows, possible options may be identified to improve the efficiency and effectiveness of the system in response to social demands and the job market.

E. Educational costs and finance

Costs of education

Total costs of education (Recurrent and capital): This means expenditure by type, by function and by level of education. Expenditures are in general analyzed in terms of recurrent or capital expenditures.

Formula:

$$C_d^t = RC_d^t + I_d^t$$

Where:

t = year

d = level of education

$$C_d^t = \text{Total costs}$$

$$RC_d^t = \text{Total recurrent costs}$$

$$I_d^t = \text{Investment}$$

Recurrent costs: Recurrent costs (expenditures) are subdivided into salaries (teaching personnel and non-teaching personnel) and other recurrent expenditures (textbooks, teacher guides, other educational materials). Sometimes, expenditures are made in cash or in kind. The analysis of unit costs, notably on salaries and school buildings, is important and necessary. On the basis of total expenditures and enrolments, one can calculate unit costs (costs per pupil) by school level, by type (general or technical education) or by status (public, semi-public or private).

Increasingly, organizations analyze costs per pupil or salaries per teacher as multiples of GDP per capita to make comparisons not only between the levels and types of education in the country, but also to make regional and international comparisons. Considering the importance of salary expenditures, these are analyzed in a detailed way in relation to the salaries of other professions of similar qualifications in the country, and salaries of teachers in comparable countries. These unit costs are compared with the bulk of salaries in the light of class sizes and the student/teacher ratios (or the weekly teaching hours for teachers and the weekly learning hours for pupils, especially at post-primary levels). This analysis will make it possible for each country to adopt appropriate policies in increasing or maintaining salary levels by taking measures in quality improvement in education and in the status of teachers.

Formula:

$$RC_d^t = CT_d^t + CM_d^t + CA_d^t + CO_d^t$$

$$CT_d^t = \sum_{i=1}^n \sum_{j=1}^k T_{dij}^t W_{dij}$$

$$CM_d^t = E_d^t * CMPS_d$$

$$CA_d^t = E_d^t * CAPS_d$$

$$CO_d^t = E_d^t * COPS_d$$

where:

$$CT_d^t = \text{Teacher costs}$$

$$CM_d^t = \text{Costs of materials}$$

$$CA_d^t = \text{Administrative costs}$$

$$CO_d^t = \text{Other costs}$$

$$T_{dij}^t = \text{Teachers by categories(i) and steps(j)}$$

$$W_{dij}^t = \text{salaries by categories and steps}$$

$$CMPS_d = \text{per pupil cost for materials}$$

$$CAPS_d = \text{per pupil administrative cost}$$

$$COPS_d = \text{per pupil other costs}$$

Capital cost: The analysis of the cost of school buildings is another important field, in particular in countries where enrolment ratios are low. Given that much capital expenditure comes from external finance in some countries, the pressure exerted by technical and financial agencies mounts with regard to building costs, which vary tremendously from country to country and even within a country itself, depending on the options retained. The beneficiary countries can justify high unit costs for the construction of classrooms, which requires a careful analysis of the procedures, expenditures and methods of construction.

Formula:

$$I_d^t = CBPS * [E_d^t - (1 - a) * E_d^{t-1}]$$

where:

$CBPS_d$ = per pupil building cost

E_d^t = Enrolment

a = replacement rate of buildings

Educational finance

This involves the analysis of the financing of education by the State and local authorities (national education budget and other public budgets), of the financing by families (in kind or by cash) in public as well as in private education, of the financing by other national agents (industries, religious denominations, parents' associations, etc.) or by external agencies (which could be grants or loans at multilateral, bilateral, or NGO level), and for recurrent or capital expenditures.

At the national level, there exist several ministerial departments in charge of education and training. It happens that decentralized authorities receive non-allocated credits from the State. It is therefore important to devote sufficient time to obtain the data on consolidated public expenditure for all education and training activities. It is necessary to define the budgets voted and the real expenditure.

It is important to analyze the non-governmental budgets, be they national (local groups, parent associations, enterprises, etc.) or foreign (multilateral, bilateral or non-governmental grants and/or loans). The non-governmental national budgetary data can be obtained during household surveys or from other providers of education and training. Experience also shows that it is not easy to obtain the budgetary data of external agencies, given the (i) multiplicity of concerned partners; (ii) the absence of accounts and the diversity of budgetary categories; (iii) the different programming and disbursement cycles of agencies

F. Managerial and institutional aspects

This is the question of relating the normative aspects of the system to the institutional and organizational management practices of the sector with a view to identifying strengths and weaknesses in order to bring about improvements. The management aspects could be examined according to the traditional duality of the educational organization: (i) the planning and administrative function which consists of programming and distributing resources (budgets, personnel, buildings, instructional materials, etc.) among the levels of education, regions and /or schools, (ii) the pedagogical function which contributes to the actual management and transformation of these resources into end-products (graduates, learning achievements, individual and social benefits).

In its *planning and administrative function*, it reverts to examining how the decisions were taken and implemented in the programming and distribution of resources and what criteria were used in the exercise of distributing resources amongst different levels and education establishments. Examination of various management tools (information systems, programming tools, feasibility studies, monitoring-evaluation, etc.) could provide information on the efficiency and coherence of these functions.

In its *pedagogical function*, it is about relating the inputs available to the actual outputs and outcomes (number of students trained and their school achievements). It is true that the same inputs do not necessarily produce the same products in education because of other factors like family origin and pupils' dispositions. But it is generally known that teachers (and their style of teaching), instructional materials and school space have an obvious impact on pupils' achievement. The question, therefore, is to examine how these different resources have been mobilized and used in a rational and proactive way in a given environment. Different techniques and methods of analysis are used for this purpose.

These managerial and institutional aspects can be analyzed as part of the sector analysis or by means of a specific audit or institutional analysis.

Annex 2. Stakeholders: different perspectives

*Professional perspectives*¹²

The principal professionals involved in education are: educators, administrators, researchers, etc. But each has a different or even diverging perception of education. Each of these actors tends to give priority to certain aspects of education that are of special concern to them, rather than to well articulated priorities for the education sector as a whole.

Educators, by definition, focus their attention on the educational or pedagogical aspects, such as curriculum, teaching methods, pedagogical materials and learning achievements. They tend to underestimate the financial feasibility aspects and often defend extremely ambitious proposals.

Economists (and the finance specialists), who have been very influential in national and international arenas since the 1980s, focus their attention on costs, financial capacity and educational efficiency. Educational goals are determined by the benefits accruing to economy and employment. Economists often use econometric models to carry out studies on these themes and their options. In the last few decades, economic and financial aspects have often prevailed over the educational, cultural and socio-political considerations in policy design.

Researchers, in the majority, and irrespective of their diversity according to discipline (teaching, psychology, sociology, the economics of education, etc.), believe that research makes an essential contribution to policy formulation. They complain that policy makers make too little use of the research results. However, due to the diversity of research areas, researchers often tend to focus on their own area of specialization without taking a holistic view of the system. Often, they lack the “feel” for reality.

Administrators (and managers), in principle, apply a global vision of the education system while ensuring coherence in managing its various sub-sectors and resources, both human and financial. Depending on their level and authority, they share some of the concerns of planners, finance specialists or economists, but give greater attention to the procedures, functions and organisation of the administrative structures. Yet, in practice, most education ministries are professional bodies: the administrators are recruited among teachers without appropriate training for their task. Hence, lacking appropriate training; they do not necessarily function effectively as managers and administrators.

¹² This Annex is adapted from a UNESCO document, Jallade, L. et al. 2001

Planners typically are guided by a systemic vision of the education sector as a whole, and its place in the wider national (and international) context. This global vision takes into account different aspects of education policies – financial and administrative, as well as pedagogical consequences – and the interrelations between the goals proposed for the various sub-sectors of the education system. Planners should justify policy options by means of studies and factual data as well as longer-term projections of objectives and resources, etc. They are in a position to integrate the various concerns of other educational professionals into such a systemic perspective. However, often they tend to focus on quantitative rather than on qualitative measures, on technocratic aspects rather than the political ones and on a centralised, bureaucratic vision rather than a participatory, or administratively decentralised approach.

The above snapshots point to the need to integrate such diverse professional perspectives. By its institutional and political complexity, education is multidimensional. Learning and teaching are at the centre of education systems, but pedagogical aspects represent only one of many aspects to be considered, along with the costs, financing and management capacities of the system or the implications for the transition between school and work. Unfortunately, professionals often function in isolation, each confined in their own conceptions. For example, there is often a lack of communication between educationists and economists, each being insensitive to the arguments of the other. The same goes for practising educators and researchers or professors of education: the first often reject research results that do not match their personal experience, the latter, on the strength of their intellectual status, air views without consideration of the reality of what it is like in the field.

Hence, there is the need to encourage a **dialogue** between various professionals in order to develop interdisciplinary approaches and perspectives in policy formulation.

The actors and interest groups

It is important that not only educational professionals, but also different actors or groups of actors with common stakes in education policies take part in debates and negotiations. From a functional point of view, there are seven main groups:

- Elected bodies (policy makers, parliament, etc.)
- Civil service (managers, administrators at the central, regional, local level, finance specialists)
- Other providers of education (private institutions, communities, religious groups, ...)
- Teachers
- Beneficiaries (students, parents, employers)

- Other stakeholders (publishers of pedagogical material, NGOs, professionals in other sectors, e.g. health, building, tourism sectors, etc.)
- International cooperation (international and bilateral donor, lending or cooperation agencies), especially in the case of countries which rely on external support for education.

All these stakeholders can be said to share core common concerns about the provision of quality education and training, but at the same time they will have specific concerns and interests along the lines of what follows:

The overall concern of **politicians and government administrators** is the effectiveness of the education system. Depending on the country's contexts, politicians and high level administrators may or may not share the same concerns and interests; they may or may not respect wishes of the population and there may be diverse ideas surrounding educational reforms. Managers and administrators at 'lower levels' are mainly concerned with the efficiency of the system. **Ministries of finance** within the administration have to deal with the competing demands for public expenditure, mindful of the overall, national budget and sources of finance. Their major concern is to control public finance and costs according to certain financial and economic criteria and parameters. Being accountable to the heads of government and commonly to international financial institutions such as the IMF, their interests may be in conflict with those responsible for the education sector, especially if the latter are unable to formulate arguments adequately that defend the case made for public educational expenditure. This is often the case in many countries.

Other non-governmental, institutional providers of education comprise owners and managers of private schools and religious associations and congregations. They often demand policies that enhance the freedom of teaching as well as government subventions for private education.

Teachers, a great many of whom are civil servants, not only have their particular educational concerns, but also well-known corporatist claims concerning wage levels, workloads, class size, pedagogical autonomy in the classroom, etc. They are numerous and often well organised in powerful unions and represent one of major concern to politicians. Teachers represent the strongest driving force in educational development. In the context of budgetary constraints, however, that limit the role of State education funding, their participation in the formation of education policies and strategies is crucial, though in many cases it is often quite limited in practice.

Educational beneficiaries (pupils and students, parents and employers) are involved not only as "recipients" of educational services but also as direct or indirect contributors to educational funding in kind, in cash or through taxes. Their concerns and interests include the benefits to be drawn from education – employment, social or geographic mobility, prestige – but also the financial burdens and opportunity costs, etc. Families' expectations regarding education – its validity, the language of instruction, curricula,

teachers, religious education, etc. – vary considerably according to their communities or ethnic groups, or whether they come from rural or urban backgrounds. It is often difficult to accommodate such diversity.

Other stakeholders include central agencies and line ministries concerned with educational development as well as those dealing with welfare, health, etc. that are usually affected by education-related decisions. There are some operators, such as textbook publishers, entrepreneurs in school-related industries, etc. that are affected by decisions concerning health, building or school holiday periods, etc. Their interests are mainly economic.

The international and bilateral agencies share many concerns with the above national actors in matters of educational development. Yet their interests are also linked with their accountability vis-à-vis their respective institutions external to the beneficiary country. There are differences according to the type of agency:

- Bilateral aid agencies may have specific interests in the recipient countries, whether programmatic or historical, whilst all bilateral agencies are ultimately accountable to their own taxpayers and are influenced by domestic public opinion. Some agencies have been able to negotiate arrangements for a joint accountability, built around their commitment to contribute to the achievement of outcomes in the recipient countries, e.g. mutual commitments toward the achievement of the Millennium Development Goals (MDGs);
- The (multilateral) lending institutions, e.g. the development banks, because of their financial leverage, can often exert control and impose conditions which influence recipient country's policies;
- The (multilateral) agencies of the United Nations, where the governments of the recipient countries are strongly represented, are more subject to the beneficiary countries' policies, but to varying degrees.

Annex 3. Simulation in policy formulation and action planning

A. Simulation as a tool for policy formulation and dialogue

Policy simulations can contribute to the formation of educational policies. They can help to identify the implications of different policies put forward by the diversity of interests with a stake in education.

Compared to other socio-economic sectors, educational development involves difficult and multidimensional problems: (i) faced with financial constraints, governments have to adopt restrictive measures and make difficult decisions to regulate resource utilisation, without leading to serious disruptions and dysfunctions; (ii) there are too many actors, variables and interrelations between these; it is necessary to have not only a reliable information system but also an objective forecasting tool to facilitate policy consultations regarding financial constraints and their consequences on educational options. (see Chang & Radi, 2001)

The first stage of use of a policy simulation is at the beginning of the formulation process regarding the main lines of educational policy. It is used as a tool for testing the feasibility of sectoral reform or development options. At the preliminary planning stage, computer simulations can illustrate the pedagogical, physical and financial implications of goals and objectives over the long term. Simulation techniques thus contribute to designing educational policies and strategies by highlighting the required background information.

A policy simulation model can contribute useful information to policy dialogue and facilitate consultation and the negotiation between national partners, and, in the event of external financing, between them and their international partners. The “*freewill*” goals and objectives, or those addressing ambitious social demands, are defined and evaluated according to their budgetary implications. The simulation enables the demonstration of the feasibility or impossibility of achieving these objectives within the country’s socio-economic and financial context. Several development scenarios are then designed and demonstrated. Stakeholders can discuss arguments in support of or against different policy objectives and options; they can examine alternative scenarios, and evaluate the advantages and disadvantages of each on the basis of relatively reliable estimates.

B. Action planning through computer simulation

The simulation model contributes to the preparation of medium-term action plans. It is used as a forecasting tool following the adoption of sector reform and/or development options. It makes it possible to determine the pedagogical, physical and financial implications of educational objectives for precise periods. To prepare an action plan

credible to all the actors concerned, including external partners, it is desirable for each country to develop a simulation model that is specific to its education system.

The purpose of the action plan is to first express in operational terms the national orientations which were defined at the formulation stage of the sector's general policy. The action plan must include the financial estimates of recurrent and investment requirements to achieve the goals of education and training. It must also specify the actions and activities that educational authorities intend to implement in a co-ordinated and coherent way during the planned period.

A simulation model could contribute immensely to the development of a sectoral action plan. As a systemic forecasting tool, it helps in considering the dynamics of the educational system and the detection of the interrelations of a number of parameters which influence the operation and the improvement of educational services. In particular, it provides the information on the *necessary educational inputs* and the *monitoring and evaluation indicators* on planned actions. The Table below shows an example of the scenarios and the quantity, quality and time objectives and indicators that can be generated by the simulation model.

Note: As a system, education and its development can only be designed as a whole, comprised of sub-sectors and the organic interrelations between them. The sector-wide approach makes it possible to guide the balanced development of the sub-sectors which depend on the system. In other words, an education sub-sector, with all the dimensions it implies, should not be treated in a sub-sector manner. Its planning must be integrated in a systemic and interdisciplinary approach.

Educational inputs requirements. Educational inputs needs are estimated on the basis of the quantitative and qualitative objectives expressed in operational terms. The simulation model makes it possible to determine the nature and scale of these inputs per year for the period considered. It provides indicative information on school enrolments as well as the human, physical and financial means to mobilise, in order to carry out development actions. Presented below are some categories of requirements in educational resources whose evaluation is carried out thanks to computer simulation.

Table 3.1: Quantity, quality and time objectives and indicators generated by a simulation model for three scenarios

	Scenario 1 Maintaining past trends, with slight improvement in supervision rate				Scenario 2 Past trends, plus: reducing class size at all levels, and pupils/ teacher ratio reduced at primary			Scenario 3 Moderate reduction of class size and pupils/teacher ratio; development of private sector at post primary levels		
	2001	2006	2011	2016	2006	2011	2016	2006	2011	2016
Primary education										
<i>Gross enrolment ratio</i>	67%	76%	85%	95%	76%	85%	95%	76%	85%	95%
<i>Promotion rate</i>	83%	85%	88%	90%	85%	88%	90%	85%	88%	90%
<i>Double shift</i>	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
<i>Students/teacher ratio</i>	53	50	46	43	44	36	30	48	43	38
Student enrolments	187 259	243 256	316 109	410 929	243 256	316 109	410 929	243 256	316 109	410 929
No of teaching posts	3 663	5 040	6 938	9 556	5 682	8 820	13 698	5 252	7 534	10 814
No of classrooms	2 520	3 747	3 747	8 302	4 198	4 198	11 674	3 897	3 897	9 339
Secondary education										
1st Cycle										
<i>Transition rate</i>	92%	91%	93%	98%	91%	93%	98%	80%	78%	98%
<i>Promotion rate</i>	80%	84%	88%	92%	84%	88%	92%	84%	88%	92%
<i>Students/teacher ratio</i>	33	15	13	12	13	10	7	14	11	9
<i>Gross enrolment ratio</i>	32%	31%	39%	50%	31%	39%	50%	27%	32%	47%
Student enrolments	57 142	64 645	94 254	141 268	64 645	94 254	141 268	57 458	78 330	133 470
No of teaching posts	1 729	2 204	3 647	6 173	2 578	4 943	9 654	2 170	3 627	7 314
No of classrooms	801	994	1 595	2 627	1 175	2 211	4 247	981	1 600	3 207
Secondary education										
2nd Cycle										
<i>Transition rate</i>	62%	64%	67%	72%	64%	67%	72%	60%	60%	62%
<i>Promotion rate (Gen & Tech)</i>	76%	79%	82%	85%	79%	82%	85%	79%	82%	85%
<i>Students/teacher ratio</i>	22	22	22	22	17	13	10	20	18	16
Student enrolments	18 957	25 025	35 834	59 646	25 025	35 834	59 646	23 110	27 547	43 803
No of teaching posts	875	1 147	1 642	2 734	1 493	2 791	6 077	1 174	1 560	2 738
No of classrooms	535	709	1 025	1 726	922	1 735	3 812	723	958	1 688
Higher education										
<i>Transition rate (from General Secondary)</i>	88%	70%	75%	88%	70%	75%	88%	70%	75%	88%

	Scenario 1 Maintaining past trends, with slight improvement in supervision rate				Scenario 2 Past trends, plus: reducing class size at all levels, and pupils/ teacher ratio reduced at primary			Scenario 3 Moderate reduction of class size and pupils/teacher ratio; development of private sector at post primary levels		
	2001	2006	2011	2016	2006	2011	2016	2006	2011	2016
<i>Promotion rate (Arts & Science)</i>	77%	77%	77%	78%	77%	77%	78%	77%	77%	78%
<i>Students/teacher ratio</i>	18	16	12	9	16	12	9	16	12	9
Student enrolments	3 016	5 570	6 878	10 777	5 570	6 878	10 777	5 477	5 699	7 238
No of teaching posts	164	348	586	1 216	348	586	1 216	342	487	835
No of classrooms	75	153	258	535	153	258	535	150	214	366
Expenditures										
<u>Recurrent costs</u>	3 624 645	5 300 839	8 711 760	14 271 283	5 984 112	11 123 888	20 939 640	5 264 213	8 422 803	13 450 187
Primary education	1 265 333	1 947 652	3 197 283	4 832 864	2 191 770	4 010 265	6 877 818	2 036 027	3 538 884	5 483 219
Secondary education 1st Cycle	783 437	1 084 685	2 070 640	3 741 597	1 289 953	2 857 127	5 995 461	1 046 204	1 860 399	3 167 620
Secondary education 2nd Cycle	297 982	464 654	829 072	1 632 123	606 243	1 396 517	3 611 403	419 207	596 084	1 043 997
Higher education	131 107	318 314	465 594	814 983	318 314	465 594	814 983	313 106	388 294	554 600
<u>Investments</u>	4 299 293	5 659 114	8 699 491	11 427 836	8 144 763	14 706 409	18 158 336	5 456 770	8 267 431	10 118 046
Primary education	2 338 708	3 263 251	4 896 505	5 292 028	4 458 233	7 494 420	7 441 914	3 649 298	5 694 954	5 953 531
Secondary education 1st Cycle	796 846	1 352 849	2 033 142	2 685 207	2 066 502	3 597 853	4 174 904	1 134 263	1 654 684	1 976 168
Secondary education 2nd Cycle	394 207	555 022	1 375 288	2 348 103	1 132 036	3 219 578	5 439 020	249 420	741 265	1 542 589
Higher education	769 532	487 992	394 557	1 102 498	487 992	394 557	1 102 498	423 789	176 527	645 758
<u>Budgets likely to be available</u>	6 500 000	8 503 311	11 124 047	14 552 497	8 503 311	11 124 047	14 552 497	8 503 311	11 124 047	14 552 497
<u>Costs of simulation</u>	7 923 938	10 959 952	17 411 252	25 699 119	14 128 875	25 830 296	39 097 976	10 720 983	16 690 234	23 568 233
<u>GAP Budget/Simulation costs</u>	-1 423 938	-2 456 641	-6 287 205	-11 146 621	-5 625 564	-14 706 250	-24 545 479	-2 217 671	-5 566 187	-9 015 736

- **Personnel.** The model makes it possible to estimate the number of teaching and non-teaching personnel required (managerial and supervisory staff, administrative and service personnel, technical and maintenance workers, etc.) and to foresee recruitment needs (per year, per region, and by education level) while allowing for staff attrition. It also help to identify the training needs of these personnel, both at pre-service and in-service training level. The new requirements for teachers for a given year will indicate to the national educational authorities the need to take adequate measures many years in advance (this varies according to countries) in order to forecast projected training periods for the various categories of teachers.
- **School buildings.** On the basis of the number of students and the parameters of pedagogical management, the simulation model has the potential to evaluate the number of buildings to build, in a given time-horizon. It also indicates the expenditure necessary for the purchase of necessary equipment and maintenance expenses of all kinds. The required number of classrooms and other spaces as well as the needs for new buildings are provided by the model per year and by region for all levels of teaching.
- **Teaching and learning materials.** With the inventory of the stock of textbooks and other teaching aids available, a simulation model can allow estimates of future needs for these books and indication of the requirements for the production and the distribution of these materials, in accordance with national policy in this field. It can also help to foresee the necessary actions required to acquire and/or renew the materials, so as to meet the curricular reform and to evaluate the recurrent costs resulting from this.

Quantified indicators. Faced with economic and financial difficulties, ministries of education in many countries are under pressure from their ministries of finance as well as international development partners to prove that resources provided are being used effectively. These pressures have contributed to the introduction of new approaches to accountability-based programming and management. In recipient countries, external bilateral and multilateral agencies increasingly are requiring the programming of development actions to be more accountable and results-based.

This new approach changes the way agencies work with recipient countries in the preparation of development plans and programmes in the education sector. These plans now need to include explicitly the results expected of development actions in order to measure, in advance, the educational policy's potential to achieve its objectives – thereby ensuring the wish for efficiency of external investments. The objectives and actions of development plans are thus formulated by integrating indicators for monitoring and evaluation from the start.

Simulation models are powerful tools for generating performance indicators that should be identified when preparing an action plan. They provide these in the form of quantified indicators relating to the educational system's organization and operation. These indicators are provided per year for a reasonably long period according to the planned programme, by region and for all the levels of education and training which are examined in the simulation.¹³

¹³ It is worth noting at this point that the adjustments made at the level of decision parameters could lead to changes in results. These adjusted parameters and variables are used to update the indicators of monitoring and evaluation at the time of the implementation of development plans and programmes.

Annex 4. The reconstructed cohort method

A school cohort is defined as a group of pupils who enter the first grade of a given cycle or level of education in the same school year, and who subsequently experience the events of promotion, repetition, dropout, or successful completion of the final grade.

According to the type of data collected, there are three ways of analyzing the internal efficiency of an education system by means of cohort analysis method: (i) real cohort method, (ii) apparent cohort method, (iii) reconstructed cohort method. The ideal way of obtaining a more precise idea of the internal efficiency is the real cohort method. To this end, one undertakes either a longitudinal study tracing the progression of a cohort of students through a level of education, or a retrospective study of the school registers which make it possible to reconstitute student flows over the past years. The real cohort method has however the disadvantage of being expensive and of taking too much time; it is necessary moreover that there are good school registers and reliable information on each pupil. It is the reason why this method is not very much used.

In the absence of individualized information on pupils, one can evaluate the internal efficiency using the enrolment data of two consecutive years by means of apparent cohort method or reconstructed cohort method. One can apply apparent cohort method when there are no data on repeaters: one compares the enrolments registered in class 1 (or 1st grade) in a given year with the enrolments of successive grades over successive years, on the assumption that the reduction in enrolments from a grade to another one corresponds to dropouts. This method, however, gives too approximate estimates of dropouts and its great weakness is that it assumes that pupils either pass to a higher grade or drop out of the system. The repetition, which is an important factor, is simply neglected. This method is appropriate nevertheless for countries which practise automatic promotion.

More relevant and commonly used is the reconstructed cohort method. It is less demanding on the availability of detailed data over time. To apply this method, data on enrolments by grade for two consecutive years and on repeaters by grade from the first to second year are sufficient to enable the estimation of three main flow rates: promotion, repetition, and dropout. Once obtained, these rates may be analyzed by grade, to study the patterns of repetition and dropout, and, in a reconstructed pupil-cohort flow, to derive other indicators of internal efficiency.

Table 4.1. Enrolments in 2000 and 2001

Year		Grade I	Grade II	Grade III	Grade IV	Grade V	Graduates
2000	Enrolments	20 194	18 770	17 436	16 243	15 104	11 237
2001	Enrolments	19 052	17 671	16 357	15 226	14 129	
	Repeaters	1 357	1 331	1 327	1 324	1 315	

How well these indicators describe the way in which a cohort actually progresses through a level of education depends on the validity of the assumptions on which this model is based and on the reliability of the statistical data available for estimating the flow rates.

The methodology of the reconstructed cohort flow model is based on the fundamental concept that for pupils enrolled in a given grade at a certain year, there can be only three eventualities: (1) promotion to the next grade in the next school year, (2) dropout during the course of the year, and (3) repetition of the same grade in the next school year.

Based on the flow rates, a cohort of 1,000 pupils through an education cycle may be retraced, with the following important assumptions:

- that there will be no additional new entrants in any of the subsequent years during the lifetime of the cohort to the original cohort of 1,000 pupils;
- that at any given grade the same rates of repetition, promotion, and dropout apply, regardless of whether a pupil has reached that grade directly or after one or more repetitions (hypothesis of homogenous behaviour);
- that the number of times any given pupil will be allowed to repeat is well defined; and
- that flow rates for all grades remain unchanged as long as members of the cohort are still moving through the cycle.

According to this assumption, the data of the above table allows the calculation of the following three flow rates. For example, on the 20 194 pupils admitted in Grade 1 in 2000:

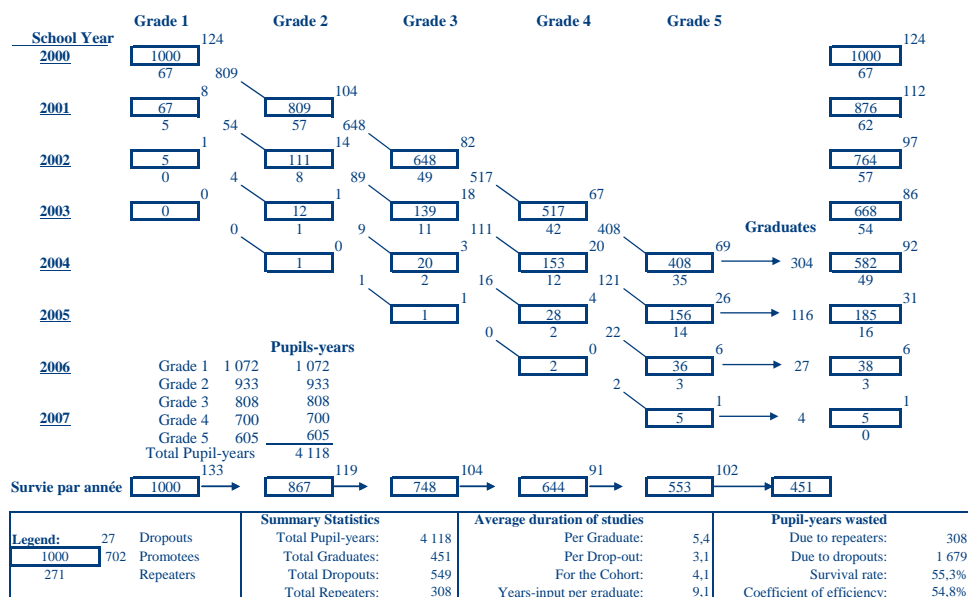
- a) 1 357 repeated Grade 1 in 2001, i.e. 12.4%
- b) 16 340 move up to the higher grade, or 80.9% (17 671 registered in Grade 2 in 2001 minus 1 331 who have repeated this grade in 2001)
- c) 2 494 gave up the school, i.e. 6.7% (20 194, less the sum of 16 340 and 1 357).

The corresponding flow rates therefore are: $p=80.9\%$; $r=6.7\%$; $a=12.4\%$, whose total is 100%. By applying the same fashion of calculation, one is able to calculate the flow rates of the other successive grades.

Table 4.2. Flow rates in 2000

	Grade I	Grade II	Grade III	Grade IV	Grade V
Promotion (p)	80.9%	80.1%	79.7%	78.9%	74.4%
Repetition (r)	6.7%	7.1%	7.6%	8.2%	8.7%
Dropout (a)	12.4%	12.8%	12.7%	13.0%	16.9%

One can use these flow rates to make further analyses by means of the cohort analysis diagram as shown in Figure 4.1. One can draw from this flow diagram a certain number of interesting observations. For example, on the initial number of 1 000 children admitted in Grade 1, they are 303 who graduate from the cycle without any repetition; 116 graduate with one year of delay (or repetition), 27 with two years of delay, therefore after two repetitions, and 4 after having repeated three times.

Figure 4.1: Diagram of reconstructed cohort flow analysis

Moreover, this diagram makes it possible to calculate some principal indicators of internal efficiency. For example, it can indicate the number of pupils reaching a given grade, which makes it possible to calculate survival rates by grade. In Figure 4.1, for example, 867 of the 1000 pupils of the cohort (86.7%) have reached Grade 2. Survival rates are calculated by deducting the sum of the dropouts in each grade and each year from the enrolments in this same grade, e.g. there are $124+8+1+0=133$ dropouts for

Grade 1, which, once deducted from 1000, gives 867 survivals. Lastly, by making the sum of the dropouts of each grade ($133+119+104+91+102$), one obtains a total of 549 pupils who gave up the school system without completing primary education. Thus, on the initial troop of 1000 pupils, they are only 451, that is approximately 45%, who complete the primary education cycle.

By multiplying this number of graduates by the number of grades ($451 \times 5 = 2,255$), one would obtain the ideal number of pupil-years necessary to produce the graduates. The relationship between the latter and the actual number of pupil-years who were used by the cohort (4,118) gives the coefficient of efficiency ($2,255/4,118 = 0,548$, i.e. 54.8%).

The number of years-input per graduate (9.1) is obtained by dividing the total number of pupil-years (4,118) by the total number of graduates (451). One can then compare the number of years of schooling per graduate with the required ideal number which is simply the duration of the cycle, i.e. 5 years in this case. The analysis of the diagramme makes it possible to conclude that because of repeaters and dropouts, one needed almost twice the ideal number of pupil-years to produce 317 graduates.

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