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The Role of Statistics in Improving the Quality of Basic Education in Sub-Saharan Africa

by Glory Makwati

Bernard Audinos

Thierry Lairez

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Association for the Development of Education in Africa (ADEA)
International Institute for Educational Planning
7-9 rue Eugène Delacroix
75116 Paris, France
Tel.: +33(0) 1 45 03 77 57
Fax: +33(0)1 45 03 39 65
adea@iiep.unesco.org
web site : www.ADEAnet.org

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Acronyms and abbreviations

ADEA	Association for the Development of Education in Africa
CONFEMEN	Conférence des Ministres de l'Education des pays ayant le Français en partage
MLA	Monitoring Learning Achievement
NESIS	National Education Statistical Information Systems
PASEC	Programme d'Analyse des Systèmes Educatifs des Pays de la CONFEMEN
PRSP	Poverty Reduction Strategy Papers
SACMEQ	Southern Africa Consortium for Monitoring Educational Quality
SAP	Structural Adjustment Programs
UNESCO	United Nations Educational, Scientific and Cultural Organization

1. EXECUTIVE SUMMARY

1. All stakeholders in the education sector agree that no significant, sustainable improvement can occur in education in developing countries without taking quantitative and qualitative aspects into account on an equal basis. Unfortunately, these countries rarely have reliable and regular data at their disposal that would enable them to measure the quality of their education systems.

2. The NESIS/SISED programme of the working group on education statistics (WGES) has, for several years, attempted to contribute to national capacity building to produce indicators that enable dynamic follow-up of all aspects of African education systems. The methods and tools recommended by the SISED/NESIS favour a systemic approach based on the needs of all requesters of statistical information, and in which quality of education is given its full importance. In particular, and to meet these expectations, the data gathering methods recommended by the SISED/NESIS structure the information collected around the students, situating them in their school and social environments.

3. Control over the "statistics chain" is the essential component for successful steering of any education system. Since 1997, the SISED/NESIS has worked on the promotion and development of methodological and technical tools designed to help countries in sub-Saharan Africa ensure reliable data collection and then processing of their statistical education data. A number of countries now use this approach, which combines rigour and flexibility across the "statistics chain".

4. For these countries, the actual foundations of reliable information systems now exist, thus opening the way to better use of data to improve steering of all aspects of their education systems.

5. Unfortunately, in the field of statistics it is usual to oppose qualitative and quantitative aspects. The SISED's recommended methodology aims to combine the two approaches. It proves that we can back up analyses that contribute to better understanding of the quality aspects of education with numerical data, synthesis of which provides a better structure for the analysis.

6. Without the pretension of being exhaustive, several themes covering significant qualitative aspects are automatically taken into account in the proposed modelling:

- School "conveniences"
- Teaching space
- Teaching conditions
- Teachers
- Involvement of local authorities
- Efficiency of the education system (productivity)

7. This report presents three case studies:

- Analysis of the availability of school books in primary education in BURKINA FASO from 1997 to 2002
- Impact of the feminization of the teaching profession on gender equality in schools in SENEGAL in 2002/2003

- Impact of access to water and hygiene facilities in schools on gender equality in SENEGAL in 2002/2003

Analysis of the availability of school books in primary education in BURKINA FASO from 1997 to 2002

8. The availability of school books for pupils is a recurring question strongly linked to measures of education quality. In Burkina Faso, the availability of data for the last six years makes a reliable analysis of the major trends feasible. The first part of the study presents the developments in the raw data, and the second part presents a more sophisticated analysis of the availability of reading books for children in primary education.

9. One of the observations that resulted from this study tends to prove that the relatively strong growth of the numbers of children enrolled in school over the last 5 years has absorbed most of the new provisions of school books. This relative deterioration seems more marked in urban areas.

Impact of the feminization of the teaching profession on gender equality in schools in SENEGAL in 2002/2003

10. The under-representation of women in the teaching profession is a constant factor in most sub-Saharan countries. It is often argued that enrollment then retention of girls in school is encouraged if there is a higher proportion of female teachers. The study illustrates these points and contributes to proving that controlled structuring of statistical data enables us to back up analyses sometimes perceived as being too subjective.

11. On data covering almost all schools in Senegal we demonstrate that the classes with female teachers generally have "one more girl for every ten boys" than the same classes with male teachers. The study then lists these results by region in order to analyze the geographical disparities of this phenomenon.

Impact of access to water and hygiene facilities in schools on gender equality in SENEGAL in 2002/2003

12. School equipment, in particular the access to water and latrines, is often presented as an important factor in retaining pupils, particularly in rural areas. The reality of social and family practices that put pressure on girls make measuring the impact of these facilities on their enrollment a pertinent exercise.

13. The study attempts to illustrate, without the pretension of fully explaining the phenomenon, the impact of these comfort variables on the enrollment of girls. It specifically demonstrates that the drop observed globally in girls' attendance at school from third year of primary school onwards is more marked in schools with no access to water and not equipped with latrines.

2. INTRODUCTION

14. The issue of the quality of education is increasingly becoming an area of interest and concern to many nations of the developing world, especially in Sub-Saharan Africa. This is so because many countries in this region have realized that education plays a crucial and pivotal role in development at national, regional and international levels. There is concern because generally in SSA, quality of education seems to be either stagnating or deteriorating. It is also generally accepted that educational development in Africa has remained low in comparison with other regions of the world. There is interest in the issue of quality because it is an integral part of the development and monitoring of education systems the world over. There can be no argument over the fact that quality assessments have frequently been made on the basis of key indicators generated through the analysis of the statistics available. What has frequently not been appreciated, however, is that statistics is one of the essential, key instruments for the promotion of quality in education. This presentation attempts to highlight some points on how statistics has been, and can be used, to improve quality in education. So the paper is not meant to tell you anything new, but rather to raise awareness on the importance and value of statistics in the development of quality in education.

2.1. The global focus on quality

15. One of the key issues the 1990 Jomtien conference focused on, is the need for the signatory nations to ensure that they offered education of an acceptable standard for all their citizens. Article 4, for example, referred to the need for education systems to focus on measurable learning outcomes. The Jomtien Conference also made reference to the need for relevant education or, alternatively, education that responds to the current and future needs of the learners. All these are different expressions of quality. More recently, the 2000 Dakar World Education Conference revisited the issue of quality, and stated that:

16. *"The Dakar framework for Action gave new impetus to the promotion of quality in education, based on the consensus that expanding access to education will have a beneficial impact on individuals and on society only if the education is of good quality."* (EFA Global Monitoring Report 2002.)

17. Despite all the declarations of commitment, the realization or achievement of good quality education has remained elusive for many countries in SSA because of the ever increasing demand for education in the context of very limited resources, among other factors. Africa is the continent that has been hardest hit by the HIV/AIDS pandemic, wars, famine etc. and it is experiencing the slowest rates of economic growth, with poverty deepening in many countries. With these developments taking place, the challenge of achieving the erstwhile goal of quality education for all (EFA) is even greater. It is commonly accepted, however, that quality in education is a prerequisite for national development.

2.2. What is Quality?

18. The definition of quality is difficult, because it is an all encompassing concept or attribute (Murimba, 2002). There has always existed a conceptual controversy over the definition of quality. Murimba goes on to say it is a characteristic that is easily recognized when present and indeed conspicuous when it is absent. Quality is a multi-faceted concept. It encompasses how learning is organized and managed, what the

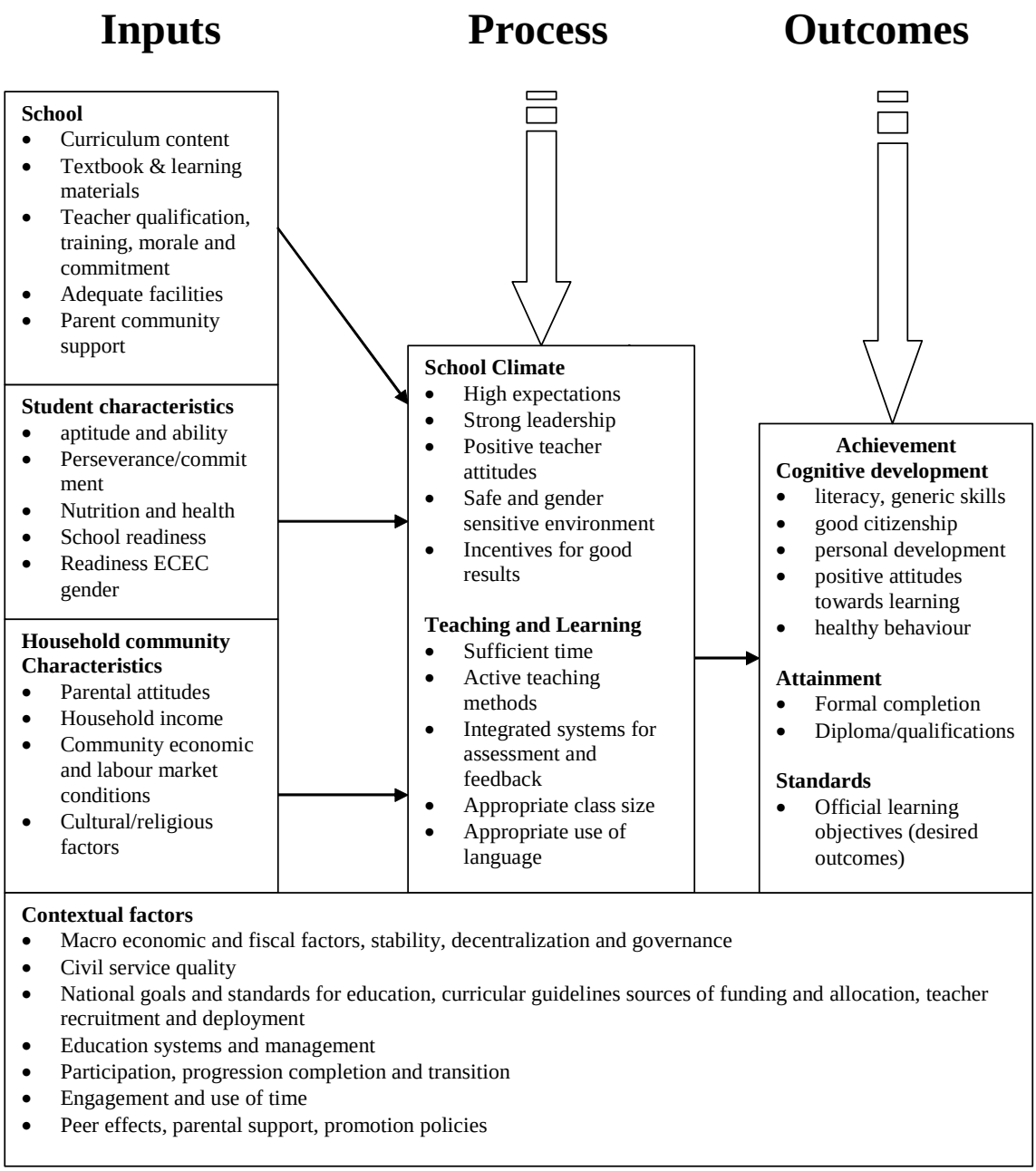
content of learning is, what level of learning is achieved, what it leads to in terms of outcomes, and what goes on in the learning environment. (EFA Global Monitoring Report, 2002, p. 80).

19. Vespoor (2002) also presents the conceptual framework of quality in education as being composed of three distinct components i.e. the Input, the Process and the Output. This model, presented in Table 1, is sometimes referred to as the Process, Black Box, or Combustion Engine model. Other authorities call it the Education Production Function model. The diagrammatic representation of the model is an oversimplification of the real process in the development of quality in education. In reality, the process elements that go towards the production of quality, combine and react in a more subtle and complex way than can be represented in the linear way. Quality of education becomes an amorphous element and concept that is a result of many variables that combine in a complex and infinite reaction.

20. Another attribute of quality in education is that it is not universal. It is country or environment specific and relates to the goals, expectations and aspirations of a given community, and these may change over time. Each country has to determine its own priorities in order for them to accept the validity of the quality of their education systems. So the relevance of quality in education is closely related to the efforts of a given group in seeking to achieve their own perceived or real goals. In this context therefore quality will differ from country to country and this renders it more difficult to subject it to global, universal measures. Although universal measures of quality in education are difficult to set, every nation can easily define the minimum or desirable benchmarks that are reflective of its own quality ideals. It is therefore important for countries individually to reach these levels, and to use them in the global quality development and assessment program. It is important to note that international assessment of quality in education in each country is for purposes of comparability and not for league type comparisons of performance. Each country has to find its own slot in the global structure that is not necessarily hierarchical.

21. In the light of the above, it is incumbent upon all stakeholders and actors to develop strategies for the measurement, monitoring, evaluation, and management of the quality of education at country, regional and international levels.

Figure 1 The role of statistics in the development of quality in education



Source: EFA Global Monitoring Report (2000)

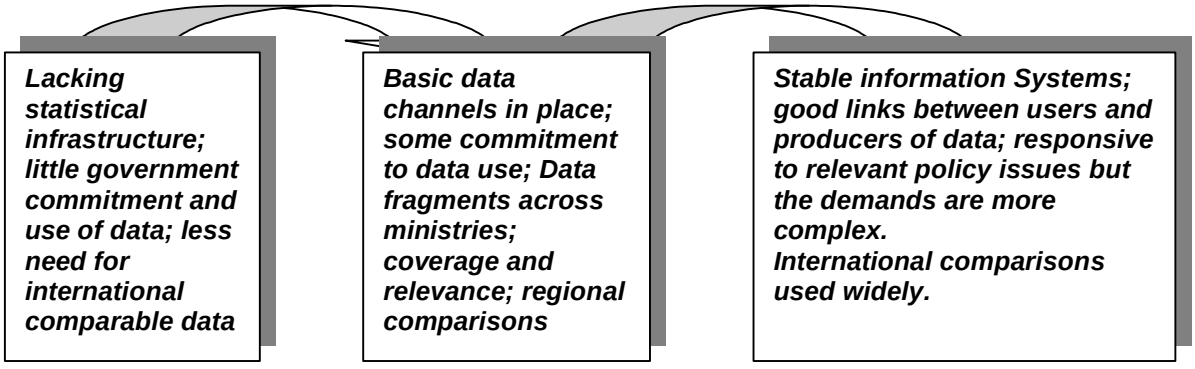
2.3. The role of statistics in the development of quality in education

22. Statistics are a potent and effective tool for the development of quality in education. As education systems become increasingly complex, so also is the availability of accurate, up-to-date statistics a clear imperative. This by no way suggests that statistics on their own ensure or guarantee quality, but rather that their availability are a condition for achieving it. The role of statistics in the promotion of quality can be examined by linking it to each of the stages of the model presented in Figure 1. Alternatively, statistics can be viewed as part of the broader process of quality assurance that includes educational planning, policy formulation, management, monitoring and evaluation of the education systems, and highlighting the role played by statistics in strengthening the process itself.

2.3.1. The current situation

23. Slightly over a decade ago many countries in Sub Saharan Africa (SSA) had serious capacity gaps in the generation and development of statistical information. This was a time when there was great need to make informed decisions on the judicious allocation of limited resources. Investment in building information capacity did not increase in accordance with the demand for information. Instead the capacity for providing the requisite information deteriorated further, rendering decision-makers less capable of making informed decisions. The majority of African countries in SSA had very little or no up-to-date statistical information on education. The pages on SSA in the UNESCO Year-book were largely blank and the education policies of Africa lacked the quantitative dimension, although their goals were expressed in quantitative terms. So the goals and targets of the countries were not anchored to the reality of the situation.

Figure 2 Statistical capacity building process



Source: UIS Statistical Capacity Building (2003)

2.4. Conceptual framework for the statistical capacity building process

24. There is need to build a robust statistical program which is capable of informing the education development process. The achievement of good quality education is dependent on the quality of statistics which inform the policy formulation, educational planning, management and monitoring processes. The statistical capacity building process at national level is made up of four broad stages.

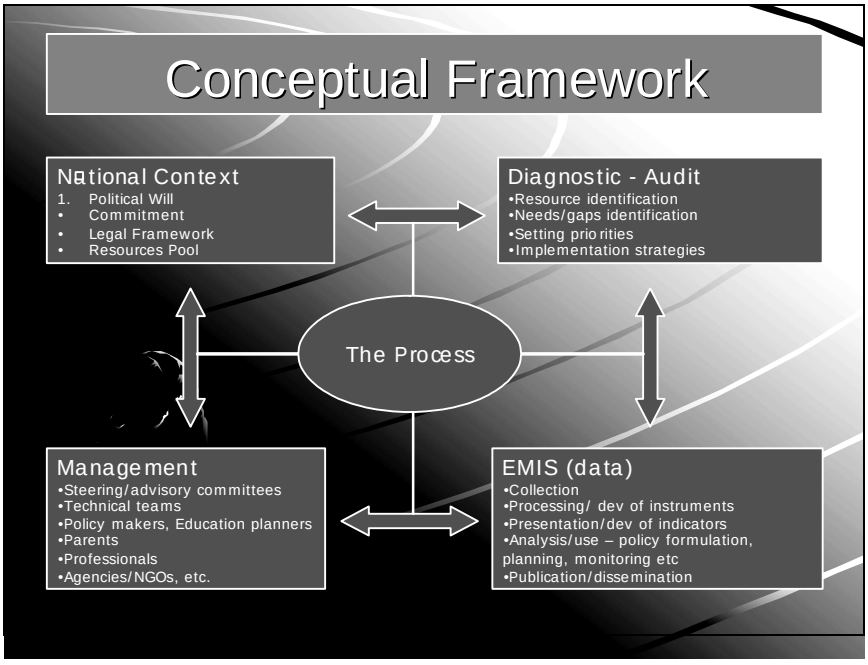
25. The first stage is the Political will/commitment stage. At this stage national development policies are spelt out to give direction to all other sectors of the nation.

26. The second stage comprises of a diagnosis of the national environment. An audit of national resources is undertaken in the light of set development plans and targets. It is at this stage that gaps are identified, priorities are set, work plans drawn and resources redistributed.

27. Stage three involves the collection of data, data processing, data analysis and dissemination. It is at this stage that a management system is set up to guide and inform the education development process.

28. The final stage is that of setting up management structures to ensure program sustainability, sound communication within and without the organization. This stage also ensures the involvement and greater participation of various stakeholders including parents, private sector, NGO's etc.

Figure 3 The conceptual framework of Statistical Capacity Building (SCB)



2.4.1. Inputs, processes, outcomes and the quality of education

29. One of the issues that has hampered efforts at enhancing the quality of education is the insufficient supply of all types of inputs to education systems. The inputs that are required for quality education are summarized in the first box of Figure 1. By defining and measuring quality from the inputs perspective, the assumption made is that there is a direct relationship between inputs to education and its quality. This is why many players in the field of education equate the provision of adequate resources to schools with quality. As the story goes, a frustrated minister of education from Africa said: "*What good are statistics? We need schools and books.*" (Ko Chi Tung, 2001). Of course the minister was right. However, when he was asked how many of each item he needed, he realized that he had very little knowledge of the system and its needs and there was no accurate and reliable information to assess or investigate the situation. This illustrates that, while those charged with the responsibility of promoting quality are aware that certain levels of inputs are necessary in order to achieve quality, they underestimate the value of statistics in providing basic information needed for the systematic provision of these inputs.

30. The provision of inputs is not as simple a matter as it is frequently believed to be. Effective learning requires certain levels of given inputs in the "right mix", and in situations where resources are limited, it is important to strike the right prioritization of such inputs. Providing expensive school buildings at the expense of textbooks and teachers, for example, can frustrate efforts at achieving quality. The allocation of resource inputs within schools and among schools is also important for reasons of equity, which is another attribute of quality. The provision of the appropriate critical mix of inputs, and the judicious allocation within and among schools, is a process that can only be informed by statistics. However as Figure I shows, not all inputs are quantifiable.

31. The central mission of school systems is to ensure that children realize certain learning outcomes. For this reason, quality has been measured from the outcome perspective. In order to provide the information on learning outcomes, there is need to embark on a lengthy and tedious process of testing and assessment that culminates in the production of statistics that reflect measures of pupil performance. It is on the basis of these statistics that knowledge on quality is gained, and appropriate quality interventions instituted. Without statistics on learning achievement, it is impossible to know what the quality of education offered is, and without such knowledge, no action can be taken. Indeed, the major research initiatives like the International Association for the Evaluation of Educational Achievement (IEA), Southern Africa Consortium for Monitoring Educational Quality (SACMEQ), Programme for International Student Assessment (PISA) and Programme d' Analyse des Systèmes Educatifs de la Conference des Ministres de l'Education (PASEC) etc. focus on outcomes and by relating them to inputs and making recommendations that seek to promote and enhance outcomes, which may be referred to as education quality outcomes.

32. Between inputs and outcomes is the *Black Box, processes*. Given certain inputs, one can make assumptions about expected learning outcomes. It is a matter of common sense that schools with the correct mix of inputs in the desirable quantities will realize better outcomes than those without. However, if a given set of inputs fails to secure expected levels of outcomes, then one may conclude that something has gone wrong with the process. Little research has been conducted on learning processes, largely because there are many qualitative elements that apparently are not readily amenable to quantification. However, there is reason to argue that while this remains a big challenge, there is the possibility of designing effective ways of statistically measuring the critical

elements within the domain of processes, and thus inform decision makers on what teaching and learning processes ought to be undertaken to ensure quality outcomes. Just inputs comprise quantifiable and non-quantifiable elements, the same applies to processes.

2.4.2. Use of statistics in quality assurance

33. Quality assurance processes are many and diverse, but those most commonly associated with statistics are educational planning, policy formulation, management, monitoring and evaluation. Policy provides the framework for the provision of education services. It provides guidelines for action, and therefore as a tool for the regulation of quality. At every level of the education system, there are policies that have a far-reaching impact on quality. For example, policies on teacher/pupil ratios, on the length of the school day, homework, teacher qualifications – just to name a few – all influence quality. Traditionally, education statistics have been regarded as vital for the formulation of policy in relation to issues of access, coverage, equity, efficiency and relevance. However, we have to acknowledge that it is quality that underlies the total education experience. In other words, access, coverage, equity, efficiency and relevance are sine qua non attributes of quality. My argument here is that an education system that is characterized by gross inequities, or low coverage, inefficiency and poor access can hardly be regarded to be of high quality. Policies can be shaped from statistical indicators on each of these aspects. .Indeed, policies are generated from statistical information generated on inputs, processes and outcomes.

34. This same argument applies to other quality assurance activities, namely, planning, monitoring, evaluation and management. The major form of information used to provide insights into the functioning of the education system is statistical. Planning decisions on the demand and supply of school places by location and age group, the evaluation of the impact of past policy decisions on the system's performance, the potential impact of alternative options, monitoring of current and past projects and programmes, and the management of physical, human and financial resources, are all informed by statistics in the first place.

35. The need for accurate and timely statistical information becomes more crucial when we realise that economic recession has worsened in many SSA countries. These countries are faced with the difficulties of continued demand and provision of education in the context of diminishing resources. This has put increasing pressure for more effective planning and management of resources. Consequently timely, reliable, accurate and policy relevant statistical information has become an imperative for SSA countries and the rest of the poor regions of the world.

2.5. The unfolding scenario

36. In a World Bank study on education policy in SSA, one of the key factors deemed to be holding back the development of education in Africa was the lack of relevant statistical data and analytical capacity. Since the early '80's, and throughout the 1990's, the demand for relevant statistics and efficient information services, have been growing due to development in the countries of the region. The participation, in matters of the state, by civic society and other stakeholders and the demand for accountability, good and transparent governance and participation in the provision of education have further increased the need for timely and relevant statistical information. The globalization of the world and technological advancement in the field of information, have also added to the demand for timely and sustainable information services.

37. However, in the context of this heightened demand for information, many countries have reached the limits of their capacity to deliver and in many cases even weakened due to over stretching their capacity. As the expanding target groups of central services reached into evermore remote areas of the countries in the decentralization processes, centralized governance and management became more untenable, thus further extending the need for reliable information services at lower levels of the education systems. The lack of statistical information hindered informed decision making at lower levels of the education systems. In those cases where reliable information was available, the decentralization process became more systematic and came to include the extension on information capacity building and use at the provincial, district and school levels.

38. The need to attain quality in education is also increasingly becoming an international obligation. As a result, many SSA countries have chosen to be signatories to international declarations, conventions and treaties such as the Millennium Development Goals (MDG), Education For ALL (EFA), Convention on the Rights of the Child, and others all of which set minimum quality targets to be achieved by member countries in the field of education. For SSA countries, these obligations come at a time when other challenges such as the HIV/AIDS pandemic, rising levels of poverty, and globalization are imposing new pressures on their education systems. There is no way these countries can effectively address these challenges without a concerted effort to generate more relevant, reliable indicators and sustainable, user friendly and efficient statistical information services, for monitoring and assessment of systems performance with regard to the attainment of set goals and targets.

39. Those countries who have nearly achieved their goals of Universal Primary Education (UPE) or Universal Primary Education and Literacy (UPEL) later shifted their focus towards the development and achievement of quality education because they realised that, in fact, the gains made with UPE and UPEL could not be sustained without giving attention to quality. The reason for this is that, when stakeholders feel that the quality of education offered is low, they tended to invest less in it.

40. The definition of quality is therefore now viewed not only as the standard of performance achieved, but also the relevance to the needs of individual communities and countries. The expanded vision of the EFA program confirmed and stressed the importance of the quality of education. Goal Six specifically states that:

> *In order to achieve this and other goals the need for relevant, reliable and timely statistics, informed policy formulation, implementation, monitoring, assessment of performance and attainment of educational goals and targets, including the quality of education, cannot be over emphasized. However it is important to note that while the demand for information has increased in SSA, investment in the building of capacity in information management has not grown correspondingly. In many countries experiencing economic recession, the education sector staff and budgets have been cut and serious bottlenecks exist all along the respective phases of information processing.*

41. These problems arise from non-standardized school records and error-prone data collection and processing methods, to lack of analytical reports, making the full use of information collected difficult" (Kochi Tung, 2001).

42. The advent of the *Association For the Development of Education in Africa* (ADEA) in the early 1990's and its *Working Group on Education Statistics* (WGES) ushered in a new era for education statistics. Together with WGES's operational arm, the *National Statistical Information Systems* (NESIS) and the *UNESCO Institute for Statistics*

(UIS), in partnership with ministries of education in Africa and funding agencies, there is a window of hope in the development and achievement of quality education. The major strategy used in achieving this is investment in *Statistical Capacity Building* (SCB) for sustainable statistical information services. The achievement of high statistical capacity will ensure the attainment of acceptable quality of education in many countries of the region.

43. To date, African countries can be classified into three categories thus n accordance with their capacity in statistics, namely: Basic, Medium and Self-sustaining. This is illustrated below.

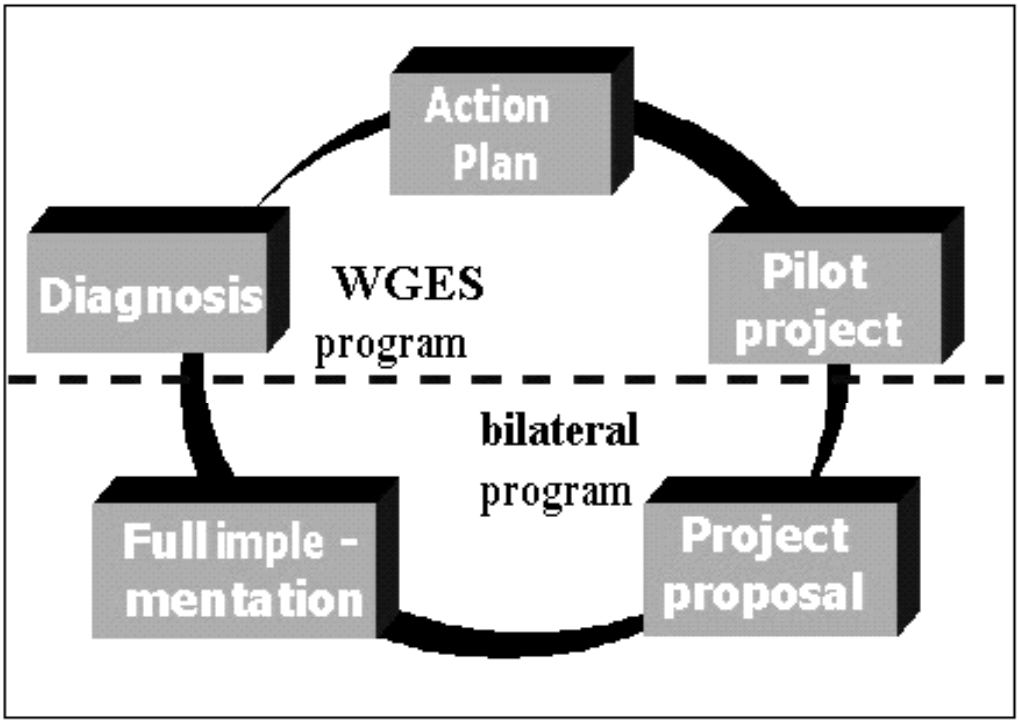
2.6. The role of statistics in the future

44. To date, there has not been sufficient institutionalization of the use of available statistical information for decision-making, policy formulation and educational planning by many countries. As a result, ad hoc decisions continue to be made without reference to available information. In most cases, the information has also not been published and widely disseminated in order for it to benefit the development and achievement of quality education.

45. There is need for a major shift in terms of the conceptualization of the role of education statistics, and in practices regarding the actual use of statistics, if the quality ideals of any country have to be achieved. In order to achieve this, we need an operational model for the generation and use of statistics that can be applied by all those who are committed to the improvement of quality through the effective use of statistics.

46. The NESIS programme views the process of statistical capacity building as shown below.

Figure 4 The NESIS model



47. The first stage is the NESIS model which is composed of the following components: Diagnosis, Action plan, Pilot project, Project proposal and Full implementation. Diagnosis is an audit of the country education system in order to establish national needs. This exercise reveals the gaps that may exist. The next step is the action plan which sets priorities and strategies for intervention

48. The NESIS program, in partnership with ministries of education in Africa, has developed several statistical packages and modules that can enhance the development of quality in education. These are outlined briefly below.

2.7. Core Data/SISED module

49. The core Data/SISED module is one of the very early generic modules developed by the NESIS program to enhance capacity building at national level. It is a very versatile tool that is capable of calculating indicators of quality, access, efficiency, coverage, etc. The development of this module is ongoing. The role of statistics in the development of quality is amply demonstrated by three case studies form the Dakar node.

3. CONCRETE EXAMPLES OF THE USE OF STATISTICS IN MONITORING QUALITY IN EDUCATION

50. Since 1997, SISED has endeavored to promote an d develop methodological and technical tools that will assist Sub Saharan Africa in providing a more reliable collection and processing of educational statistical data. Today, many countries have adopted this approach, which combines rigidity and flexibility in the whole "statistical chain".

51. There exist in those countries nowadays the very foundations of a reliable information system, which allows for an improved use of statistics towards a better monitoring of the education system in all its dimensions.

52. There is a frequent tendency, where statistics are concerned, to oppose quality to quantity. Even the methods used to analyse the data sometimes reveal such opposition. The SISED methodology, far from claiming to integrate all those dimensions, tends to combine the two approaches[1]. It shows that an analysis that contributes to a better understanding of the aspects pertaining to "quality in education" may be supported by numerical data when a synthesis of such data provides a better structure to the analysis itself.

53. Each of the three case studies that follow deals with the multi-faceted aspects of quality in education. Available statistical information has helped to provide a more elaborate analysis:

- Availability of textbooks in primary schools in Burkina Faso, from 1997 to 2002.
- Impact of greater female staff enrolment on the girl/boy parity in Senegal in 2002/2003
- Impact of the access to water and toilet facilities in schools on the boy/girl parity in Senegal in 2002/2003.

[1] If they are really different at all

Example 1: Availability of textbooks in primary schools in Burkina Faso, from 1997 to 2002.

The issue

54. The availability of pupils' textbooks is a recurrent issue closely associated to the measure of quality in education. It is now possible to measure such availability in many countries through an accurate collection of basic information on textbooks and a structured presentation of such information. The data apply to teachers[2] as well as pupils and are structured subject wise and level wise. When these data are examined in the light of the school population, it then becomes possible to come up with reliable indicators such as **textbook/pupil ratios**.

55. The high increase in the number of education systems in Sub-Saharan Africa sometimes conceals strong disparities between the various components of a quality education system: school buildings may often be given priority at the expense of more "*fungible*" investments associated with the actual quality of education. The *textbook* is one of those components.

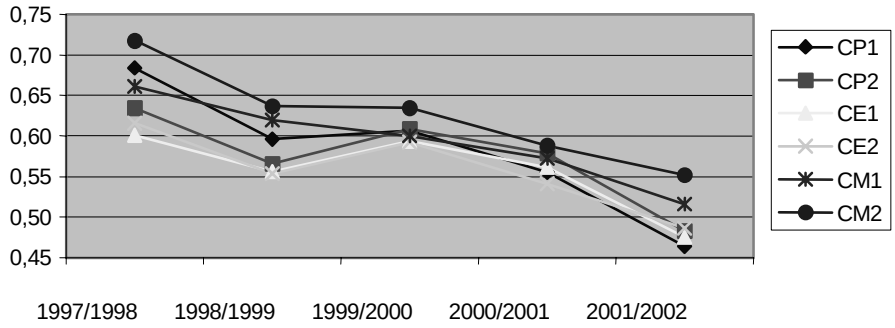
56. In Burkina Faso, it is now possible to make a reliable analysis of the major trends thanks to the availability of data collected over the last six years (five for arithmetic textbooks). The first part of this brief survey presents the evolution of the raw data. The second part is devoted to a more elaborate analysis of the availability of reading material for primary school pupils.

[2] Teachers' Guides

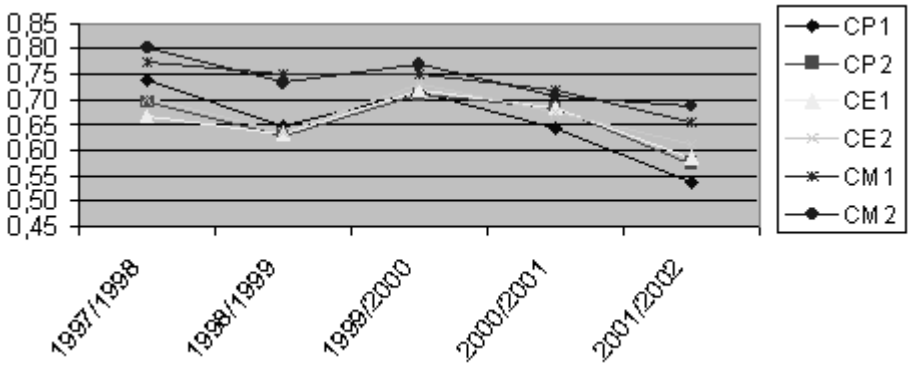
Analysis

A. Evolution over five years of the "reading material/pupil" ratio in Burkina Faso

Graph 1 **Evolution of the "reading material/pupil" ratio in primary schools in Burkina Faso**



Graph 2 **Evolution of the "reading material/pupil" ratio in Burkina Faso in rural areas**



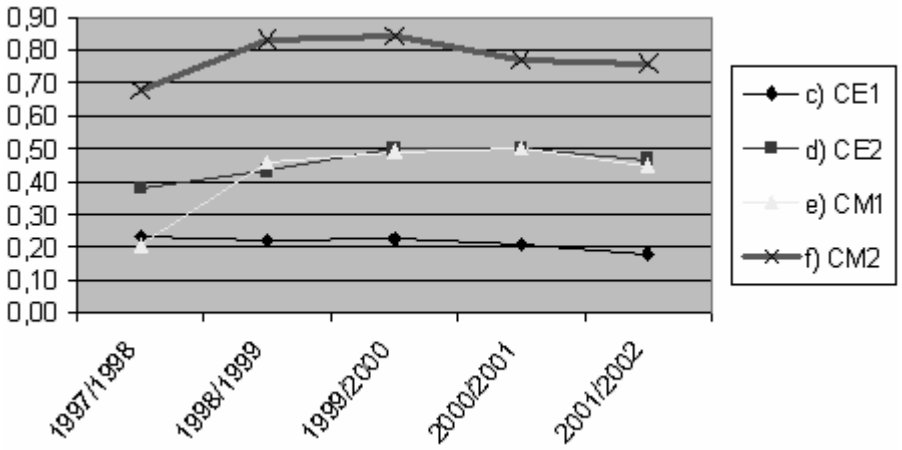
57. On the whole and at all levels, the real availability of reading material has decreased. The drop is more noticeable in urban areas. This is not surprising since everybody knows that the effort undertaken in the context of the Ten-Year Plan for the Development of Basic Education (PDDEB) mainly targeted the rural areas, with special emphasis on the priority provinces. However, this marked disparity is only relative since the availability, in real terms, of reading material **in urban area**s is often supplemented by the purchase of books by the parents, and those books have not been included in the school data. In the urban areas, the book/pupil ratio may not reflect the "real" availability of reading material in the classroom in view of the "twofold availability" situation which is highly prevalent in those areas.

B. Evolution over five years of the "Arithmetic textbook/pupil" ratio in Burkina Faso[3]

Table 1 Evolution of the "Arithmetic textbook/pupil" ratio in Burkina Faso

	CE1	CE2	CM1	CM2
1997/1998	0,23	0,38	0,21	0,68
1998/1999	0,22	0,43	0,46	0,83
1999/2000	0,22	0,50	0,49	0,84
2000/2001	0,21	0,50	0,50	0,77
2001/2002	0,18	0,47	0,45	0,76

Graph 3 Evolution of the "Arithmetic textbook/pupil" ratio in Burkina Faso



58. The availability of arithmetic textbook for upper primary classes has remained constant for the last five years and is clearly greater in CM2.

C. Inequalities in the dynamic availability of reading material

- **Inequalities "urban/rural areas"**

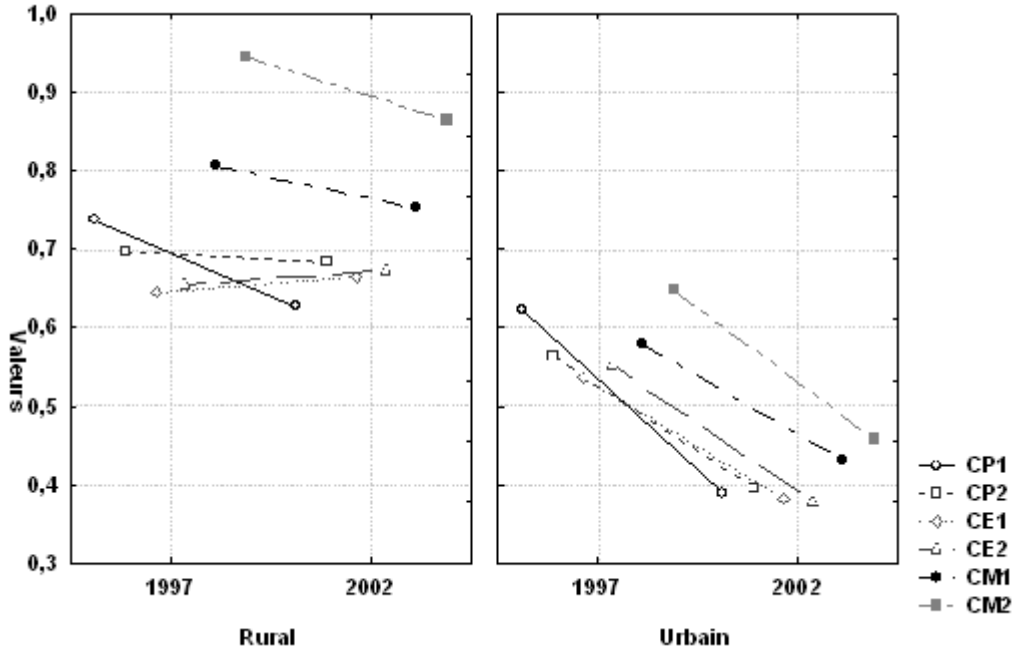
59. Marked inequalities exist between the urban and rural areas. PDDEB grants preferential treatment to 20 "priority" provinces. Those provinces, which are essentially rural, have been determined solely with respect to the quantitative aspects of school enrolment[4]. It may be an exaggeration to impute this inequalityto the sole net effect of the PDDEB, still in its initial stage. But this effect certainly exists. Moreover, it can be asserted that this example brings forth one of the major weaknesses of the PDDEB: at the pressing request of the donor agencies, the Plan in the first instance could only identify priority zones according to purely quantitative criteria[5], on account of this very pressure.

[3] Arithmetic textbooks are only available for the last 4 years

[4] The 20 provinces with the lowest Gross Schooling Rate in 1966/1967

[5] While it is generally known that demographic pressure is twice as high in the urban areas as in the rural areas.

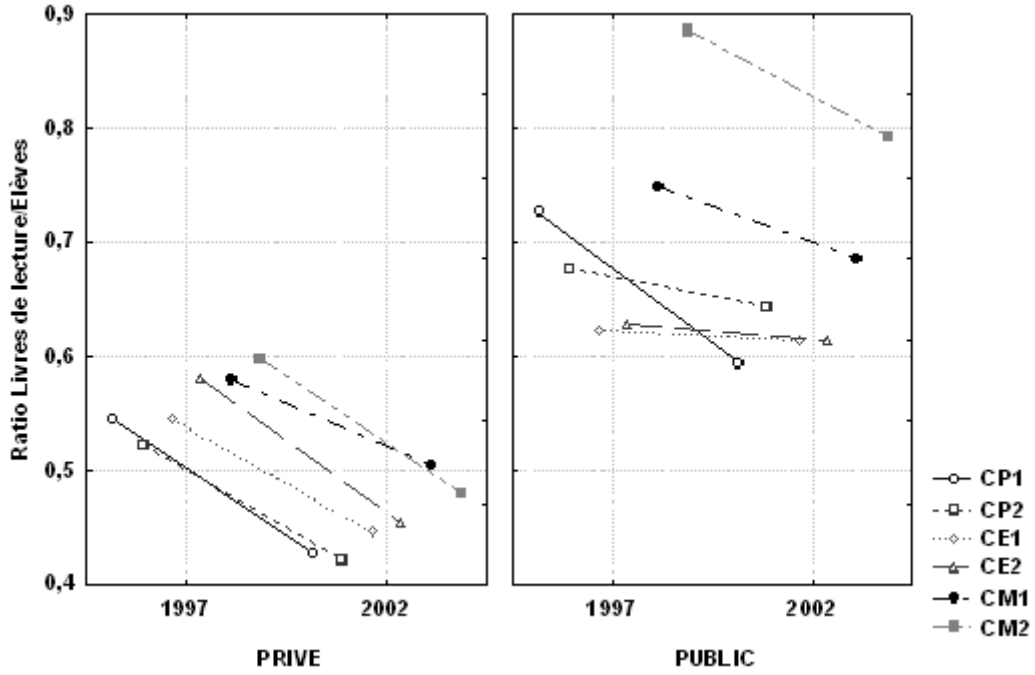
Graph 4 Evolution over 5 years of reading material availability, at primary level, in Burkina Faso



- **Inequalities pertaining to the status of the schools**

60. A first analysis reveals that the situation in private schools seems to have worsened when compared to public schools. This sounds quite paradoxical, being given the generally positive image enjoyed by private education in Africa. However, the explanation lies in the origin of the data. The paradoxical situation reveals the limits of the exploitation of data coming exclusively from the schools (thus advocating a better use of secondary data on education, such as household surveys). Indeed, the collected data emanated essentially from the "assets administered" by the school: they "ignore" the actual expenditure incurred by families where the purchase of books constitute an important budgetary item. One can assume that the reduced availability of free reading material for pupils is a consequence of the increased financial pressure on families to provide appropriate education to their children.

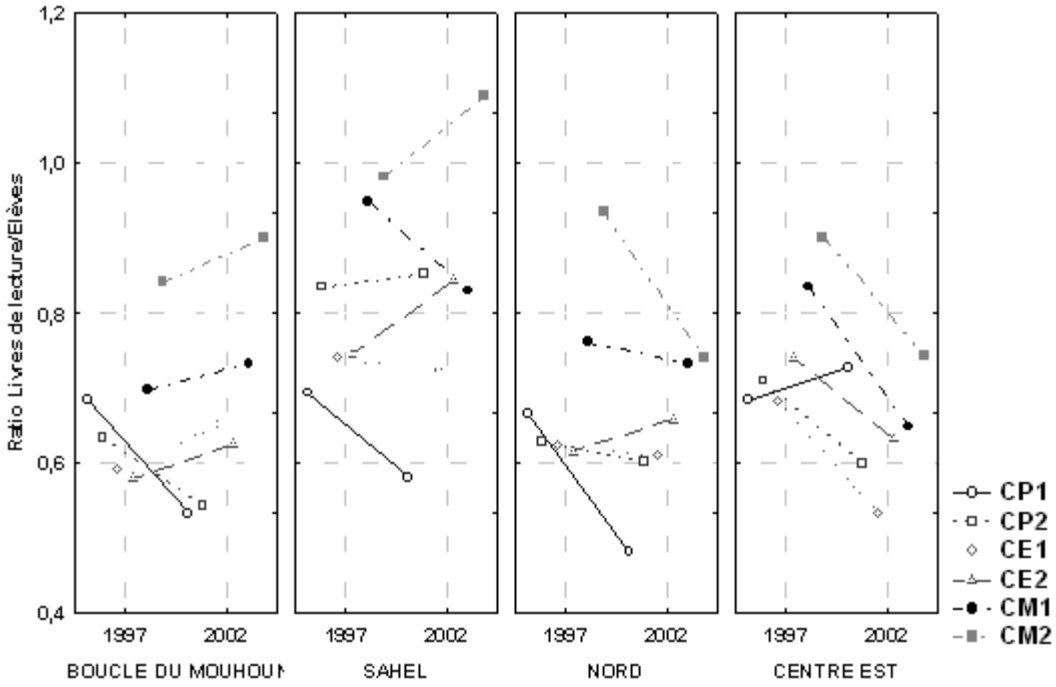
Graph 5 Evolution over 5 years of reading material availability, at primary level, in Burkina Faso according to the status of the schools



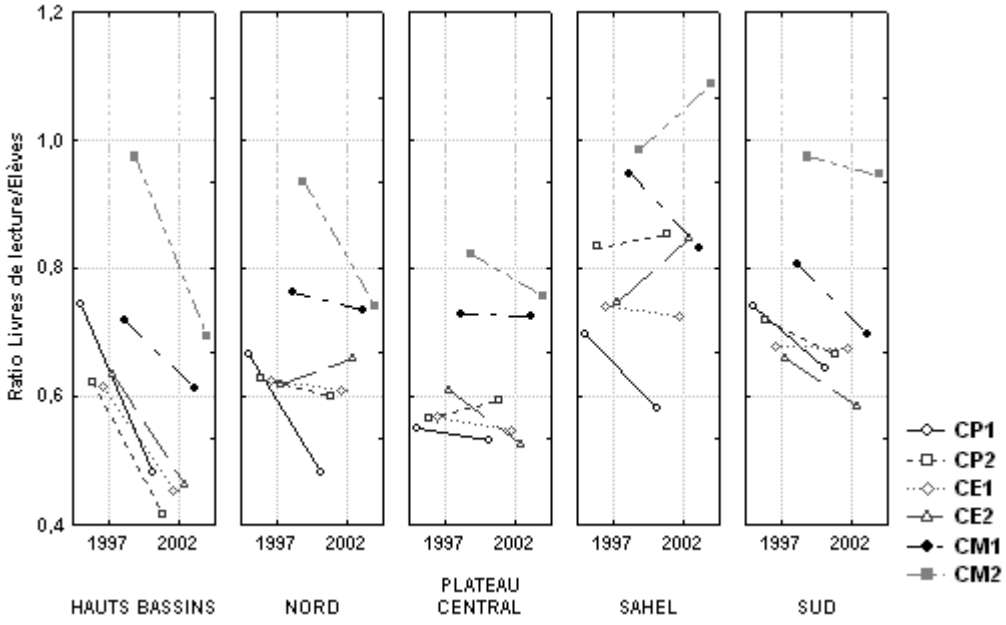
- **Regional inequalities**

61. When the analysis is restricted to CP1 only, the "reading material/pupil" ratio has shown a decrease in all the regions except in the East. There has been no major advocacy on the distribution of textbooks in Burkina Faso; those textbooks found in 1997 have either become, five years later, quite worn out or totally useless. On the other hand, the country has witnessed a high growth, in absolute terms, of its school population, and that has used up all the funds earmarked for textbooks. The East being one of the regions with the smallest school population, the greater availability of reading material in that region is therefore only relative since only 5% of the pupils are concerned. Furthermore, the number of NGOs "working" in this zone is quite high and a complementary survey that would measure their action, both quantitatively and qualitatively, in the field of education, would be welcome.

Graph 5a **Evolution over 5 years of reading material availability, at primary level, in Burkina Faso by region**



Graph 5b **Evolution over 5 years of reading material availability, at primary level, in Burkina Faso by region**



Graph 5c Evolution over 5 years of reading material availability, at primary level, in Burkina Faso by region

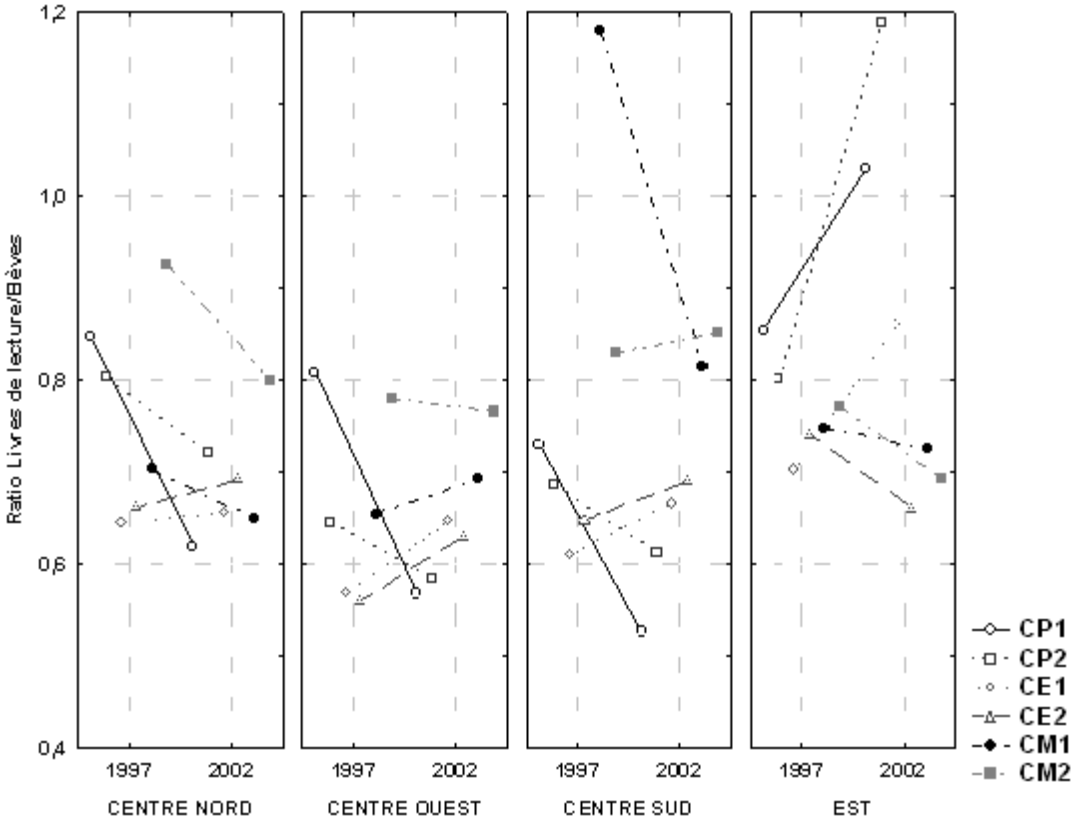


Table 2 Gross Enrolment Rate (GER) and Gross Intake Rate (GIR) by region

Region	Children enrolled	GER	Grade 1 (CP1)	GIR
Boucle du Mouhoun	95 697	38,6	18 904	37,2
Cascades	33 892	46,7	5 797	41,4
Centre	162 864	92,2	25 605	73,5
Centre-Est	70 435	38,3	14 091	35,2
Centre-Nord	59 073	30,5	12 560	27,0
Centre-Ouest	87 267	41,7	16 377	37,3
Centre-Sud	47 661	40,8	9 341	39,2
Est	**41 597**	**23,4**	**8 631**	**20,2**
Hauts-Bassins	116 705	55,3	19 572	45,3
Nord	91 590	43,7	18 421	37,7
Plateau-Central	45 788	36,7	8 733	31,0
Sahel	27 996	21,2	7 372	23,9
Sud	38 707	36,9	8 726	44,3
Total	**934 534**	**43,3**	**183 233**	**39,2**

Example 2: Impact of greater female staff enrolment on the girl/boy parity : Case study in Senegal - 2002/2003

The issue

62. A recurrent feature in most of the Sub-Saharan African countries is the under representation of women in the teaching profession. It is often assumed that the more female teachers there are, the more girls would attend school and for a longer period. This assumption, which is highly qualitative as far as admission in school is concerned, deserves to be compared with a more accurate impact measure.

63. The model designed on the basis of data collected during the various yearly school census now makes it possible, in several countries, to better understand this "degree of feminization". Above all, it is now possible to understand it in the light of the Girl/Boy parity level with regard to the number of school years or even the sociological environment of the school.

64. This brief survey can be illustrated by a few tables, graphs and short comments. It goes on to show, if necessary, that a structured presentation of statistical data can easily support studies that are sometimes considered to be too sujective.

A. Stucture of the teaching profession in Senegal (public primary education – 2002-2003)

Table 3 Distribution of teachers and their classes in 2002/2003

		CI	CP	CE1	CE2	CM1	CM2	Total
Urban	**Men**	674	504	668	753	981	1 134	**4 714**
	Women	658	763	580	488	216	76	**2 781**
	Sub-total	*1 332*	*1 267*	*1 248*	*1 241*	*1 197*	*1 210*	***7 495***
Rural	**Men**	2 895	2 350	2 097	2 240	1 851	1 979	**13 412**
	Women	554	558	352	311	101	52	**1 928**
	Sub-total	*3 449*	*2 908*	*2 449*	*2 551*	*1 952*	*2 031*	***15 340***
Total		**4 781**	**4 175**	**3 697**	**3 792**	**3 149**	**3 241**	**22 835**

65. A quick look at the table clearly illustrates how women are, as a whole, underrepresented, since they constitute only 20% of the teaching profession. This low rate, however, hides a strong sociological inequality since women represent only 12% of the profession in rural areas, against 37% in urban areas. More than half of them teach at the lower primary level and only 9% at the intermediate level. Even if there is an overrepresentation of male qualified teachers (MC)[6], that is not enough to explain the distortion in the mode of distribution of levels of responsibility: there is a tendency to impute those gaps to the poor integration of women in the education system in Senegal, where they are on the whole given fewer responsibilities than men.

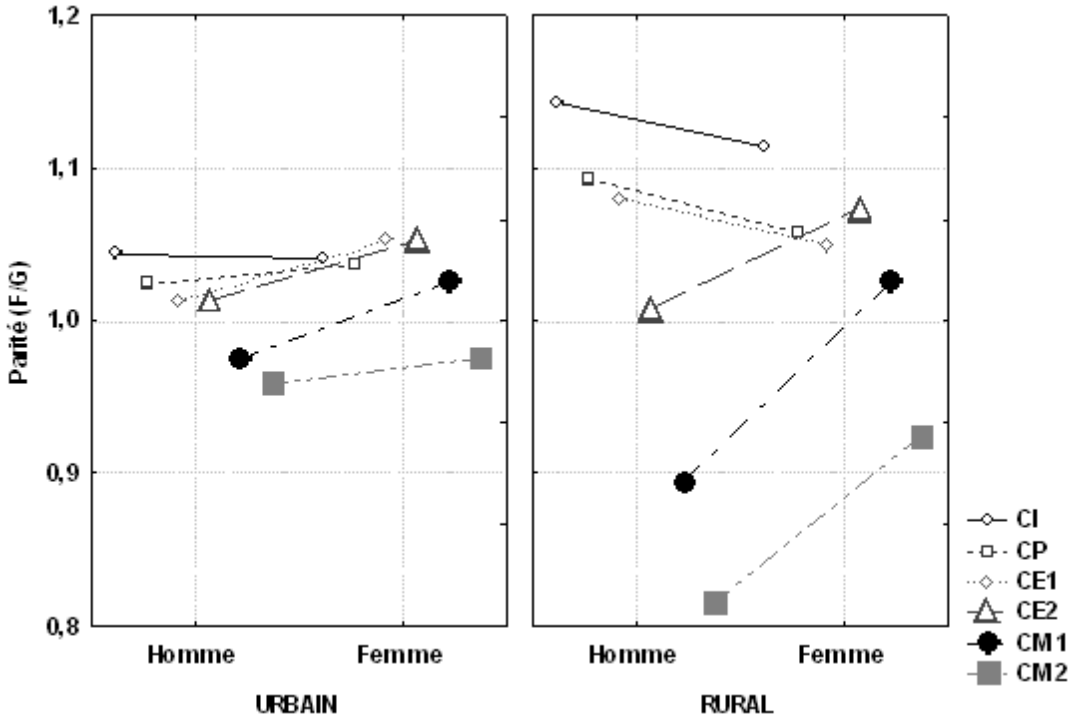
[6] 26% of men against 16% of women

Table 4 Teachers parity and status

	Hommes		Femmes	
Teachers	4 586	80,5%	1 108	19,5%
Qualified teachers	4 675	86,3%	740	13,7%
Benevolent teachers	5 056	76,3%	1 573	23,7%
Teaching assistants	3 044	73,7%	1 084	26,3%

B. What is the relationship between having more female teachers and equity?

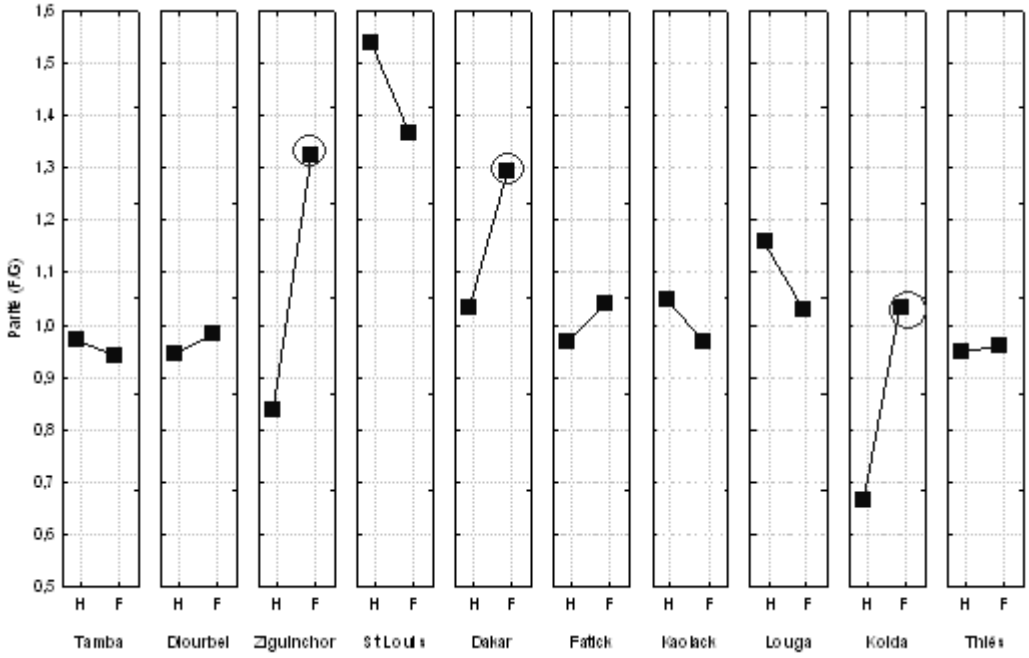
Graph 6 Impact of women teachers on the parity girls/boys, in the public sector, in Senegal, 2002/2003



66. The table clearly shows that if the fact of having more female teachers has an impact on equity, this is mainly visible in rural areas and is more significant in the last three years of the primary level[7]. Indeed, classes run by a female teacher have, generally, "one more girl for every ten boys" than the same classes run by male teachers. It must be clearly stated here that these are not the findings of a survey, which is always subject to controversy, on the reliability of the selection of samples, but rather the results of an analysis encompassing almost all public schools in Senegal.

[7] CE2, CM1, and CM2

Graph 7 Impact of women teachers on the parity girls/boys, in grade 4, in Senegal, 2002/2003



67. The analysis can be extended to more geographical – hence sociological - aspects to highlight the regional inequalities with respect to the issue under study.

Example 3: Impact of the access to water and toilet facilities in schools on the boy/girl parity in Senegal in 2002/2003

The issue

68. Facilities available in schools, especially running water and toilets[8], are often considered to be important for the *retention* of pupils, particularly in rural areas. In view of the realities of family practices as far as girls are concerned, it is quite normal to wonder whether the availability of such facilities has an impact on their going to school. Data on those facilities are now being collected in several countries, due care being paid to analyse such information in the context of the schoolgoers' profile[9].

69. The purpose of this brief analysis, which does not aim to measure exactly the impact of the "*comfort variables*", is to show the relationship between those variables and a higher enrolment of girls in Senegal.

A. Description of the data

70. The survey deals with the access of pupils to running water and toilet facilities in school. A proper measure of such accessibility will have meaning only in the light of the actual number of pupils affected by such facilities. The very structure of the analysed data, which links the groups of pupils with the facilities actually available, will help establish a weightage of the impact of the facilities.

71. On the whole, **more than a quarter** of primary schoolchildren in Senegal in 2002/2003 had no access to either running water or toilet facilities at school. In that respect, private schools seem to be better off[10]: the rest of the study will be dealing only with public schools operating in Senegal in 2002/2003 so as to highlight the various factors likely to have an impact on girl schooling.

Table 5 Access to water

Schools	Without running water	With running water	Total
Private	0.6%	10.6%	11.1%
Public	25.1%	63.8%	88.9%
Total	25.7%	74.3%	

Table 6 Access to toilet facilities

Schools	Without toilet facilities	With toilet facilities	Total
Private	2.6%	8.6%	11.1%
Public	25.2%	63.7%	88.9%
Total	27.8%	72.3%	

[8] The "comfort variables"

[9] Age, grade, gender…

[10] cf. tables 5 and 6

B. What is the relationship between the "comfort variables" in school and equity?

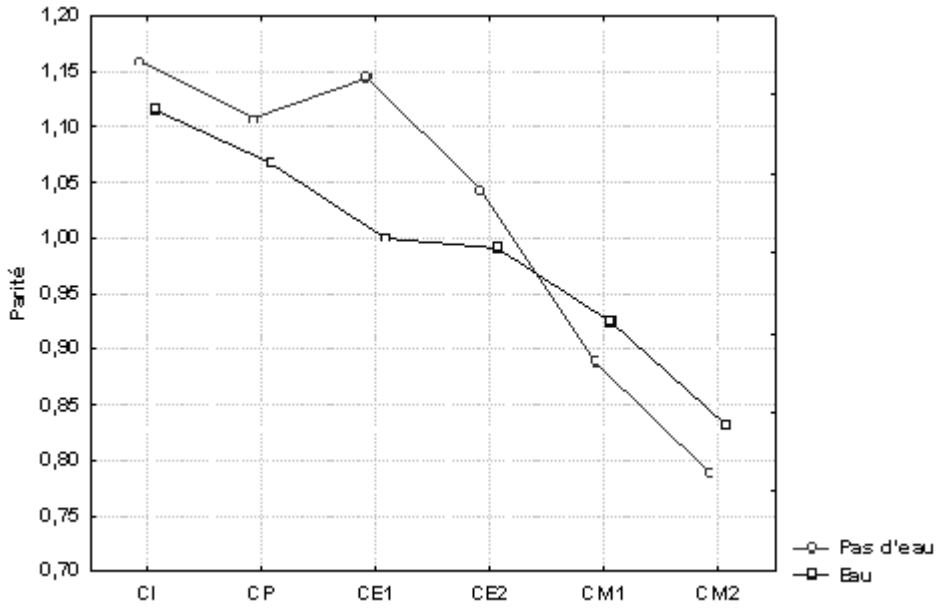
72. This brief study will take into account two variables in its scope:

- Water
- Toilet facilities

73. A more elaborate study might extend this scope to include other "comfort variables", such as availability of seats, lighting, or still the quality and number of textbooks actually made available to the schoolchildren.

C. Access to running water

Graph 8 Impact to access water on equity in public primary schools, Senegal 2002/2003

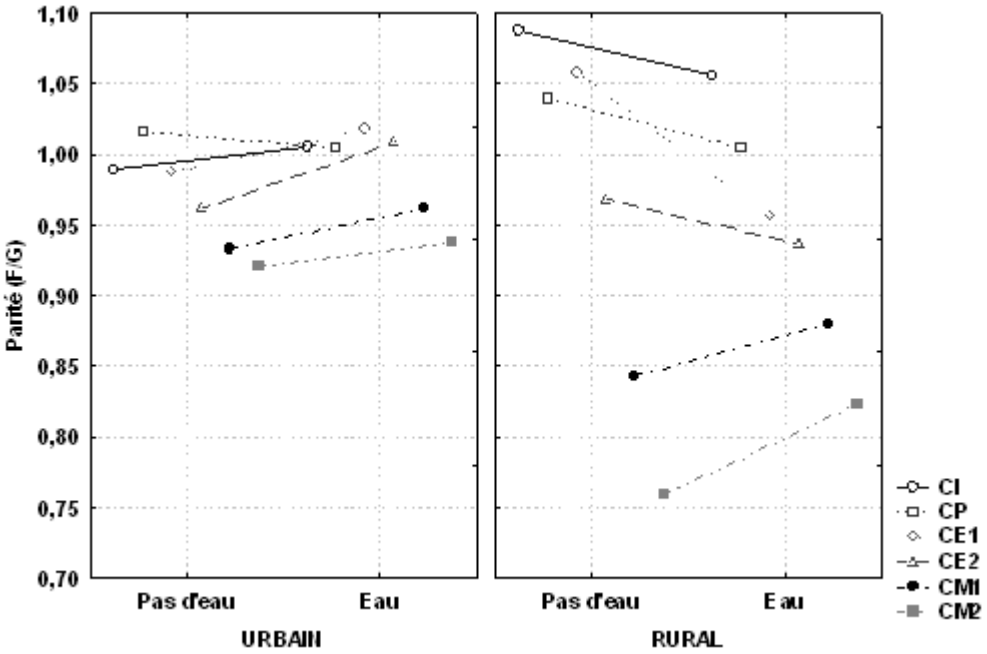


74. This table illustrates, on the whole, a reversal of the trends in parity levels at the end of CE2. This is the level of schooling generally reached by girls who, as from that age, are often made to stay at home to do household chores. This age effect, which is quite negative where equity is concerned, is however mitigated in the case of girls who have access to running water at school.[11]

[11] 1 girl less for 20 boys

75. The table below shows a stronger interaction in rural areas.

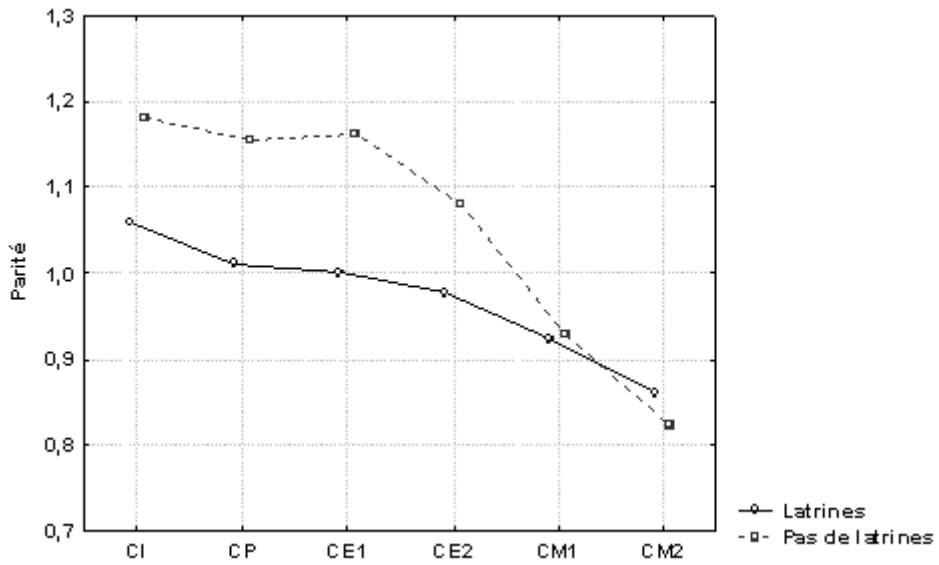
Graph 9 Impact to access water on equity in public primary schools, in urban and rural areas, Senegal 2002/2003



D. Access to toilet facilities

76. This table shows clearly the "collapse" of parity in schools not providing toilet facilities. This sharp drop is more visible as early as in CE1/CE2, school years that correspond to the ages when girls are subjected to greater social pressures.

Graph 10 Impact to toilet facilities on equity in public primary schools, Senegal 2002/2003



4. CONCLUSION

77. The three case studies endeavour to illustrate the flexibility of the models proposed by SISED. It rests essentially on two fundamental notions: the “class” and the “geographical distribution”.

78. The class is the basic unit for the collection of data: it brings together pupils who have reached the same school year, receiving the same education in the same classroom and from the same teacher. This unit is functionally linked to all the components that intervene within the school: the socioeconomic environment, infrastructure and school equipment, teachers, etc.

79. The geographical distribution structures the data in space by ensuring that the model is adapted to changes in administrative divisions, which are frequent in Africa.

80. A more elaborate structure of the data offers to planners numerous possibilities to carry out studies, both quantitative and qualitative, in the classical sense of the words, as is shown in the three case studies.

81. Thanks to the tools made available by the computer, it has been easier to collect and process the data. It has thus been possible to exploit them and bring forth the many and varied interactions between them, both quantitative and qualitative.