An quick examination of the role and of education management information systems in Mozambique. At the national level the initial evidence suggests that EMIS helps generate targets for policy frameworks. In addition EMIS supports the Ministry of Education and Culture to establish targets and objectives for their strategies, as well as helping them to monitor progress towards achieving them at the national level. However, it appears that links between information systems and planning are not so strong at other levels of the education, such TVET. Similarly, EMIS plays a limited role in supporting the planning process at the provincial level due to lack of funds and access to data at the local level.
Education Management Information System: A Short Case Study of Mozambique

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Executive summary

EMIS is providing evidence of increased access to primary and secondary education albeit with low primary completion and consequent limitation on access to succeeding cycles. It also suggests that improvement in education quality has been limited. In addition, EMIS in the TVET sub-sector is not articulated with the changing demands for labour in an evolving economy.

Plans for educational development as part of a poverty reduction strategy are informed by EMIS. At the same time, monitoring and evaluation at the provincial level is largely confined to implementation, budgetary constraints precluding additional activity.

Core EMIS data collected through a school census are collated at provincial level whereas data analysis and dissemination of information is performed at central level.

EMIS has been in operation for some thirty years, computerized data storage and analysis being set up in 1980 with development assistance. A range of information is available through the statistical EMIS including enrolment of orphans following the HIV/Aids pandemic and information about poor attendance and drop-out.

Capacity for tracking expenditure and linking it to work plans is weak but a new system has been developed to address this issue. Personnel databases are established to support human resource management and are being updated for greater effectiveness.

Paper-based reporting systems are well established at school level but are not linked to EMIS and consequently have little input to strategic planning. In contrast, a new digital system for school-based information has been piloted with a view to making information more readily available for increasing access; it is not yet fully functional.

Development partners require periodic performance indicators but civil society is less involved in EMIS.

The various levels of education management are involved in the school census but lack of capacity reduces the quality of data validation.

Difficulty in obtaining reliable estimates of the school-age population makes the calculation of enrolment rates problematic and the statistical basis for their calculation has been questioned in the Mozambique context. However, although there are issues about enrolment rates, the trends are clearly discernable at national and lower levels.

There is a lack of effective links between EMIS, monitoring and planning but there has been a growing consensus between stakeholders about the need for agreed quantifiable indicators.

Capacity for analysis tends to be shallow and not based on a holistic approach with consequent low utilization of information at decentralized levels.
There is a lack of transparency in education finance exacerbated by poor communication between the education and finance ministries resulting in a lack of reliable financial information for planning and operations at the various levels. Budgetary information systems are weak and there is no system for tracking teacher performance. Linkages between EMIS and organizational structures have been weak but recent developments have greater stakeholder involvement. However, access to information beyond the central level is limited with expansion heavily dependent on training, equipment and energy supplies. EMIS utilization is greatly reduced by the lack of capacity to exploit it fully.

The minimalist nature of EMIS with relatively low demands on expertise and funding augurs well for its sustainability. Although the sustainability of statistical EMIS appears assured, the outlook for the financial and human resource management information systems can only be judged after their current reform.

Annual statistical reports are made available to various stakeholders and utilized for a variety of purposes. Printed copies of budgets, with limited information, are available; some financial information is on the ministry intranet. Digital information about individual schools is not widely available; it is not clear how traditional paper-based institutional information is utilized. EMIS publications are lacking in meaningful analysis related to planning issues.

1. Introduction

The role played by EMIS in educational planning in Mozambique is mixed. At the national level the initial evidence suggests that EMIS helps generate targets for policy frameworks. In addition EMIS supports the Ministry of Education and Culture to establish targets and objectives for their strategies, as well as helping them to monitor progress towards achieving them at the national level. However, on the downside it would appear that links between information systems and planning are not so strong at other levels of the education, such TVET. Similarly, EMIS plays a limited role in supporting the planning process at the provincial level due to lack of funds and access to data at the local level.

2. EMIS and the Planning Process

- EMIS is providing evidence of increased access to primary and secondary education albeit with low primary completion and consequent limitation on access to succeeding cycles

- EMIS also suggests that improvement in education quality has been limited
At the broad policy framework level, it would appear that data plays a significant role in helping the government to develop strategies and also establish targets, including monitoring progress towards such targets. A close look at the broad policy frameworks will help illustrate the role played by EMIS in the planning process.

Mozambique has just completed the implementation of the Education Sector Strategy Plan 1 (1999-2003). This focused on basic education and had three objectives: (i) Expanding access to basic education throughout all regions of Mozambique, (ii) Improving the quality of education services and (iii) strengthening of the institutions and the administrative framework for effective and sustainable delivery of education. Analysis of data from EMIS showed that considerable progress was made in improving access to education, reflected in an increase in enrolment at primary and secondary levels (MEC, 2005). The education system continues, however, to be characterized by low primary completion rates due to high levels of drop outs and the limited number of so-called ‘complete’ primary schools (i.e. those offering both EP1 and EP2). Access to secondary schools is also still severely limited, as is access to higher education despite the considerable increase in the number of both public and private higher education institutions in recent years.

EMIS also helps educational planners understand that improvements in education quality were limited during the implementation of ESSP I. For instance, some indicators suggest that enrolment expansion may have occurred at the expense of quality. This happened despite some initiatives to address quality such as teacher training initiatives and curriculum development in primary education. Some progress during ESSP I was also made in the implementation of the broader strategy of public sector reform in the education sector, addressing the three themes of decentralization, improved management and administrative structures, and the strengthening of capacity at all levels.

The monitoring of the ESSPI by education planners enabled them to develop goals and targets for the Education Sector Strategy Plan II (2005-2009). Specifically, the goal of the ESSPII is to reach de facto universal primary completion and gender equity in EP1 by 2009 and make substantial progress towards these goals in EP2 (grades 6-7) by this time. ESSP II is thus intended to make a huge stride by 2009 toward the 2015 goal of universal primary completion, or an integrated program of 7 years basic education that provides all children with the basic skills for further learning and responsible participation in society. Much of the base line information and targets for the ESSPII were obtained from data collated and analyzed by EMIS (see annex II).

**Links between EMIS and planning for TVET**

- EMIS in the TVET sub-sector is not articulated with the changing demands for labour in an evolving economy

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1 At the time of writing ESSP II had not yet been formally been approved as the costing of the strategy had not been finalized. This is however expected to happen soon.
Minimal links exist between the production of accurate information and decision making in TVET. Under recent reforms the government limits the number of new entrants in technical schools and jobs are no longer guaranteed for graduates or trainees. This assumes that provision will become more responsive to the labour market and institutions will adjust the curriculum accordingly. However, at present EMIS has not yet adapted to the new role of a market economy and the centralized management systems prevents institutions from responding to changing demand. As a consequence in certain fields graduates are produced for areas where there is no labour market demand. Nevertheless, recent reforms for TVET are attempting to make TVET more demand driven and involve developing the appropriate institutional structures to ensure that decision making is based on accurate labour market information.

The role of EMIS in monitoring and evaluation

- Plans for educational development as part of a poverty reduction strategy are informed by EMIS
- Monitoring and evaluation at the provincial level is largely confined to implementation, budgetary constraints precluding additional activity

The outputs from EMIS play an important role in the annual planning cycles and monitoring. For instance, education policy targets are set annually by the government of Mozambique (GoM) in conjunction with the MEC and the progress towards targets is discussed at annual review meetings, involving stakeholders. Throughout the year there are smaller internal reviews as well as regular meetings between representatives of the donor community and representatives of the MEC at the level of national directors. Similarly, the Poverty Reduction Action Plan is implemented through annual planning exercises that are reflected in the Economic and Social Plan and the State Budget. An important tool in this process is the Performance Assessment Framework (PAF), which is used to review progress toward PARPA’s objectives. The PAF currently contains three education objectives: (1) increased access and retention; (2) increased quality of education; and (3) reduced gender disparities. To achieve these objectives the PAF calls for the development and approval of the Education Sector Strategy Plan II (ESSP II) which is discussed in more detail below. The PAF also sets specific targets for improved access and retention in primary schools as summarized in the Table 1.

Table 1. Performance Assessment Framework Targets

<table>
<thead>
<tr>
<th>No</th>
<th>Indicator</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>EP1 net enrollment rate – total</td>
<td>79 per cent</td>
<td>83 per cent</td>
<td>86 per cent</td>
</tr>
<tr>
<td>1b</td>
<td>EP1 net enrollment rate – girls</td>
<td>77 per cent</td>
<td>81 per cent</td>
<td>84 per cent</td>
</tr>
<tr>
<td>2a</td>
<td>EP1 completion rate – total</td>
<td>48 per cent</td>
<td>58 per cent</td>
<td>66 per cent</td>
</tr>
<tr>
<td>2b</td>
<td>EP1 completion rate – girls</td>
<td>41 per cent</td>
<td>52 per cent</td>
<td>62 per cent</td>
</tr>
</tbody>
</table>

Source: MEC (2005), p.9
Attempts have been made by GTZ to introduce a **culture of monitoring and evaluation** in several of the country’s provinces (Maputo, Province, Inhambane, Sofala and Mancia). In practice the majority of effort focused on the monitoring of work plans, that is, the systematic checking of whether activities listed in plans have indeed been undertaken or not. It proved difficult to take the process one step further and to start systematically considering whether activities have the desired results or outcomes or not. The monitoring process at the decentralized level was therefore of a very practical nature (‘activity monitoring’), while monitoring at a ‘higher’ level (achievement of strategic objectives) only took place to a limited extent in line with planning and budgeting cycles. **This process** has been on-going for **over 5 years** and numerous evaluations have been undertaken to understand why the setting-up of the M&E systems have experienced difficulties. One of the main constraints relates to the fact that the monitoring and evaluation processes are not always budgeted for. However, this occurs because of the relationship between the development of operational plan and the provision of funds. For instance, some operational plans are developed and budgets developed accordingly, but then the budgets are cut. Another issue preventing the monitoring of education policy is the lack of capacity and the fact that operational plans have different indicators to strategic plans. In effect this means that activity monitoring is an isolated activity not linked to strategic plans and/or information systems.

**The location of EMIS**

- **Core EMIS data collected through a school census are collated at provincial level**
- **Data analysis and dissemination of information is performed at central level**

The **statistical core** of the EMIS in Mozambique is collected through a **survey** of all primary, secondary and technical schools. Via the district authorities’ information is forwarded to the provincial offices where data are collated and from the DPEs the data are forwarded to the Statistical Department in the Planning Directorate of the MEC in Maputo.

The MEC is **responsible for analysis and dissemination** of education statistics. The responsibility for the production of education statistics is delegated by the national statistical agency (INE, Instituto Nacional de Estatísticas) to the MEC (similar to select other government departments such as the ministries of agriculture and health).

Apart from the statistical core EMIS, the MEC can draw on several other information systems which will be discussed in the next section, including financial and human resource information systems.

The summary of ESSP II in this section, and in particular the boxes and tables, suggest a strong role of EMIS in relation to education policies in Mozambique. Box 1 and Table 2
provide a clear-cut set of performance indicators that should be produced by information systems on a regular basis to support monitoring of the strategy.

As will be shown in later sections, for various reasons EMIS in Mozambique only performs such a strong role to a limited extent. In other words, there is ample need for the improvement of EMIS in Mozambique and, in several areas, work is in progress in this context.

3. The development of EMIS in Mozambique

- **EMIS has been in operation for some thirty years, computerized data storage and analysis being set up in 1980 with development assistance**

Soon after independence it was realized that a national statistical EMIS was needed in order to monitor educational development in the new state. A system was introduced in **1976 with a core consisting of a survey of all schools**. During the initial years all survey data were processed manually, the provincial and district authorities serving only as data collection intermediaries. From **1980 data began** to be processed using the computer capacity of the **government data processing centre**, a task later performed in partnership with the first national university.

In the late 1980s Mozambique received **support** for the development of a statistical **EMIS** from the Swedish International Development Agency (**SIDA**). SIDA supplied all provincial education directorates with computer hardware and data entry software, and trained staff in the use of the software, enabling data entry and processing to take place at the provincial level. Since 1995 all provinces have sent their data to MEC in digital format for subsequent analysis and dissemination.

Mozambique has in this way adopted a donor-supported **minimalist approach** to the **statistical EMIS**. The system is based on simple database software, **spreadsheets** and **communication by email**. Databases are not electronically linked between districts, provinces and the central level. A **drawback** of the current system is that detailed final information is **only accessible** electronically in the **headquarters** of the MEC; the application used for analysis is not electronically accessible from districts or provinces. Apart from incidental donor support the statistical EMIS is **fully funded by government** and is operated and managed by staff from the planning directorate statistical department at the central level and the planning departments in the provincial directorates and districts.
Current information and information needs addressed by the statistical EMIS

- A range of information is available through the statistical EMIS including enrolment of orphans following the HIV/AIDS pandemic and information about poor attendance and drop-out.

Main types of EMIS data collected

<table>
<thead>
<tr>
<th>Static data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student numbers by class, age, sex</td>
</tr>
<tr>
<td>Repeater numbers by class and sex</td>
</tr>
<tr>
<td>Boarder numbers</td>
</tr>
</tbody>
</table>

- Teacher numbers by sex, age, subject, training status
- Numbers of non-teaching staff

| Number of shifts                  |
| Number of classrooms and type of construction |
| Allocation of books per student by subject and class |
| Allocation of teacher manuals by subject and class |

The semi-annual EMIS surveys cover all primary, secondary and technical schools and therefore allow for analysis and dissemination of data and information at any desired level of aggregation. The surveys are conducted using national standardized questionnaires outlined in the box above. Over time, questionnaires have been adapted better to capture the reality at the school level and to take account of new demands for information.

Such new demands include information on school materials, included in questionnaires since 2004; information about enrolment of orphans which has increased rapidly in recent years due to the HIV/AIDS pandemic; and qualitative information regarding absenteeism, especially the causes of absenteeism and drop-out. These new items facilitate the monitoring of ESSP II.


**Budgetary information systems**

- *Capacity for tracking expenditure and linking it to work plans is weak*

- *A new system has been developed to address this issue*

Given the shortcomings indicated, the budgetary information systems and the staff databases are not sustainable in their current form. This has long been recognized by MEC and reform programs have started to overhaul both information systems. Future information systems should allow for adequate financial planning and monitoring of budgetary execution in a transparent way. They should also allow for linkages between sub-information systems and, in particular, between human, material and financial resources and student numbers in various parts of the education system. Once the new systems are in place an assessment can be made to which extent these systems are able to meet their requirements in practice.

In the area of planning and finance, all national and provincial directors in the public education sector have printed copy of the approved budget with detailed information on allocations; this information is used to produce annual work plans including budgets. Budgets and work plans are supposed to be available on the MEC’s intranet but the information on the intranet is often not broken down by directorate and is seldom up-to-date.

A more important drawback of the budgetary information systems is the absence of an effective system to track budgetary execution. According to the administration and finance directorate MEC, all directorates are responsible for tracking their own budgets but this is often not happening. In practice, directorates at the central level and in the provinces send requests for funding of particular activities and await the response which may well be that the relevant budget line has already been exhausted. Certain directorates, such as that for basic education, have however introduced software specifically to track the flow of donor funding.

The MEC administration and finance directorate maintains a paper-based administrative system with various and voluminous registers. Not surprisingly, information processing is a tedious job and up-to-date information on budget execution is very hard to obtain. The directorate is eagerly awaiting the introduction of the new financial system, SISTAFE, which has been in the pipeline for some time, and for which MEC has been selected as a pilot ministry. SISTAFE was to start up in late 2005, its introduction serving as a precondition for further IMF assistance. SISTAFE is a closed system which covers budgets and spending as well as certain aspects of human resource management.

During the implementation of ESSP I progress was made with the development of a sector wide approach incorporating integrated planning and the development of a basket funding mechanism. This process will continue to operate during ESSP II although it has been has been criticized for its relative lack of transparency in terms of operations and
information about the availability of funds. It appears that not all donors are enthusiastic about this funding mechanism.

**Staff database and human resource management system**

- Personnel databases are established to support human resource management and are being updated for greater effectiveness

The directorate for human resources in the MEC operates national databases of all teachers. These databases have been developed using official documents concerning staff changes (recruitment, transfers, deaths, etc.), including a database with electronic copies of the official government gazette in which all appointments are published. The databases are functional but do not allow for convenient treatment of staff changes which are currently dealt with through a cumbersome system based on spreadsheets that have subsequently to be imported into the central database. As the database is limited to data derived from official documents it does not keep track of, for example, short training courses or other activities relevant in the context of job performance. Given the personal nature of the data, the database is not accessible for staff outside the directorate but others can request information by province, city, school, etc.

MEC is in the process of introducing a more comprehensive human resource management system which includes improved databases for teachers, allowing for the treatment of routine changes in staffing and other staffing issues. A survey of all teachers currently employed by the MEC is also being processed.

**School reports**

- Paper-based reporting systems are well established at school level but are not linked to EMIS and consequently have little input to strategic planning

In its current form, the school reports do not seem to perform a useful function and are unlikely to be a sustainable part of EMIS. For various reasons, including operational problems in the day-to-day running of schools, reports hardly perform a serious role in either monitoring or planning.

To become a useful planning tool, the school reports should become at least in part computerized and perhaps linked to the statistical EMIS and the Carta Escolar. Schools could then produce comprehensive reports, on a regular basis, including not only information about students and staffing but also short, relevant financial information and qualitative information regarding problems, challenges, limitations etc. These reports should be rapidly processed and made available at decision-making levels in the district and province.
Human resource and budgetary information systems could in principle draw on periodical reports produced by schools. **Schools produce reports** every semester with **financial information** (budget and spending) and information on changes in staffing, pedagogical and students’ affairs (number of students, results, etc.). In addition, schools **produce more comprehensive annual reports**. Pedagogical reports are based on the so-called *livro de turma* in which all test results and marks of a group of students are noted. At least some teachers keep hand-written or computer-based back-up copies of the key results. The *livro de turma* is also used to register the presence and absence of students and teachers, the latter information linked to salary payments. The administrations of larger schools usually keep a register of income and expenditure, and balance sheets are also produced on a regular basis and serve as an input into school reports.

School reports are supposedly consolidated at the level of districts or provinces and are subsequently sent to the planning directorate as well as other directorates. These formal, written reports however seem to have a rather passive role in educational planning; urgent issues are dealt with immediately using alternative means of communication and considerations or queries raised in school reports are often ignored at the higher levels of governance. Consequently, **schools have no great incentive to produce useful reports.**

**Carta Escolar**

- A *new digital system for school-based information has been piloted with a view to making information more readily available for increasing access; it is not yet fully functional*

In some provinces a **new electronic information system** has been introduced on a **pilot basis**. This information system combines geographical information on the location of schools with other information, such as enrolment, derived from the statistical EMIS or other sources of information. All information can be shown on screens with electronic maps of areas which highlight schools and other information.

The primary purpose of this system, called the *Carta Escolar*, is to serve as a **tool for planning new school construction** for equitable expansion of the school network. School construction has recently been decentralized and is the responsibility of provincial authorities. The *Carta Escolar* is being piloted at the institutional level, allowing a stronger involvement of local communities.

The new information system is, however, **not yet fully functional** and seems not to be used in practice despite the importance that is being attached to it at the central level. In one province, for example, staff had difficulties with conducting basic operations.
Conclusions regarding the design and functionality of EMIS

- Development partners require periodic performance indicators but civil society is less involved in EMIS

To encourage greater effectiveness, efficiency and accountability in the utilization of resources many international agencies require the regular production of an agreed set of indicators. In Mozambique, the recently installed national government is also under internal pressure to show clearly identifiable results reflected in improved indicators. EMIS in Mozambique has been designed and subsequently adapted in such a way that it should be able to produce much of the information necessary to support strategic plans and the statistical EMIS is very important in producing the ESSP II performance indicators. Much attention is given to these indicators defined in strategic plans with technical assistance agencies showing a consequent interest in EMIS operations. In contrast, civil society does not seem to be strongly involved in EMIS except as users of information.

4. EMIS Operations and management

Current operations and data quality in the core statistical EMIS

- The various levels of education management are involved in the school census but lack of capacity reduces the quality of data validation

The core statistical information system covers the whole country through a semi-annual data collection system. The March survey focuses on enrolment whilst the December survey is used to calculate results such as examination pass rates. The survey is undertaken through the MEC planning directorate which therefore holds a key position in the implementation of ESSP II. The director of planning has direct access to the minister when necessary.

The survey involves not only schools but also district and provincial authorities. The standardized questionnaires are distributed by the MEC and filled out by hand at each school before starting their journey back to the ministry. Direct costs are limited to the paper questionnaires as all operations are undertaken by permanent MEC staff at the various levels. Data ownership lies with the MEC central service.

During the process of data entry and validation a number of simple checks are carried out at the district and provincial level (e.g. missing schools) but these checks are not comprehensive and are not undertaken systematically because qualified staff is often not available. The forms used for data entry are also prone to summation errors at the district level (before data are entered electronically), and no cross-checks are performed. Errors arising from missing data and double counting can easily occur and, on various
occasions, the introduction of software for error detection and correction has been recommended to address this issue.

The data are forwarded in digital format to the statistical department in the planning directorate of in Maputo which further processes the data using spreadsheets. Because capacity problems also constrain operations at the central level, the validation of the statistical information produced by the EMIS is limited.

**Errors due to combining administrative and statistical information**

- **Difficulty in obtaining reliable estimates of the school-age population makes the calculation of enrolment rates problematic**

Given the operations of the statistical EMIS and the requirements of ESSP II, in particular the primary education and gender strategies, **EMIS data** have to be combined with other information to calculate certain performance indicators. In particular, net enrolment rates combine enrolment data from schools with population data derived from censuses and household surveys conducted by the national statistical agency.

The next census will be in 2007 and, in the meantime, **enrolment rates** are calculated on the basis of projections using recent survey information such as the 2003 demographic and health survey. The implications of using population projections are two-fold: firstly performance indicators in ESSP II are subject to changes in the denominator unrelated to developments in the education sector itself and, secondly, indicators tend to become less accurate over time and more so at lower levels of aggregation. In particular, district level population projections are known to be unreliable.

**Indicators and the dynamics of education sector**

- **The statistical basis for calculating enrolment rates has been questioned in the Mozambique context**

Considering the indicators produced by the statistical EMIS and the underlying dynamics of the education sector, a **number of issues** have been raised including the appropriateness of using the 6-10 year-old cohort as the relevant age group for primary education. Only half of the pupils enter EP1 at the age of six, resulting in a systematic underestimate of the net enrolment rate.

In any given year most drop-out will occur between the March and December surveys. These drop outs will only be taken into consideration in the calculation of enrolment rates for the following year, measured again in March, leading to a systematic upward bias in net enrolment rates for any given year. It is not clear whether there is a systematic
underestimation or overestimation of the net enrolment rate or whether it may indeed be neutral.

Conclusions

- There is a lack of effective links between EMIS, monitoring and planning

Although the statistical EMIS in Mozambique is able to produce information that is necessary to support education strategies, the quality of this information has been criticized. This criticism concerns not so much the key operations of the statistical EMIS, such as the use of survey instruments, but the application of certain definitions and the consequences of using demographic information from other sources. As the shortcomings of demographic projections in Mozambique have been identified, some technical co-operation agencies prefer to use alternative projections. This leads to confusion about the value of performance indicators for ESSP II.

A major drawback of the operations of the statistical EMIS concerns the lack of analysis of data with operations limited to ‘producing the numbers’. EMIS in Mozambique is not effectively linked to monitoring and evaluation or to operational and strategic planning, and these shortcomings being more severe at decentralised levels, especially with regard to financial and human resource information systems.

5. EMIS and strategic/operational planning

A strong link between information systems and planning?

- There has been a growing consensus between stakeholders about the need for agreed quantifiable indicators

As planning and implementation need to be based on adequate information, EMIS should have a well-defined role in both operational and strategic planning. Starting at the strategic level, this role could cover at least the following three areas:

1) supporting the education planning process in a general sense, including the identification of problems and areas for strategic intervention.

2) monitoring, evaluation and planning of strategies, policies and reforms in the education sector.

3) supporting governments in tracking progress towards pre-defined goals and quantifiable target values, including the MDGs, and planning interventions accordingly.
Among Mozambique government institutions, national stakeholders and international agencies the interest in agreed sets of measurable or quantifiable indicators has strongly increased in recent years, as reflected in the targets for ESSP II. Even though international agencies are generally speaking from a perspective which would also allow for a focus on quality issues, attention in practice has often been on ‘clear numbers’ such as the number of students and the number of schools.

These considerations indicate a shift in the use of information systems towards areas (2) and in particular (3) above. In other words, given current tendencies towards measurable or quantifiable results, one would expect a narrow linkage between statistical information systems and monitoring and planning in the education sector, as opposed to a more general use of information systems in education planning. In practice, such a narrow linkage between information systems and planning is hampered by a number of factors.

Data, indicators and statistical information for education planning

- Although there are issues about enrolment rates, the trends are clearly discernable at national and lower levels

- Capacity for analysis tends to be shallow and not based on an holistic approach with consequent low utilization of information at decentralized levels

In principle, the planning directorate should use the products of EMIS to undertake the three roles (1), (2) and (3) listed above, and in particular to monitor and track progress against the targets set out in ESSP II, including those related to the MDGs, and to plan interventions accordingly. In practice, a number of basic problems with the statistical EMIS hamper the performance of such a function in Mozambique.

A recent review noted that it is difficult to ascertain whether one of the principal indicators used by the MEC, the net enrolment rates in EP1, give a realistic estimate of net enrolment, thus undermining the role of EMIS for in strategic planning, monitoring and evaluation. In addition, the target completion rates set for the education sector in policy documents have been criticized for being unrealistic and based on a limited understanding of dynamics in the education sector with regard to possible or achievable year-on-year changes.

On the positive side, it should be noted that even though there may be confusion about the precise meaning of published net enrolment rates, more firm conclusions can be drawn on the basis of enrolment levels and trends measured over time and eliminating the need for demographic information. Another positive feature of information in Mozambique is that data are available for all levels of geographical aggregation and all information is available by sex.
A broader understanding could be based on a more comprehensive model of stocks and flows of pupils and teachers as opposed to a focus on the production of a narrow range of indicators. No matter how carefully selected, individual indicators will always suffer from shortcomings and need to be considered in the context of other quantitative as well as qualitative information to obtain a full picture of developments in the education sector. Only a full picture allows for the adequate planning, monitoring and evaluation of education policies.

Furthermore, indicators concerning enrolment should be linked to information and indicators concerning the human, material, and financial resource requirements of the education sector. A shallow and isolated analysis of selected indicators is not an adequate basis for strategic planning. The capacity to undertake a broader analysis is, however, not well developed at the central level and largely absent at the provincial and district levels; statistical information is used only to a very limited extent at the decentralized levels for the purpose of identifying areas for intervention, including resource utilisation and performance measurement.

**Capacity is limited** to the core operations of the statistical EMIS (‘producing the numbers’). Too few staff members are able to manage and genuinely oversee these operations and they do not have time to conduct the very necessary more general analysis of the statistics. The absence of such analysis unduly limits the role of EMIS in strategic planning and even in operational planning.

**Planning, layers of government and financial information**

- **There is a lack of transparency in education finance exacerbated by poor communication between the education and finance ministries resulting in a lack of reliable financial information for planning and operations at the various levels**

Both strategic and operational planning of public financial flows in the education sector in Mozambique are generally characterised by lack of transparency; fixed rules relating to inputs or outputs are not established or applied. In principle, schools are accountable to district directorates of education (DDEs), which fall under the provincial directorates. The activities of the latter are guided by MEC which defines the national education strategy, objectives and targets. These different parts of government, central, provincial and district, work however on the basis of their own annual work plans, with some activities managed centrally, e.g. curriculum development, and others sub-nationally, e.g. intra-provincial allocation of resources and pedagogical supervision.

Apart from the fact that co-ordination and communication between these different government institutions is far from perfect, in part because of limited means of communication, the main drivers of the financial flows are the MEC administration and finance directorate and the Ministry of Finance. The latter two actors channel funds through the provinces, part of which will eventually arrive at schools. In practice, other directorates in the MEC, provinces and districts seem to have only limited influence over
these flows, the volume of which is determined through lengthy processes within an overall budgetary envelope determined by the Ministry of Finance.

Furthermore, **financial flows are often subject to prolonged delays**; provincial directorates only receive their annual budgetary allocations for a particular year two to three months after the year has started and schools operate for months without operational funding from the government.

The **delays** in the flow of funds from central through provincial to district level are **due to several factors**. These include liquidity problems, resulting from differences in time flows in incomes and expenditures at the central level, and bureaucratic or administrative delays due to processing of accounts and compliance with accounting norms and regulations. Government budgetary allocations are also low and do not allow for routine maintenance expenditures. Capital expenditure depends mostly on the interest of donors.

Taken together, these factors **usually prevent schools** from operating on the basis of clear **operational plans** and activities, and management is often focused on the resolution of problems that hamper day-to-day operations.

**Missing linkages between information systems and organizational structures**

- **Linkages between EMIS and organizational structures have been weak but recent developments have greater stakeholder involvement**

Linkages between EMIS and other areas of strategic planning are weakly developed. For example, there is a gender unit in MEC but its precise role is not clear nor is the extent to which it uses EMIS for strategic purposes. Strong linkages with other ministries such as health are largely absent.

An important issue in this context is the buy-in and the role played by stakeholders in the design and operations of EMIS. The statistical EMIS in the MEC is clearly a given for most actors within and outside the MEC, and the same goes for much of the other current education information systems (financial, school reports, etc). Only recent reforms, such as the introduction of SISTAFE, are characterized by a larger role for stakeholders.

**Specific operational problems**

- **Access to information beyond the central level is limited with expansion heavily dependent on training, equipment and energy supplies**

- **Budgetary information systems are weak and there is no system for tracking teacher performance**

- **EMIS utilisation is greatly reduced by the lack of capacity to exploit it fully**
Problems afflicting the relation between strategic planning and information systems are also relevant in the case of operational planning which is particularly hampered by some shortcomings of EMIS. One is the fact that at the decentralized levels (provinces, districts and schools) access to information is limited. Not all provinces have access to the internet to consult the MEC’s intranet which contains statistical and some budgetary information. Only selected districts and schools, mostly in Maputo City and Maputo Province, have such access. Another problem concerns electricity supply which is less reliable at the provincial level than in Maputo City, and even here a continuous supply is not guaranteed.

Most schools operate without a computerized administration that would allow for monitoring of results and interventions based on solid information. Following the recent introduction of computerized administration systems in technical schools on a pilot basis, plans are being developed to use the same system in pilot in general education schools. The introduction of computerized administration in technical schools however showed that staff generally had little experience with computer systems and software and a fair amount of capacity building would be needed to enable the effective utilisation of these systems. This situation is highly likely to be similar in the general education system, and more so in view of the significant proportion of unqualified teachers.

Apart from the need for general computer hardware and software training, there is a need to train staff in the understanding of indicators. At the level of schools, understanding of indicators would be more strongly focused on practical information but some theoretical grounding in concepts of education indicators would be necessary as well.

Of equal relevance for operational planning is the absence of information systems allowing for monitoring of budgetary execution and delays in the availability of funds. As the acquisition of school materials such as books is centralized, schools cannot do much more than wait until materials arrive.

Finally, an issue that relates to both the strategic and the operational level is the absence of information systems regarding teacher performance, other than pay related to qualifications and the register of presence during classes. A clear performance management system that would allow for a modern student-centered approach to learning is lacking at schools.

A certain extent of strategic planning is undertaken at the central level, based on information produced by EMIS. The role of EMIS is however unduly limited by:
- technical shortcomings including the application of certain definitions and the use of inaccurate projections
- bureaucratic processes, the legacy of central planning, and the lack of linkages between information systems
- capacity problems and the lack of a comprehensive approach to educational planning and EMIS.
At decentralized levels, moving out of the MEC and into the provinces, districts and schools, strategic planning on the basis of adequate information becomes progressively more difficult. Operational planning at the school level is often overtaken by the need to focus on the day-to-day running of school affairs. Very little operational or strategic planning is initiated at the level of schools.

6. Strategies for maintaining EMIS

- *The minimalist nature of EMIS with relatively low demands on expertise and funding augurs well for its sustainability*

Mozambique adopted a donor-supported minimalist approach to the development of a statistical EMIS. The advantages of this system lie in its transparency and in the absence of the need to maintain specialized technical skills to operate hardware, software or communications. Because the statistical EMIS is fully operated by government staff the costs to operate the system can be kept to a minimum.

All these factors are supportive to the sustainability of the system. Furthermore, the system is well-known and understood, survey operations have been undertaken on a regular basis for a long time and the system is flexible in the sense that new information can be readily accommodated.

It appears that the basic weaknesses of the system, including those relating to the role of the statistical EMIS in strategic planning, monitoring and evaluation, can be overcome without changing its fundamental characteristics. In other words, improvements in data entry software and the need for a more comprehensive analysis of flows in the educational system can be accommodated without changing the statistical EMIS and should rather be seen as additional tools.

**Conclusions on sustainability of information systems**

- *Although the sustainability of statistical EMIS appears assured, the outlook for the financial and human resource management information systems can only be judged after their current reform*

Sustainability of information systems differs markedly between systems. Despite its weaknesses, the statistical EMIS is sustainable and seems much in line with the needs and capacity of Mozambique. The system of school reports, on the other hand, seems outdated and cannot be expected to serve a useful function until school administrations are computerized.
Other systems and, in particular, the financial and human resource management systems at all levels, are however in the process of drastic reform. Once the new systems have been established, a realistic assessment has to be made about their sustainability.

7. Strategies for dissemination

**Statistical EMIS: main outputs and dissemination**

- Annual statistical reports are made available to various stakeholders and utilized for a variety of purposes

Based on the statistical EMIS the planning department in MEC produces annually two main statistical outputs: an annual school survey, and annual school results.

The former centers on enrolments at the beginning of the school year reported in March and the latter focuses on results as reported in December. Both reports are published in the middle of the calendar year, the first referring to enrolment the current school year and the second referring to results in the preceding year. Both reports show tabulations of the numbers of schools by province, and enrolment or results by level of education, class, sex and province.

Printed copies of the reports listed above are widely distributed at the central level in MEC and to donors and technical co-operation agencies. These agencies use the reports to inform their policies and to discuss national policies and their contributions. Some agencies use the data for their own calculations based, for example, on alternative demographic projections.

The reports are also made available to all provinces but not to districts or schools. As most of the latter do not have access to other dissemination channels it is clear that the information is not used at this level.

Apart from MEC publications, information is also made available through statistical publications from INE and on MEC and INE websites.

**Budgetary information systems and staff databases**

- Printed copies of budgets, with limited information, are available; some financial information is on the ministry intranet

Officially approved budgets are available in hard copy and, to a certain extent, on the MEC intranet. No information on available balances, based on budgetary execution, is
regularly available in any form outside the context of the donor programmes supported by specific financial software.

Given the personal nature of data, the human resource database is only accessible to authorized ministry staff. Published information on the number of teachers etc. usually draws on the statistical EMIS.

**School reports and Carta Escolar**

- Digital information about individual schools is not widely available; it is not clear how traditional paper-based institutional information is utilized

Information produced by the Carta Escolar project is not widely disseminated, the latter reflecting the pilot status of the project. There is a long-established system of periodic paper-based school reports but it is not clear what happens to them once they have reached the central level; there is confusion as to which directorates should make use of them.

**Assessment of dissemination strategy**

- EMIS publications are lacking in meaningful analysis related to planning issues

The disseminated outputs of the statistical EMIS are of acceptable quality but contain no analysis of trends or what the data might mean in relation to educational planning, monitoring and evaluation. This is a basic weakness of the statistical EMIS, which is related to the role of information systems in strategic and operational planning and not limited to dissemination strategies.

It would be useful to make all statistical outputs available in all districts and schools but such a strategy would be costly for printed products. A more cost-effective route would be through the wider provision of internet access, a process that has started in selected schools.
References

Collier and Sparreboom (eds.), *Lifelong learning in Mozambique*, forthcoming.


MEC (2004d), *Questionnaires school surveys (levantamento escolar)*, Ministry of Education and Culture, Maputo.


Annex 1. List of persons interviewed


Mr Agostinho Barreto, former *National Director for Teacher Training*, Ministry of Education and Culture, Maputo.


Mr Germano Gebunda, *Head of Technical Education*, Education Directorate Maputo City.

Mr Alastair Machin, *Team Leader*, GTZ/GFA PROETFP, Maputo.

Mr Carlos Mapoissa, *Pedagogical Director*, Escola Industrial e Comercial de Matola

Mr Sergio Martin, *Department Head, Human Resources*, Ministry of Education and Culture, Maputo.

Mr Mazembe, *Department Head, Administration and Finance*, Ministry of Education and Culture, Maputo.

Mr Júlio Mocemoce, *School Director*, Escola Industrial e Comercial de Matola.

Mr Zefanias Mujovo, *Head of Technical Education*, Education Directorate Maputo Província


Ms Fátima Zacharias, *Director of Social Statistics*, Instituto Nacional de Estatística, Maputo.
Annex 2. Overview primary education strategy

Achievements during ESSP I

- Substantial increase in enrolments, particularly at EP1 level.
- Introduction of a new curriculum for primary education that is expected to improve learning and reduce repetition and drop-out rates.
- Abolition of school fees starting 2005, removing one cost barrier to education.
- Concerted efforts to start integrating the existing large variety of teacher in-service programs.
- Decentralization of funds to schools through the Direct Support for Schools program.
- Development and start of implementation of the FTI as a key step in achieving EFA.
- Training of teachers and managers to address HIV/AIDS.
- A de-worming program is in place in Sofala province (to be expanded to all the country).

Baseline summary

- EP1 enrolment (2004) 3,143,000 (46 per cent female); EP2 enrolment 426,000 (41 per cent female); girl’s dropout higher.
- One million children age 6-10 are out of school, net enrollment rate of 72 per cent in EP1.
- High repetition rates (23 per cent in EP1); low completion rates (40 per cent in EP1 in 2003; 48 per cent boys and 32 per cent girls).
- Major disparities in access to primary schooling between and within provinces.
- Major use of triple shifts in urban areas.
- Many rural communities lack complete schools; more than 1,500 schools still lack complete EP1.
- Learning achievement is unacceptably low.
- Existing centralized classroom construction processes have capacity of at most 1,000 classrooms per year.

Strategy

ESSP II will seek to address efficiency, equity and quality concerns in a holistic manner, placing emphasis on quality as a pre-requisite part of providing access to all. In line with this, the following key areas of will be at the center of 2005-2009 primary education strategy:

- Expanding the network of schools in an equitable and affordable manner (addressing regional disparities and ensuring that schools offer safe gender sensitive environments).
  - Ensuring that all primary schools offer a full cycle (grade 1-5) and expanding multi-grade classrooms as a strategy of providing complete schools in small communities.
  - Reducing late entry in grade 1 especially of girls.
  - Investment in school infrastructure targeted as a matter of priority to eliminate triple shifting, to reduce overcrowding in schools with the highest student classroom ratios (> 80) and provide facilities in district with the lowest gross enrollment ratio (< 80 per cent).
- Improving the quality of instruction, student learning achievement and retention.
  - Improving and streamlining teacher pre- and in-service training.
  - Implementing new primary curriculum with adequate support of textbooks and materials and special focus on bilingual and multi-grade instruction.
  - Ensuring an adequate supply of textbooks and instructional materials to all schools.
- Addressing problems of corruption and sexual abuse in schools, through improved supervision and monitoring, adequate training of managers and teachers and (whenever necessary) the enforcement and improvement of existing legislation.
- Strengthening planning and decision making at the decentralized level, so that provinces, districts and schools can play a proactive role in addressing issues of quality and access.
  - Decentralizing funds to schools in order to improve efficient allocation and stimulate
Table 2: Summary primary education framework and targets

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outputs</th>
<th>Performance Indicators/Targets (2009)</th>
<th>Policy and reform assumptions</th>
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<tbody>
<tr>
<td>Expand access to learning opportunities</td>
<td>On track for EFA/MDG goals</td>
<td>NER EP1 95 per cent</td>
<td>Community managed construction, costing $10,000/classroom</td>
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<td></td>
<td>Construction of 2,000 classroom/year with two teacher houses per school in rural areas</td>
<td>Student classroom ratio reduced from 70:1 to 63:1</td>
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<td></td>
<td>Reduce late entry of girls</td>
<td>Percentage of girls admitted older than 6 years</td>
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<td></td>
<td>Provide complete EP cycle in all schools</td>
<td>Percentage of schools with complete cycle</td>
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<td>Improving quality of instruction and student learning achievement</td>
<td>Schools emphasize student learning</td>
<td>Repetition reduced in EP1 to 5 per cent and in EP2 to 10 per cent Performance of students in Portuguese and Math on standardized test improved by 10 per cent</td>
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<td>Restructuring and streamlining teacher pre- and in-service training</td>
<td>No teachers recruited without pre service training All teachers have access to in-service opportunities ZIPs strengthened</td>
<td>New EP teachers trained in new 10+1 programs. CRESCER implemented nationwide</td>
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<td>Ensuring an adequate supply of textbooks and instructional materials</td>
<td>Textbook available to students in 1:1 ratio for core subjects and lower ratio for others</td>
<td>Textbook procurement decentralized</td>
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<td>New primary curriculum implemented with special emphasis on bilingual instruction and multi-grade teaching</td>
<td>Teachers apply new curriculum Textbooks and other instructional materials for bilingual instruction and multi-grade available</td>
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<td>Direct support to school for consumable materials,</td>
<td>All students have adequate supplies and access to health</td>
<td>DSS increases to about $5 per year by 2010</td>
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<td>Facility maintenance and school health programs; SMC ensure maintenance of schools</td>
<td>Addressing problems of corruption and sexual abuse at schools</td>
<td>Policy disseminated and enforced; teachers and administrators trained</td>
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<td><strong>Strengthening decentralized planning and decision making</strong></td>
<td>Revising management mandate of head teacher, school management committees and districts</td>
<td>School regulations revised; schools have school development plan</td>
<td>Program expanded nation wide (component 12)</td>
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