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The design of Ghana's education management information systems is an example of good practice in Africa for decentralised planning and budgeting, supporting reforms at various levels. Challenges remain for successful implementation, notably in commitment, capacity development and dissemination.

Education Management Information System: A Short Case Study of Ghana

October 2006

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Education Management Information System: A Short Case Study of Ghana

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Prepared by:

Cambridge Education.

Edited by:

Michael Trucano (*info*Dev).

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Executive summary

EMIS design in Ghana is an example of best practice for decentralised planning and budgeting, supporting reforms at various levels but challenges remain for successful implementation, notably in commitment, capacity development and dissemination.

EMIS plays an important role in policy formulation, operational planning and subsequent monitoring of targets through periodic review although stakeholder participation has yet to be fully developed. The system is particularly useful for calculating levels of disadvantage and related budget allocations.

EMIS is established for non-formal education where it is being decentralised, and in higher education where it could be better utilised for planning future developments.

Detailed plans for a rationalised EMIS, serving all sub-sectors, are formulated but are not likely to be implemented in the near future.

Early EMIS suffered from major capacity constraints but the later introduction of a policy for free, compulsory, basic education spurred development of increased capacity in relation to public institutions in the relevant sub-sectors.

Software issues have precluded time-series analysis and wastage of trained personnel has slowed data processing but current enhancement and expansion activities are addressing these issues and promoting wider ownership of information in a decentralised system.

Decentralisation is resulting in greater local utilisation of information with the centre now taking on support and quality assurance roles. However, there remain issues of obtaining information from private schools although data quality for public schools has been increased through better verification.

Head teachers have perceived little benefit from school census activities and teachers in general have seen the policy of continuous assessment and consequent need for records as an additional burden which has tempted some to mis-report.

Incomplete census coverage and the consequent interpolation of missing data to facilitate analysis are queried in some quarters, reducing confidence in EMIS products

A parallel school mapping system also poses challenges for EMIS and a lack of resources for IT maintenance continues to be a major constraint.

There are proposals to develop a web-based solution for EMIS based on the standardised package developed by the UNESCO Institute for Statistics. Major capacity development and the provision of new equipment will be required for this enhanced IT infrastructure

Dissemination of information remains limited, central government being the main user. Information is available for other stakeholders but not in readily utilised formats.

1. Introduction

- *Ghana EMIS design is an example of best practice for decentralised planning and budgeting, supporting reforms at various levels*
- *Challenges remain for successful implementation, notably in commitment, capacity development and dissemination*

In terms of **planning and design**, EMIS in Ghana can be viewed as an example of **best practice**. There is a clear synergy between the history of education policy and the development of EMIS. Initial attempts at data collection helped support the formulation of the country's national education policy. More recently, attempts have been made to align the policy of decentralisation with the collection and analysis of education data at the district level. Within this process EMIS is being used to help construct their operational plans and develop budgets for implementation. By providing reliable and accurate data it is anticipated that EMIS will play an important role in the decentralisation process by helping to ensure that education provision becomes more efficient and responsive to local needs.

EMIS is also **supporting reforms** that are occurring in other parts of the education system, especially in **non-formal education and tertiary education**. Non-formal education is one of the means by which Ghana can make progress towards achieving MDGs and EFA. For these reasons the Non-formal Education Division (NFED) has carefully developed systems and procedures to help monitor progress towards pre-defined targets and also to reward providers who achieve such targets. The National Council for Tertiary Education (NCTE) also collects, collates and analyses data from universities and polytechnics, all of which is used to calculate funding levels for the sector. The country's technical and vocational education and training sector (TVET) is in the stages of reform and the National Coordinating Committee for TVET has developed a census form to gather information about the sector. As a result of these various educational reforms the EMIS unit is also in the process of transformation, reflecting its new functions. Under these proposed changes an EMIS management committee will be established within the Ministry and this will contain representatives from different operational units, including NFED, NCCTVET, GES, and NCTE. This will help improve coordination of data provision and subsequent dissemination.

However, the **gap between planning and implementation**, or theory and practice, is **very large** and there is evidence to suggest that the EMIS system is characterised by a number of systemic and capacity issues. One of the main systemic issues is the lack of support or commitment from the district offices or the schools to the process of data collection and analysis. Part of the problem stems from their lack of capacity, both in terms of skilled personnel and equipment. As a consequence a vicious circle develops in which the lack of capacity results in a lack of commitment and so on. Lack of capacity is also a headache for the Ministry of Education and Science, especially in the light of the fact that a significant proportion of the staff involved in the production of performance and monitoring reports are either expatriates or part-time staff. Another significant problem identified by the study was the apparent lack of articulation between the donors in terms of their support for data collection initiatives. This lack of coordination raises the question of efficiency and could also send out

mixed messages, especially if two different sets of results were achieved. A final concern of the present EMIS unit is the almost total lack of dissemination. There is a lot of useful information but no strategy has been developed for dissemination.

Despite the short-comings identified above, **EMIS** in Ghana provides a number of **important policy lessons** for other countries who are embarking on the process of decentralising their educational system. The government itself is aware of these limitations and has started to tackle them through a revised strategic plan for EMIS called 'Enhancement and Expansion'. This strategy is based on a carefully designed needs analysis and contains a number of guiding principals for successful implementation over the 2004 to 2008 period, including what role will played by donors and the logistics associated with procurement and capacity building activities.

2. Objective and functions of EMIS

- *EMIS plays an important role in policy formulation, operational planning and subsequent monitoring of targets through periodic review although stakeholder participation has yet to be fully developed*
- *EMIS is particularly useful for calculating levels of disadvantage and related budget allocations*

As discussed earlier **EMIS plays** an important role in helping the Ministry of Education and Science to **formulate strategic policies**, develop operational plans and monitor subsequent **progress towards pre-defined targets**. The EMIS unit works in conjunction with the Policy, Budgeting, Monitoring and Evaluation (PBME) Division to carry out these activities. The relationship between two is simple, namely EMIS provides data to the PBME and the PBME undertakes the analysis and produces performance and monitoring reports for the Ministry. The EMIS unit and the PBME reports to Ghana Education Services (GES), the largest operational unit within the Ministry of Education and Science. It is estimated that GES takes around eighty per cent of the Ministry's budget for education.

A brief reference to policy developments can illustrate the important role played by **EMIS** in the **policy process**. The country's education system is guided by the Education Strategic Plan (ESP) and this has been formulated through wide consultation with stakeholders and members of the public. There are a number of guiding policy principles and issues underpinning the plan. The Education Sector Plan identifies a total of ten key policy goals, under the following four thematic areas: (i) improving equitable access to education, (ii) improving the quality of education, (iii) strengthening and improving educational management and (i) expanding and improving science and technology education, as well as TVET. Each of these thematic areas has specific goals, strategies and time-frames. However, in order to support implementation the PBME has developed an annual sector operational plan (AESOP) and an education sector annual review (ESAR). The AESOP is a three year rolling programme in which the Ministry attempts to ensure the prioritisation, phasing and timing of the programme is consistent with ESP targets.

The ESAR is an **annual review** process to monitor progress towards **established objectives and targets**, as defined in the above table. There are a number of

components or stages to this review process. The first of these involves the production of a preliminary education sector performance report (PESPR), followed by a participatory review meeting and a review plenary. Responsibility for carrying out these activities rests with the Planning, Budget, Monitoring and Evaluation Unit (PBME). This process is supposed to be participatory and involve a whole range of stakeholders, both from within and from outside the education system. Under this process stakeholders are supposed to review progress and make recommendations on how implementation difficulties can be overcome. In turn these recommendations will be feed back into the process of operational planning under AESOP. The role played by EMIS is central to all stages of the review process. All of the information contained in the preliminary education sector performance report (PESPR) is obtained from EMIS. Reference to some the tables contained within this report will help illustrate the important role played by EMIS in the review process, particularly with regard to tracking progress towards the defined targets (see Annex II and Annex III). For instance, the EMIS showed that by 2005 the GER for males at the primary level was 90.5, compared to a figure of 84.4 for females. This information suggests that existing strategies have not been effective in expanding access and reducing barriers to access for students in Ghana, especially females. However, the data also suggests that strategies have not been so effective at meeting the 2004-05 targets. Therefore, this information demonstrates that a continued focus will be required in order to ensure that female enrolment targets are achieved. This highlights the potential role played by EMIS is tracking progress.

Moreover, in order to ensure that **donors** and **stakeholders** have an **input into the monitoring process**, as well as in the subsequent implementation process, the MOES has proposed to establish an Education Sector Technical Advisory Committee to oversee progress across the four themes. The rationale behind this approach is that through using EMIS stakeholders will be able to monitor progress of policies towards defined targets and to take appropriate action, if required, to ensure that polices are successfully implemented. However, during the time of the field work this committee has never gotten off the drawing board due to the failure of the MOES to decide upon its composition or precise function. As a consequence this structure is not fulfilling its intended role.

At the **national level** the EMIS unit plays an important role in helping Ghana Education Services to **formulate operational plans** and also monitor progress towards achieving such plans. However, at the regional and district level. EMIS is also starting to play an important role in supporting the whole process of decentralised planning. Under this process of decentralisation the MOES would retain responsibility for overall policy, teacher training, curriculum development and the monitoring of policy but the districts would take responsibility for their own operational plans based on accurate and up-to-date information obtained from EMIS (as opposed to the needs being determined by the MOES). The regional offices would play a facilitation role in this process and ensure that reliable and accurate data are collected.

Besides supporting operational planning at the district level, **EMIS** is also starting to provide district offices with the information to **prepare the budgets** required for implementing these plans. The idea behind this move is that it would help improve operational efficiency, promote responsiveness and improve service delivery. Thus, not only will districts offices have more autonomy in developing their operational

plans, they will also have some discretion over their annual budgets. However, the formula for determining annual budgets at the district level is based on the following criteria:

Around 30% of the budget is based on enrolment levels
Around 10% is based on the number of schools
Around 60% is allocated according to disadvantage criteria

In order to **calculate the level of disadvantage** in each district/region this is measured according to the following variables: number of untrained teachers, pass marks for science, maths and English, type of classroom structure, availability of water and seating capacity. Through adopting such an approach EMIS will help determine budget allocations based on locally identified need. Furthermore, there are plans to forge links between EMIS and the payroll systems administered by Ghana Education Service. This payroll system covers salaries of all teaching and administrative staff who work in the country's primary and secondary schools. A financial system for collecting this information has already been installed in each of the regions and there are plans to develop links with EMIS. At present each region has to prepare a trial balance each month covering teaching and non-teaching salaries, administrative costs and other expenses[1]. When the EMIS and payroll systems are linked, the EMIS unit will be provided with a further means of validating data such as the number of teachers present in each school, as well as developing links between operational planning and the development of budgets.

3. Role of EMIS in non-formal and higher education

- *EMIS is established for non-formal education where it is being decentralised, and in higher education where it could be better utilised for planning future developments*

Data reflecting the situation outside of primary and secondary education data are beginning to play an equally important role in supporting **policy formulation** and **monitoring.** For example, in Non-Formal Education Division (NFED) systems and procedures have been developed to help monitor progress towards pre-defined targets and also reward providers who achieve such targets. Within Non-Formal Education broad goals have been established for the sector, namely that one million learners will become functionally literate over the 2005 to 2010 period. This has been broken into an operational plan whereby 200,000 learners will become literate during each year. Each of the regions is set literacy targets based on the previous years performance. Progress on these targets will be checked using a number of procedures, including the use of registration forms, the instructor's class record, continual assessment records of the learner and their terminal assessment. Each month this information is collected and forward to head office. Under the present arrangement head office are responsible for compiling this information and produce quarterly reports that measure progress towards defined targets within each region. Then, quarterly meetings are held between

[1] Please note each regional office has different capacity. In some cases the MOES central office provides support for regional offices that do not have the capacity to prepare budgets. In other regions they are totally responsible for the process of preparing and submitting their budget.

head-office and each regional office to review progress. This enables problems to be identified and for appropriate action to be taken. There are also plans to decentralise this process and to give regional offices the responsibility for data collection, analysis and report production.

In the **higher education** sector **EMIS** also influences decision about resource allocation. The process of collecting data is straight forward and involves universities and polytechnics submitting completed questionnaires to the National Council for Higher Education. These questionnaires cover issues such as enrolment levels and graduation rates and the results are collated and forward to the EMIS unit within the MOES. These reports form the basis for **future funding** within each university and polytechnic. There are no capacity constraints relating to the collection and analysis of information within this sector. However, this evidence would indicate that decisions no enrolment levels and subjects studied in higher education are based more on past performance within individual institutions, than on the needs of the labour market. Clearly, there is a need to ensure better incentives exist between the output from the higher education system and the requirements of the labour market. At present no data are available to support improved decision making within the TVET sector.

4. Location of EMIS

- *Detailed plans for a rationalised EMIS, serving all sub-sectors, are formulated but are not likely to be implemented in the near future*

During the time of the field work for the present research **EMIS** was **located** within the Statistical Research Information Management and Public Relations Unit (SRIMP) and reported to the director of this unit. However, the circumstances surrounding the **future location** of EMIS are more complex. Recent proposals for EMIS imply a total different structure (reflecting its new function). Under these proposed changes an **EMIS management committee** will be established within the Ministry containing representatives from the different operational units, including the NCTE, GES, NFED and NACVET. Beneath the EMIS Centre each of these operational units will have a sub-EMIS division for the collection, collation and analysis of data for their individual sector. Under MOES future plans a needs analysis will be undertake for each of these sub-EMIS units and the appropriate staffing and equipment identified. These proposals are in the stages of being implemented and this will strengthen the commitment of the different units to the establishment of a comprehensive EMIS. Under these changes the EMIS sub-unit within General Education Service (GES) will become responsible for the collection, collation and analysis of data for pre-tertiary education. The proposed structure and information flow for EMIS are shown in figure 1.

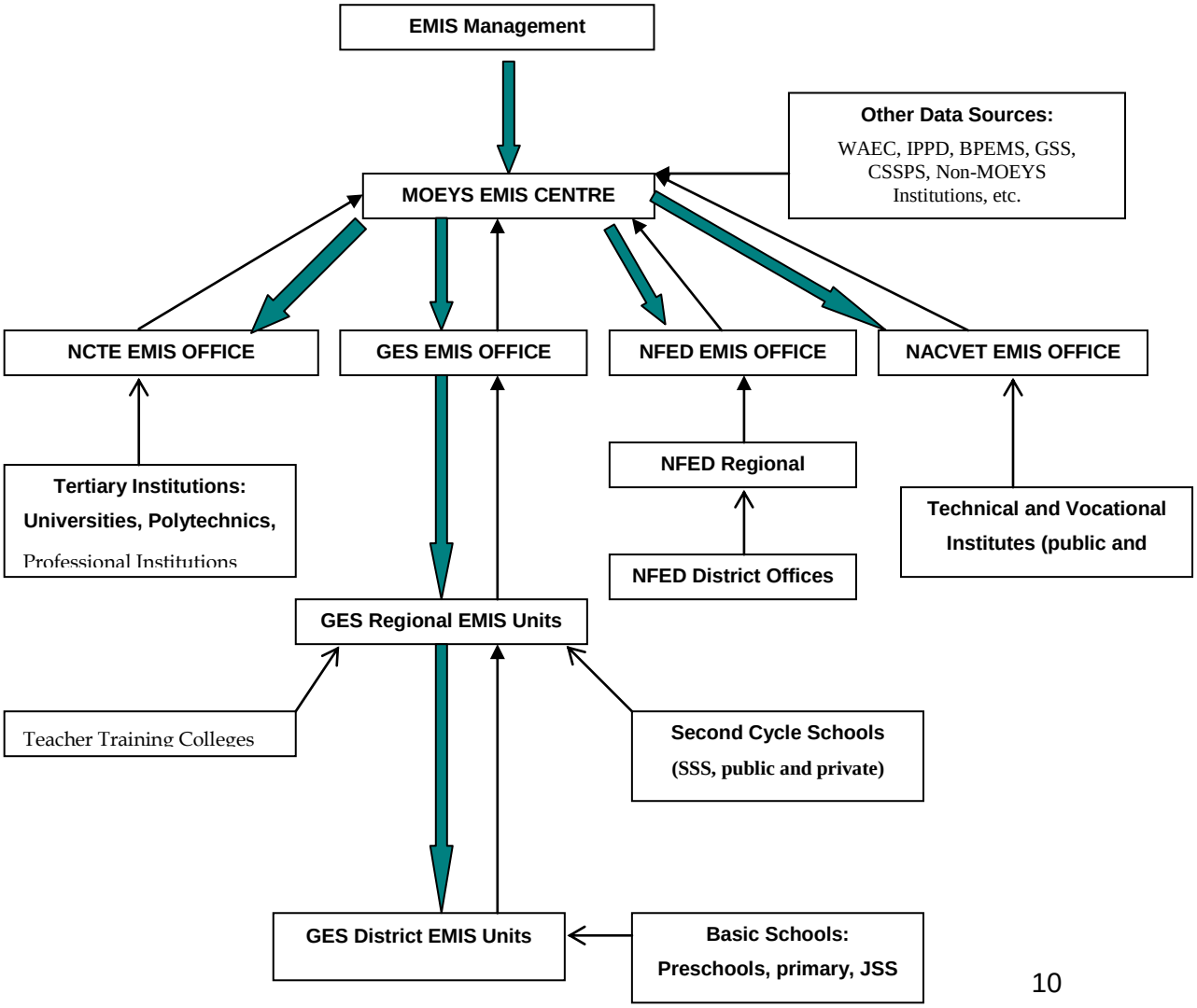
One of the **problems facing** the existing **location of EMIS**, as well as future proposals, is that the Centre is supposed to report directly to the Chief Director General. The idea behind this reporting structure is that the status of the Centre will be elevated, enabling staff to carry out their functions in a more effective manner. However, this elevation will not occur due to internal politics.

5. The development of the EMIS system in Ghana

- *Early EMIS suffered from major capacity constraints but the later introduction of a policy for free, compulsory, basic education spurred development of increased capacity in relation to public institutions in the relevant sub-sectors*
- *Software issues have precluded time-series analysis and wastage of trained personnel has slowed data processing*
- *Current enhancement and expansion activities are addressing these issues and promoting wider ownership of information in a decentralised system*

In Ghana there has been a **close synergy** between the process of **education reform** and the **development of EMIS**, including the **information technology infrastructure**. The development of the EMIS in Ghana can be divided into three distinct phases. The first of these involved the development of basic education statistics in the late 1980s when the country started on the major process of educational reform. Early attempts at collecting statistics involved UNESCO and the UNDP, and supported the MOES to develop education plans. Technical assistance was provided in order to facilitate national educational planning. However, these attempts at data collection and report generation were ambitious in the light of the

Figure 1: EMIS Management Structure and Data Collection Flow



fact there were only four members of full-time staff to collect data from the country's districts, analyse the data and produce the final reports. Understandably there were considerable delays in report production and there was little interest in educational data.

First phase of EMIS development

More **formalised attempts** at developing the **EMIS** occurred in the late 1990s when the government started to implement the policy of free compulsory universal basic education (FCUBE). During the development of this plan the MOES realised that it was important to have a system to help them track progress of this policy towards defined objectives. This stage has been referred to as the **pilot** or first phase to developing the **EMIS**. Under this pilot a total of ten of the regions capitals and twenty-six districts were selected to implement an educational survey of schools. Activities during the pilot stage involved the provision of hardware and software. The office staff were also trained in basic IT applications, including the use of spreadsheets and basic data entry. The intention was that the regions would be able to collect data from the schools and enter it onto their computer system but due to the problems of staff turnover and lack of capacity the data continued to be entered at the central level.

The second phase of EMIS development

The **second phase of EMIS** continued to build on these initial developments and attempts were made to improve capacity and **develop** the **IT infrastructure**, enabling the MOES to collect census data on primary and junior secondary schools for a seven year period (1997 to 2003). The process of designing census forms for other parts of the education system were completed, including questionnaires for senior secondary schools, technical and vocational institutes and teacher training colleges. The second phase of EMIS also helped to sensitise educational officials to process of data collection and understanding how it could be used in educational planning.

However, there were still a number of limitations of the existing EMIS. Perhaps the major draw back was that it only focused on basic education (covering pre-school to junior school). In addition the data collection process only covered public and not private schools. **Significant problems** were also experienced with the **software**. Indeed, despite the fact that census data had been captured for a number of years for some of the districts, it was impossible to analyse time series data due to the fact that the data had been stored on separate data bases. Moreover, a related problem is that the initial database for the EMIS system is incompatible with the databases being used by other systems. For instance, the payroll database contained information about teachers. However, it is impossible to cross reference any of this information with EMIS data due to the simple fact that the fields contain different coding. This also prevented the system from accessing or integrating with data from other agencies (e.g. WAEC, IPPD, BPEMS, Statistical Services etc).

There was a continual **high turnover of staff** once they were **trained**. It appears that once the district office staff have basic IT skills they are able to obtain a much higher

paid job in the private sector. This was compounded by the fact that considerable delays were experienced with data entry, data analysis and report generation. Under these constraints the reports became irrelevant to key users by the time they were disseminated.

The third phase of EMIS development

The government is now entering into what can be viewed as the **third stage** of **EMIS** called "**Enhancement and Expansion**". This builds on previous developments and attempts to overcome some of the short-comings identified above. Perhaps one of the most **important constraints** facing EMIS relates to the organisational structure and institutional arrangements for EMIS. Under the first and second phase EMIS suffered from a **lack of ownership**, acceptance and utilisation. This occurred due to the fact that GES staff were responsible for the data collection and validation, data entry and processing. Indeed, they were responsible for all aspects of the process, including the analysis of the data collected at district level. Understandably, other units within the MOES felt little ownership of data produced under these arrangements. Under the third phase a number of EMIS sub units will be established for data collection and processing. Each of these sub-units will be responsible for EMIS within their sector. For instance, the EMIS unit within the Non Formal Education Division would collect information in their sector. Similarly, Ghana Education Service (GES) will continue to be responsible for EMIS for pre-tertiary education. However, under the new expansion plans district offices will become responsible for this process (as opposed to head-office GES staff). This help will improve the sense of ownership.

The **new expansion and enhancement phase** will last for a period of four years and has a number of **specific objectives**. As outlined above the proposed new structures will create a **sense of ownership** of the whole process and ensure that there is a greater utilisation of data. Moreover, in order to ensure that the system becomes **demand driven** attempts will be made to identify new data requirements, such as those associated with HIV/AIDs and to create incentives so that information is used to manage education institutions and ensure greater levels of accountability.

Under this **new plan** the **coverage of EMIS** will **expand** with regard to the type of information collected and geographical area covered. For instance, under the new organisational structures, each of the EMIS sub-units will collect information on different areas of education. Similarly, within GES the geographical coverage will also expand from the present twenty-six districts to cover all the country's districts. Obviously, this expansion will take place in a number of phase. During the first year the focus will be on building the capacity within fifty selected district offices and ten regional offices. This cites will receive the appropriate soft-ware and hardware, as well as various capacity building initiatives. As a result of these activities the district offices will take responsibility for the data collection and processing. This whole process will be accompanied by a programme of capacity building to strengthen all administrative bodies involved with data collection and analysis, including those at headquarters, regional and district levels. Within each of the district offices four officials will be appointed in order to support this process. They are in the process of being trained in basic and intermediate computer skills, as well as how to undertake statistical analysis. According to interviews with GES officials they are now training a much larger number of people in basic IT skills than are employed at the district

office. The rationale behind such an approach is that they can create a pool of skilled workers who can be drawn upon should the district officials leave in search of other employment.

The evidence presented in this section shows a **close relationship** between the history of **education policy** and the development of **EMIS**. Initial attempts at data collection and analysis helped support the formulation of national policy. More recently attempts have been made to align the decentralisation provision of education with the collection and analysis of educational data at the district level. The development of EMIS has been an evolutionary process and a number of problems have been experienced, relating to software, data validity, capacity and data utilisation. While some the problems associated with the EMIS will be ironed out during the third phase of enhancement and expansion there are still some **unresolved issues** about ownership and generation of **demands for the outputs** from the system. Without a doubt the Ghana approach or model could be viewed as example of best practice but there is a wide gap between plans and implementation experiences.

6. Management and operation of EMIS

- *Decentralisation is resulting in greater local utilisation of information with the centre now taking on support and quality assurance roles*
- *There remain issues of obtaining information from private schools but data quality for public schools has been increased through better verification*

The **decision** to enhance and **expand EMIS** has resulted in education data being collected from **all regions** and **districts** within Ghana, as well as across all education sectors. However, due to the fact that EMIS focused initially on basic education there have been more developments within this area compared to non-formal education, TVET or tertiary education. Nevertheless, serious attempts are being made within to start collecting information in order to understand developments in other education sectors and to monitor their progress. The **management** of this **process** has not been without its **problems** and the experience of Ghana may offer other countries some **valuable lessons**, especially those who are involved in the process of education decentralisation.

Data collection for pre-tertiary education

The **process of data collection** for **pre-tertiary** institutions is the responsibility of GES and involves the implementation of a annual school census. The first stage to this process involved the **development of a census questionnaire**. Until 2005 the questionnaire was developed by officials at MOES headquarters and administered by GES staff at central office and distributed to schools via the district offices. Understandably, this did not lead to a sense of ownership. Those working at the district offices and schools just view the whole process as an administrative exercise imposed by head office. These circumstances have change during the present enhancement and expansion policy. Now there is an active involvement of stakeholders and district offices in the development, distribution and analysis of information collected using the census questionnaire. This has enabled district offices

to determine some of the question asked in the census and to also start using the data for their own planning processes.

The **initial census** questionnaire for 2005/2006 was piloted in a number of districts to find out what changes needed to occur to the survey instruments for the main census. According to GES staff the pilot revealed that there were **problems with instructions** contained within the questionnaire. These were changed for the main census. The pilot phase has also supported a school mapping exercise to find out how many of the schools were linked. That is to say the MOES wanted to find out which schools were stand alone schools and which ones had kindergarten, primary, junior or junior secondary levels. Information on these issues is important since it has implications for resource allocation and for determining where support is needed most.

Prior to the enhancement and expansion (E&E) programme the census questionnaires were **distributed** from a **workshop** held at the GES central training headquarters. Under this process a workshop would be facilitated by GES staff. This would be attended by representatives from all the district offices. Following this workshop the officials would distribute the census questionnaire to the schools and forward them back to GES headquarters for analysis and processing. This whole process would take around thirty days. However, under the new E&E programme fifty districts have been chosen to collect, process and analyse the data for themselves. Nevertheless, GES will continue to collate and analyse the same data in order assess whether the district offices have the capacity to carry out these activities. As mentioned previously the E&E programme will be rolled out in a phased process over four years. Once the E&E programme has been completed all districts in Ghana will undertake the data collection and analysis activities themselves.

Another **constraint** facing the MOES is to have a comprehensive understanding of the sector, including the role of **private schools**. It would appear that over the past five years there has been a proliferation of private schools but **little is known** about his sector. Clearly, a lack of information on this sector presents the government with a problem since there is no understanding about the size or characteristics of the private sector or the enrolment levels at such institutions. Understandably, it is important that these are monitored in ordered in order to understand how they contribute towards broader goals of reducing illiteracy and achieving gender parity. For these reasons the government has approached the Private Schools Association in order to help them start collecting data on such institutions.

The whole process of **data collection** at pre-tertiary level education has a number of **checks and balances** in order to ensure that data are **reliable** and **valid**. The head teacher of each school completes three census questionnaires. The first of the questionnaires remains at the school. The second questionnaire is forwarded directly to the MOES in Accra where data is checked, collated and analysed. The third questionnaire is forwarded to the district offices where it is also checked and passed onto the regional office for further checks. After undertaking these further checks the questionnaire is forwarded onto the MOES in Accra. This process ensures that a number of checks occur at each stage of the process and ensures that the correct data is entered onto the forms by schools. If incorrect data is found, the form is returned to the school via the district office and the schools are asked to enter the correct information. Moreover, this approach also provides a means by which the MOES can

oversee the activities of the regional offices. This will become more important as the process of decentralisation continues since the regional offices will increasingly play an important monitoring and evaluation role.

Difficulties associated with data collection

- *Head teachers have perceived little benefit from school census activities and teachers in general have seen the policy of continuous assessment and consequent need for records as an additional burden which has tempted some to mis-report*
- *Incomplete census coverage and the consequent interpolation of missing data to facilitate analysis are queried in some quarters, reducing confidence in EMIS products*
- *A lack of resources for IT maintenance continues to be a major constraint*

Despite the **emphasis** given to ensure the **validity of data** there are still **problems** with the process of **data collection**. Perhaps one of the **most significant** of these relates to the completion of the **census form** by head-teachers. According to interviews conducted during the field work head-teachers could not see the **benefits of completing** the **census** forms or how they could use the information contained within these forms. This often resulted in long delays in collecting the census forms from schools. The lack of links between the collection and use of information is a real concern. There is a need to ensure that demands exists for this information at all levels, including the school, the district, the regional, as well as the national levels. Perhaps one of the ways to encourage data collection at the school level would be to link the provision of the capitation grant to the successful completion of the census form. At present schools are required to provide information about public enrolments in order to obtain the capitation grant, which is separate from the information contained in the census form. Clearly, if the two were linked there would be increased incentives for schools to submit such information.

A number of interviewees also raised the issue of **data quality**, especially in relation to the **quality of learning** that occurs in the classroom. In the past pupils in basic education were assessed using continual assessment and a final examination. The final examination result represented 70% of the total mark, while the continual or formative assessment represented 30%. If students were successful they received a Basic Education Certificate Examination. However, teachers did not like the additional work load associated with the continual assessment process, and so in a large number of cases the examination results were made up, resulting in records of higher examination passes than were actually achieved. In an attempt to ensure that the results are a true reflection of student achievement a number of reforms have been introduced into the curriculum and assessment procedures. Instead of the students being continually assessed through examinations, they are now assessed using a combination of course work and final examinations. This reform is now is in the process of being implemented and it is hoped this will help improve quality

There are also **problems** relating to the **analysis of data**. This occurs due to the fact that there are **two major sources of data** for the MOES at the pre-tertiary level. First, there is the data contained in the annual performance review produced by the PBME. Second, there is the data produced by SHRIMPA in the annual digest of statistics. The

data contained in these publications come from the same source, namely the census. However, the PBME has performed additional calculations on the census data in order to identify missing data. There is some debate on the accuracy of such calculations. According to interviews the census data covers around 90% of public schools and around 80% of private schools. Moreover, in the past the census data just collected information on school levels, as opposed to the number of schools. For instance, if a school contained a kindergarten and a primary school they would be required to complete two census forms. Understandably, this would result in the double counting of students, facilities and staffing levels, all of which could lead to inaccurate information. Moreover, the lack of coverage of private schools is difficult to estimate from on past records since new schools are opening all the time and others are closing. Given these problems it is not difficult to see why questions have been raised about the accuracy of data, especially when estimations are made on the number of schools not covered by the census.

The process of **data collection** for **pre-tertiary education** in Ghana has been **complicated** by a **school mapping project** funded by UNICEF. About three years ago UNICEF in conjunction with JICA started a nation wide survey to map primary schools and collect data on the wider community in which schools were located. This involved working with all district offices in the process of data collection. The rationale behind this approach was that the census data was collected centrally from the MOES and the local districts did not have an input. As a consequence under this new project districts were actively involved in the process of school mapping (as opposed to being excluded). This process might create a problem since the findings could be in conflict with those obtained from the census due to the issues of timing and methodologies. According to JICA this data is more accurate since it includes data about private schools (an area that was neglected within the census data until recently). There were also recent announcements from the MOES that the data from school mapping will be used as the basis for developing district operational plans. Part of the downside of the mapping exercise is that data will only be collected every four years, as opposed to the annual census. This is a long time lag and could result in the district plans being based on data that are out of date.

The census questionnaire for pre-tertiary education collects data on the following:

- Number of schools
- Number of school building (ie some schools are sharing the same facilities)
- Number of classes per school
- Enrolment by sex and grade
- Teachers by sex and rank
- Non teaching staff by rank and sex
- Basic Education Certificate Examination

Additional information is also collected on the following:

- Indicators for ESP
- Enrolment ratios
- Percentage of girls
- Percentage of trained teachers

- Pupil teacher ratio

Other sources of data for pre-tertiary education

It should also be noted that **data** is being collected for basic education using **other mediums**. For example, monitoring data is collected in connection with the recent introduction of the **capitation grant**. Under this process the grant received by a primary school will be determined by the number of pupils. In order to receive this capitation grant the schools have to submit figures on the number of students that will be enrolling in new class. This submission is based on the assumption that the number of pupils who complete one level of education will enter the next year. The school receive 50% of the capitation grant for submitting this information. Then, the school will have to submit additional information when the new starts with figures on the actual new numbers in the new class. Only then will the school receive the remaining 50% of the capitation grant for each child.

The **proposed plans** for the data management and collection are **ambitious**. If they are successful they will help Ghana to achieve a **comprehensive systems for the management and utilisation of data** at all levels of the education system. Moreover, it will also help the government to move towards **a demand driven system** in which all levels of the education system use data for planning purposes. However, there are a number problems with the present system, relating to the collection, collation and analysis of data. These have been recognised in the enhancement and expansion plans, and attempts are being made to check the validity of collected information and to ensure that capacity is developed within the system at all levels.

However, it is important that these reforms are fully supported from head office in order to ensure successful implementation. This will help to ensure that those working in EMIS offices at the district and regional offices have full job descriptions and understand their role in the collection, collation and analysis of data. It is important that additional attention is given to maintaining the existing IT networks and systems, including those that are about to be installed in the district and regional offices. During the present study the researchers visited two regional offices, one in greater Accra and the other in Cape Coast, and found that no computers were operational. Understandably, this constrained the collation of data and prevents the production of reports, all of which can impact negatively on the perception of EMIS. Clearly, it is important that a maintenance strategy for IT needs to be developed by head-office in order to ensure the effective and efficient operation of IT equipment in the collection, collation and analysis of data. It would appear that these reforms are helping the system to move towards a demand driven approach, but is equally important that schools are part of this process. The evidence from the field work suggested that head-teachers could not see the benefits of completing the census forms. Incentives are required in order to ensure that these forms are completed and valid. One mechanism for ensuring that this occurs is to link the capitation grant to the collection of the census form. Nevertheless, a mechanism is still needed to ensure that demand for educational data exists at the school and community level.

Data collection at other levels of the education system

Outside of pre-tertiary education data are just collected for higher education and non-formal education. The process of data collected within higher education is more clearly defined than in other sectors. Data is collected from each university, polytechnic and professional institution on the following:

Application for admission by gender and faculty
Applicants qualified for admission by gender
Admission offers by gender and faculty
Full-time enrolments by gender, school and course
Graduate output by gender, school and course
Academic staff by gender and school
Part-time academic staff by gender and school
Full-time academic staff in research units
Student accommodation

This information is collected without any of the problems encountered in pre-tertiary education. It is possible to analyse this information over time. Not only does this reflect the fact there are clear lines of responsibility between institutions and the MOES, but also that universities have the capacity to collect, collate and analyse this data. Questionnaires are used to collect this information by hand. This data is put directly onto a data base for analysis and feeds directly into funding. The level of funding an institution receives is determined by its age, the number of students and costs associated with delivering a specific subject.

Within **non-formal education** the collection of **data** involves a number of **stages**. The Regional Offices collects data from the District Offices who in turn collect data from what is called literacy zones (each literacy zone contains 15 classes). Data is collected on number of learners, attendance, drop-outs and facilities. Responsibility for this data collection rests with a facilitator. These facilitators are volunteers and are not paid, but they receive a bonus if they maintain 75% of their learners over the learning cycle and achieve literacy pass rates of 80%. Each learning cycle lasts for a period of 21 months. The later is judged through an exit test which has to be completed by all learners. These facilitators receive training on pedagogical methods and also on how to capture the information. Each class must meet for a minimum of 6 hours per week. The facilitators capture initial data on a registration form which is completed by all learners and then monitoring information is captured on attendance, drop-out and facilities. A supervisor from head-offices makes regular visits to each class in order to ensure that the correct pedagogic methods are being followed and than record keeping takes place. Every four months this recorded information is sent to the Non-Formal Education Division and they compile a report in order to identify attendant rates, drop-outs and other issues affecting non-formal learning within each region. Subsequent meetings are held between head-office and each regional centre in order to review this report and take appropriate action if necessary.

7. Technical Issues associated with EMIS

- *There are proposals to develop a web-based solution for EMIS based on the standardised package developed by the UNESCO Institute for Statistics*
- *Major capacity development and the provision of new equipment will be required for this enhanced IT infrastructure*

Some of the early developments associated with the ICT infrastructure supporting EMIS are similar to those experienced in other countries, namely the use of outdated and fragmented software which prevents the retrieval of time series data, all of which made it impossible to undertake an analysis of such trends. Similarly, the data bases were developed using MS Access and as a consequence had limited storage capacity or ability to link with data sets produced by other government organisations.

In order to overcome these limitations there are proposals to change the whole ICT infrastructure supporting EMIS. There are plans to replace MS Access with Oracle in order to ensure that platforms for EMIS are the same as those for other government departments, enabling data sets to be merged and compared. Other plans are also being made to ensure that users and stakeholders needs are taken into account when designing future systems, including those relating to the types software to be used for the system. Indeed, it is anticipated that future EMIS applications will utilize N-tier based architectural framework to develop various components. However, with regard to the EMIS software this will rely a package that has been specifically developed by the UNESCO institute for statistics (UIS). The UIS will meet the needs of Ghana's EMIS with minimal modifications.

The proposed plan for **IT infrastructure** in order to support the proposed expansion and enhancement plans for EMIS are very ambitious. Over the next four years it is anticipated that a **live system** will be developed. However, at present only the data entry component has been completed and each District will have the same data entry mechanisms. It is hoped that by the end of February 2005 a common reporting template will be developed covering all targets associated with the ESP. This would enable districts to input information and enable them to automatically track progress towards defined targets at the district level. Then, a template will be developed to facilitate data analysis. This would enable the districts to undertake cross tabs and perform their own calculations (to be completed by April 2005). Under this proposal all District regional data bases would be connected to a web enabled system at head-office. This would create a live system and information would be available on demand at all levels. However, the existing system faces a number of serious constraints which are yet to be resolved. Lack of computer equipment is a major problem facing the country, particularly at the district office where only 50 offices have computer facilities. Equally significant is the lack of job description for staff working in these offices. Despite the fact that new appointments have made to support and job titles given to these staff they have no job descriptions.

8. Dissemination of EMIS outputs

- *Dissemination of information remains limited, central government being the main user*
- *Information is available for other stakeholders but not in readily utilised formats*

An equally important part of managing EMIS concerns how the information is disseminated. For data on pre-tertiary education there are **no incentives** exist for other **stakeholders** to make use of EMIS outputs. At present there are **no** comprehensive **strategies for disseminating EMIS** outputs and the only mediums using such data are: (i) an annual digest of statistics, (ii) an electronic copy of the digest of statistics and (iii) the education sector performance report. However the annual digest of statistics has not been widely distributed to stakeholders. Moreover, it has limited value since it contains raw data and no analysis has been conducted of trends over time. Therefore, it would not be possible to compare district performance or identify progress towards specific targets. In theory, the electronic copy of the digest of statistics is a much better idea. This could have enabled districts to have a copy of the data for purposes of planning. However, the information on the CD was recorded on pdf format and so district offices were not able to perform their own analysis. At the time of the field work numerous copies of the education sector performance report had been produced, but they had no been disseminated. These could resolve some of the short-comings of the former publications, but it is important some more serious attempts are made to produce the data in a format that is readily usable by district offices and stakeholders.

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Annex 1: List of People Interviewed

Angie		UNESCO Institute for Statistics
Mr Colemen	Head of EMIS	MOES
Mr Glover	Director of NCCTVET	National Coordinating Committee for TVET
Mr Does	Coordinator of EMIS for Non-Formal Education	Non Formal Education Division MOES
Ms R Dwyer	ODI Fellow	Budget, Planning and Monitoring Unit
Mr A Essumam	Chief of Director Education	MOES
Mr M.Nsowah	Director General of GES	Ghana Education Services
Mr K. Neuman	Team Leader	EU project Cambridge Education
	Financial Control	DfID funded post within MOES
Ms L. Breckwell	Consultant	Capacity Building within Budget, Planning and Monitoring Unit
Mr Foster		
	Head of Tertiary Council	
Mr E Akrli	EMIS coordinator	National Coordinating Committee for TVET
Mr D Hodem	Regional Education Officer	Regional Education Office, Outer Accra
Mr J.D. Asare	Assistant EMIS Coordinator	Regional Education Office, Cape Coast

Annex II Policy Framework Guiding the Education Strategic Plan (ESP)

Area of Focus	**Policy Goal**
1. – Equitable Access to Education	1.1 Increase access to and participation in education and training (policy goal 1)
	1.2 Promote and extend pre-school education (policy goal 8)
	1.3 Provide Girls with equal opportunities to access the full cycle of education (policy goal 10)
2 Quality of Education (QE)	2.1 Improve quality of teaching and learning for Enhanced pubil/student achievement (policy goal 2).
	2.2 Promote good health and environmental sanitation in schools and institutions of higher learning (policy goal 4)
	2.3 Improve the quality of academic and research programmes (policy goal 7)
	2.4 Identify and promote programmes that will assist in the prevention of HIV/AIDs (policy goal 9)
3.Educational management	3.1 Strengthen and improve educational management (policy goal 5)
4. Science, technology and TVET	4.1 Extend and improve TVET (policy goal 3
	4.2 Promote and extend the provision of science and technology education and training (policy goal 6).

Annex III: Increase Access to and Participation in Education and Training (Policy Goal 1)

Policy Objectives	Indicative Target	Strategies	Start by
Provide and ensure access to free basic education	GER in primary schools to rise from 79% in 2002 to 100% by 2010 □ 100% completion rate by 2015 at Primary level GER in junior secondary schools to rise from 62% in 2002 to 75% by 2010 and 90% by 2015 Average national PTR in primary schools to increase from 33:1 currently, to 35:1 by 2010 and at least maintained thereafter Average national PTR in junior secondary schools to increase from 18:1 currently, to 22:1 by 2010 and 25:1 by 2015 Universal Primary Completion by 2015	1.Conduct school mapping of primary and junior secondary schools 2. Write policy guidelines as to what constitutes 'fee-free' and 'cost-sharing' (i.e. enforcing the abolition of fees and levies and the introduction of capitation grants for basic education, and ways to implement cost sharing at the post-basic level) 3. Circulate to all deliverers within the education system. 4. Circulate guidelines to the districts, regions and other stakeholders 5. Monitor schools to ensure adherence to guidelines on fees/costs. 6. Determine physical infrastructure needs for basic schools 7. Determine teacher needs for basic schools according to establishment norms 8. Prepare and implement a 3-year rolling plan to develop physical infrastructure in basic schools 9. Prepare and implement a 3-year rolling plan to develop teacher deployment according to needs in basic schools	2003